

**THE ROLE OF KNOWLEDGE MANAGEMENT IN THE
SUSTAINABLE DEVELOPMENT
OF
LAKE VICTORIA BASIN**

by

Mary Waruguru Mwangi

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for the degree of**

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Supervisor: Prof. Patrick Ngulube

Co-supervisor: Dr. Isabel Schellnack-Kelly

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DECLARATION

“I declare that “**The role of knowledge management in the sustainable development of Lake Victoria Basin**” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.”

Signed: _____ Date: _____

DEDICATION

This work is dedicated to my beloved son **Ryan**. Thank you for the love, patience and understanding that you have given me throughout my studies.

God bless you.

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Like with every other rigorous undertaking in life, in actualising this study, I had the goodwill, and unwavering support of many individuals without whom this work could only be visualized.

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LIST OF ABBREVIATIONS AND ACRONYMS

| | | |
|----------|---|---|
| ADB | – | Asian Development Bank |
| ANet | – | Arista Networks |
| APO | – | Asian Productivity Organisation |
| CBO | – | Community-Based Organisations |
| CORMA | – | Practical Tools for Corporate Knowledge Management |
| EAC | – | East African Community |
| FNCSD | – | Finish National Commission on Sustainable Development |
| HIV/AIDS | – | Human Immunodeficiency Virus /Acquired Immune Deficiency Syndrome |
| HP | – | Hewlett-Packard |
| HTML | – | HyperText Markup Language |
| IBM | – | International Business Machines Corporation |
| ICT | – | Information Communication Technology |
| IMF | – | International Monetary Fund |
| K-Logs | – | knowledge Blogging |
| LVB | – | Lake Victoria Basin |
| LVBC | – | Lake Victoria Basin Commission |
| LVEMP | – | Lake Victoria Environmental Management Programme (I and II) |
| LVFO | – | Lake Victoria Fisheries Organisation |
| LVWATSAN | – | Lake Victoria Region Water and Sanitation Initiative |
| MDGs | – | Millennium Development Goals |
| NBI | – | Nile Basin Initiative |
| NELSAP | – | Nile Equatorial Subsidiary Programme |
| NGO | – | Non-Governmental Organisation (s) |
| NHS | – | National Health Service |
| OECD | – | Organisation for Economic Co-operation and Development |
| PDF | – | Portable Document Format |
| SECI | – | Socialisation, Externalisation, Combination and Internalisation |
| TOP | – | Technology, Organisation and People |
| UN | – | United Nations |
| UNCED | – | United Nations Conference on Environment and Development |

| | | |
|------------|---|--|
| UNCSD | – | United Nations Conference on Sustainable Development |
| UNDP | – | United Nations Development Programme |
| UNEP | – | United Nations Environment Programme |
| UNESCO | – | United Nations Educational, Scientific and Cultural Organisation |
| UNESCWA | – | United Nations Economic and Social Commission for Western Asia |
| UN-Habitat | – | United Nations Human Settlements Programme |
| UNIDO | – | United Nations Industrial Development Organisation |
| UNU-INWEH | – | United Nations University - Institute for Water Environment and Health |
| WCED | – | World Commission on Environment and Development |
| WEDC | – | Water, Engineering and Development Centre |
| WWW | – | World Wide Web |
| XML | – | Extensible Markup Language |

ABSTRACT

The Lake Victoria Basin (LVB) is endowed with natural resources which are drivers for sustainable development at local, national and regional levels. However, these resources are adversely affected by dynamic social, economic, environmental and political factors. Poor coordination and ineffective knowledge management programmes among various players within the LVB has led to duplication of efforts as substantial information and knowledge generated is unavailable to users. As a result, over-exploitation of natural resources has resulted in unsustainable development of the LVB.

This study sought to establish the role of knowledge management in promoting sustainable development of the LVB. Specific objectives were to: determine the role of knowledge management in sustainable development of LVB; determine challenges and barriers hindering effective knowledge management; establish tools and technology that can be used to enhance knowledge management; and establish the strategies used by organisations in LVB to manage knowledge generated for sustainable development.

A descriptive survey design was used in this study targeting 98 (with 76.5% response rate) officers of various ranks working in 26 organisations involved in development programmes/projects and located in the five partner states within the LVB. Data was collected using self administered questionnaires and a desk review.

Findings showed most respondents agreeing that knowledge management is a systematic utilisation of policies, processes, activities and tools which empower organisations to apply knowledge to improve effectiveness, innovation and quality. Up to 93.9% of the organisations facilitated discovery, capture, storage and retrieval of knowledge. Most organisations encouraged documentation of lessons learnt, with some making it mandatory to deposit key documents in the library.

Paper-based media was the most preferred knowledge storage format. Lack of an open-minded sharing environment, bureaucratic procedures and poor information systems were the common barriers to knowledge management, while lack of time (68.4%) was an obstacle to proper

documentation. The internet was the most popular knowledge management tool/technology; though technical issues were the most critical problems affecting ICT use (71.4%).

Based on these findings, this study recommends a holistic and coordinated approach to knowledge management among all institutions working in the LVB to address the challenges of sustainable development in the basin.

Keywords: Knowledge management; sustainable development; Lake Victoria Basin

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

Knowledge management (KM) is concerned with the exploitation and development of the knowledge assets of an organisation with a view to furthering the organisation's objectives (Davenport and Prusak 1998:5). The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge (Davenport and Prusak 1998:5). However, the meaning of the word knowledge has been subject to different interpretations and resulted in several dimensions through which it is examined. Laudon and Laudon (2005:373) describe knowledge as concepts, experiences and insight that produce a framework of creating, evaluating and using information. On the other hand, Singh (2007:170) defines knowledge as a state of mind, achieved with the coupling of understanding and cognition. This study will adopt the definition further provided by Davenport and Prusak (1998:5) that knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. In organisations, knowledge is embedded in documents, repositories and also in work routines, processes, practices, and norms.

In the context of the above definition, knowledge is understood as a strategic resource that offers a competitive advantage in organisations (Halawi, Aronson and McCarthy 2005:75). Similarly, Stewart (2001:12) acknowledges that knowledge is the "most important raw material" in an organisation and hence the need to manage it strategically. Ward (2007:16) posits that, knowledge assets of any company – rather than plant, capital or other traditional assets – are what, today ensure its competitive edge. This is also echoed by Drucker (1993:8) who notes that in today's economy, the most important resource is no longer labour, capital or land, it is knowledge.

With the importance of knowledge as a strategic resource in mind, it has become vitally important to manage this resource within an organisation. Knowledge management is a

conceptual framework that covers all activities and initiatives necessary to organise the knowledge assets of an organisation and add value to them so that they can be used for the benefit of the organisation in attaining its goals and objectives (Schwikkard and Du Toit 2004:105). The famous statement “if only we knew what we know now” prompted the idea of capturing, sharing and applying knowledge within and across organisations (Metaxiotis, Ergazakis and Psarras, 2005:6). The former South African Premier Thabang Makwetla, while delivering a keynote address at the Mpumalanga provincial government and public sector unions’ service delivery summit, stressed the need for government and public organisations to become learning organisations which manage knowledge as the valuable resource it is (Makwetla 2004). The Premier further noted that:

If we cannot learn from our own experiences, how can we learn from anyone else? If we do not know what we already know, how do we identify new areas of learning, and adapt the knowledge of others to our realities? (Makwetla 2004).

According to Hanson and Kararach (2011:9) knowledge that is readily accessible to key decision and/or policy makers is central to managing innovation, promoting sustainable development and achievement of Millennium Development Goals (MDGs) in Africa. Hamel (2005:14) notes that as we move forward into the new century, superior development knowledge bases, knowledge assets and knowledge capital including but not limited to scientific and technical knowledge, are conceivably the ultimate development resources for realising the transition to sustainable development.

This study focuses on the role of knowledge management in promoting sustainable development. Sustainable development has been described as the development that is self-sustaining and meets the needs of present and future generations (Steer and Lutz 1993:13; World Bank 2002). According to Omotola (2006:25), sustainable development is that development that does not roll back or recede, even in the face of threatening reversal waves. Further, it is the development that can guarantee the protection of the environment and resources today and tomorrow. The World Commission on Environment and Development (WCED) (2007:43) defines sustainable development as the “ability to make development sustainable to ensure that it meets the needs of

the present without compromising the ability of future generations to meet their own needs.” According to the United Nations Conference on Sustainable Development (UNCSD 2012:1) sustainable development comprises of three dimensions: economic, social and environmental facets which are inter-linked. According to Fink (2008:7) the issues of sustainable development are not restricted to national borders. Problems concerning efficient use of resources, poverty or pollution are predominantly of an international nature. Tackling the issue of sustainable development from a long-term perspective demands a sufficient national knowledge base and increased international cooperation to ensure sufficient knowledge transfer and promote capacity building.

1.2 Background to the study area



Figure 1.1 Map of Lake Victoria Basin (LVB)

(East African Community (EAC), 2006)

Figure 1.1 is a visual illustration of the Lake Victoria Basin. The size of Lake Victoria Basin (LVB) is 194,000 square kilometres, with the Lake surface covering an area of 68,800 square kilometres (EAC 2006:1). The Basin area cuts across the five East African Community Partner States namely the Republics of Kenya, Uganda, Burundi, Rwanda and the United Republic of Tanzania. The LVB is endowed with natural resources including trans-boundary resources that are drivers for sustainable development at the local community, national and regional levels. These include; fresh water, fish, minerals, wildlife, biodiversity, land, forests, wetlands, mountainous ecosystems, energy resources and other natural resources which provide unique opportunities for socio-economic development (Okurut and Weggro 2011:3). However, these resources are adversely affected by dynamic social, economic, environmental and political factors including; unsustainable use of the resources resulting from population growth and pursuit of economic growth, increased pollution, weak environmental education and capacity building, poor public participation and access to information, environmental disasters, climate change, weak institutional, legal and regulatory frameworks for environmental and natural resources management and governance (EAC 2012:3).

In addition, according to the United Nations Human Settlements Programme (UN–Habitat) (2008:15), the Lake Victoria Basin inhabitants are highly dependent on land-based and aquatic resources for their livelihoods. This is partly because a large percentage of the population within the basin lives below the poverty line (less than a dollar a day) (Okurut and Weggro (2011). Driving and sustaining the agenda of sustainable development in circumstances where the poor populations are inextricably tied to natural resources for survival is more challenging but yet it has to be done for the future we want (Okurut 2012:26).

Rapid urbanisation is also placing enormous pressure on the basin particularly on the aquatic resources within Lake Victoria. UN–Habitat (2008:16) observes that just like many towns within the Lake Victoria Basin have grown over the past decades, so has the level of pollution that these towns discharge into the local waterways, finally ending up in the lake. Therefore, although urbanisation drives economic growth, it also brings with it serious challenges, which without policy, physical planning and institutional reforms can lead to unsustainable development as well as environmental degradation and subsequent health problems.

As a result, Lake Victoria Basin resources have come under intensive pressure that has been exacerbated by three major factors:

- (i) high and rapid population growth rates;
- (ii) rapid expansion of unplanned urban and rural settlements that lack basic infrastructure, water and sanitation provision; and
- (iii) lack of expert knowledge in sustainable land and water resources management and practices at the local and sub-basin levels (UN-Habitat 2008:15).

Much of the socio-economic challenges facing the Lake Victoria Basin are directly linked to poverty, especially among the many rural communities living in the basin and relying heavily on subsistence farming. A high incidence of HIV and AIDS in the region, with a prevalence of more than 40% in the basin, puts an enormous socio-economic burden on basin communities (UN-Habitat 2008:26).

Ongoing management challenges are closely linked to the rich natural resources found within the Lake Victoria Basin (Verschuren, Johnson, Kling, Edgington, Leavitt, Brown, Talbot and Hecky 2002). These resources, especially fish, have attracted many stakeholders with diverse interests. However, lack of coordination among the various individuals, associations, organisations and these stakeholders operating within the basin have led to duplication of efforts and often ineffective knowledge management programmes aimed at addressing problems arising from resource use and extraction. The overall ineffectiveness of efforts to address these challenges has caught the attention of the riparian countries and alerted them to the need for cooperative management through an ecosystem approach.

The East African Community (EAC) designated the Lake Victoria Basin as an “area of common economic interest” and declared it a “regional economic growth zone” to be developed jointly by the EAC Partner States (EAC 2007:16). With that declaration, the Partner States committed to ensuring proper management and sustainability of the Basin’s resources for the benefit of present and future generations through the ratification of the Protocol for Sustainable Development of

the Lake Victoria Basin (EAC 2003). Following that declaration, Lake Victoria Basin became the focus of new attention both at national, regional and international level and thus the need for rational utilisation and management of resources, within the Basin. Indeed, most of the institutions and agencies operating in the Lake Victoria Basin have development and sustainability as the thread linking their interventions.

In 2004, the EAC Council of Ministers adopted a Shared Vision and Strategy Framework for management and development of the Lake and its Basin. The shared EAC vision for Lake Victoria Basin is to have “a prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits” (EAC 2007:16). With this background, the EAC Partner States committed to ensuring proper management and sustainability of the Basin’s resources for the benefit of the present and future generations through the ratification of the Protocol for Sustainable Development of the Lake Victoria Basin. The Protocol led to the birth of Lake Victoria Basin Commission (LVBC), a specialised institution of EAC mandated with the responsibility of promoting and coordinating the activities of various actors in the Basin for the sustainable development of the Lake Victoria Basin.

Given the importance of LVB, several stakeholders including universities and research institutions, public and private, have undertaken programmes, projects, studies and other initiatives with the aim of promoting sustainable development efforts in the Lake Victoria Basin. As a result, substantial information and knowledge has been generated but little is available in a useful format accessible to stakeholders (Bertilsson 2005:6). Some of the notable examples of key players in the management of Lake Victoria Basin resources include:

- i. Lake Victoria Basin Commission
- ii. The TransVic Project;
- iii. Nile Basin Initiative;
- iv. Agroforestry Programme;
- v. Lake Victoria Fisheries Organisation;
- vi. Lake Victoria Environmental Management Programme phase I and II;
- vii. Lake Victoria Region Local Authorities Cooperation;
- viii. Lake Victoria Research Initiative;

- ix. The East African Sustainability Network;
- x. Lake Basin Development Authority;
- xi. Rwanda Initiative for Sustainable Development; and
- xii. Trans-boundary Agro-ecosystem Management Project for the Kagera River Basin.

However, despite the large number of organisations, institutions and stakeholders involved at different levels in the management of Lake Victoria Basin resources, the management of knowledge generated is still poor (EAC 2007). According to the report (EAC 2007) poor cooperation and/or coordination among different actors has been singled out as an impediment.

1.3 Research problem

Lake Victoria Basin being a trans-boundary region which is endowed with rich natural resources is home to a population of about 38 million people (Okurut and Weggoro 2011:12). As a result, there is over-utilisation and exploitation of the natural resources which has led to numerous environmental and social challenges that are highly inter-dependent. In order to achieve sustainable development, there is need, therefore, to embrace a holistic and coordinated approach to address the challenges for the benefit of the current and future generations. According to Fink (2008:1) adequate knowledge should be seen as a pre-condition for effective governance structures focusing on sustainable development.

Over the years, several organisations have implemented projects and programmes geared towards sustainable development of the Basin leading to generation of considerable amount of information and knowledge. The resultant knowledge base is not readily accessible and is scattered in various institutions in and outside the EAC region. Bachou, Nyantah and Ichang'i (2005:43) observed that the major limitation to knowledge management is lack of strategies, policies and guidelines to facilitate information sharing, dissemination and awareness. A key example is the Lake Victoria Environmental Management Programme Phase I (LVEMP I) which was implemented by the riparian countries of Kenya, Tanzania and Uganda. This regional programme was aimed at restoring a healthy and stable lake ecosystem that can support, in a sustainable way, the many human activities in the catchment area and in the lake itself (Bachou, Nyantah and Ichang'i 2005:ii). During the implementation of LVEMP I, significant gains in

knowledge acquisition through research and capacity building were made. Unfortunately, this valuable knowledge base is not accessible to majority of stakeholders who need knowledge for decision making and management of the resources. This was attributed to lack of a knowledge management strategy in the design of LVEMP I and lack of a centralised location for storage and dissemination after the completion of the project.

Furthermore, organisations in the Basin often waste valuable time and resources in ‘reinventing the wheel’ or failing to access the highest quality knowledge and available expertise. Developing knowledge management strategies within institutions in LVB will promote the harnessing of knowledge resources and building a knowledge base to support sustainable development within the region. This will facilitate access, sharing, use, and replication of knowledge by all stakeholders. In the absence of knowledge management strategies, the emphasis is for each institution to collect and store information and knowledge at the expense of dissemination and sharing with other stakeholders. This results in duplication of efforts and resources which makes it difficult to make informed policy and management decisions on the Lake Victoria Basin.

UNU-INWEH (2011:20), while developing lessons in Lake Twinning,¹ notes that organisations depend on sound information to manage natural resources and meet local and global challenges. The information they need flows not only from academic research, but also from management-driven research that seeks answers to real problems. Investment in knowledge creation, knowledge transfer, and development of innovative approaches will ensure that results of all kinds of research are available to decision makers so that policies are based on a solid foundation. However, while knowledge management, dissemination and sharing is regarded as important in informing future projects and programmes, Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udejaja (2006), Carrillo (2005) and Garon (2006) note that most projects are unable to capture, codify and use knowledge in subsequent projects due to their design. According to Zedtwitz (2003) there is a frequent suggestion in literature that projects do not often reuse the lessons learnt from previous projects.

¹ Twinning is a method used by organisations to enter into a well structured relationship aimed at exchanging knowledge and experiences.

It is against this background that this study sought to establish the role of knowledge management for sustainable development of East Africa's most treasured trans-boundary natural resource, the Lake Victoria Basin.

1.3.1 Research gaps

The studies that have been reviewed indicate that the component of knowledge management among organisations involved in sustainable development projects has not been adequately addressed. Even though similar studies have been carried out elsewhere by Oluikpe (2007), Voccia (2011) and Ajmal and Koskinen (2008), there are no studies that have specifically addressed the role of knowledge management for the sustainable development in the Lake Victoria Basin area. According to Ondari-Okemwa (2006), the concept of knowledge management is relatively new to many organisations based in the Sub-Saharan region of Africa. The objective of this study is to proffer answers to the existing gap.

Oluikpe (2007) investigated the role of knowledge management in enabling development projects management achieve their objectives in Africa. The case studies are based on Nigeria, Uganda and Senegal. Oluikpe's (2007) study recommends that development projects should begin with the mapping of essential knowledge needed by the project, determining where this knowledge lies and how to leverage it. In addition, Oluikpe's (2007) study recommends that knowledge management should be seen as a component part of project management. Oluikpe (2007), however, notes that there are not many studies conducted on knowledge management in development projects, hence the need for further research. Further on, Voccia (2011) acknowledges that the application of knowledge in development projects is relatively a new concept when compared with the practice of knowledge management in profit-making organisations. With regard to the strategies and tools of knowledge management, Ajmal and Koskinen (2008) are of the opinion that unlike mainstream organisations with well-defined long term objectives, project-based organisations need unique approaches to knowledge management.

This study contributes to that body of knowledge. The study is also intended to establish the unique knowledge management strategies applicable to the trans-boundary field in developing countries.

1.4. Purpose of the research

The purpose of the study was to determine the role of knowledge management in promoting sustainable development of Lake Victoria Basin. To achieve the purpose, the study set out five objectives as discussed below:

1.4.1 The objectives of the study

The primary objective of the research study was to determine the role of knowledge management in promoting sustainable development of Lake Victoria Basin. The specific research objectives were:

- i. to establish the role of knowledge management in the sustainable development of Lake Victoria Basin;
- ii. to determine the challenges and barriers that hinder effective knowledge management in Lake Victoria Basin and how to overcome them;
- iii. to establish the tools and technology that can be used in enhancing knowledge management in Lake Victoria Basin; and
- iv. to establish strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development.

1.4.2 Research questions

To achieve the above objectives, the researcher sought to answer the following questions:

- i. What is the role of knowledge management in relation to sustainable development?
- ii. What are the challenges and barriers to knowledge management in the sustainable development of Lake Victoria Basin?
- iii. What are the tools and technologies that can be used to enhance knowledge management for the sustainable development of Lake Victoria Basin? and
- iv. What are the knowledge management strategies that can be used by organisations in the LVB to manage knowledge generated?

1.4.3 Significance of the study

This research is useful because it contributes new knowledge and its findings can be used

practically by stakeholders in the Lake Victoria Basin. The following groups, organisations and /or institutions are expected to find these research findings and recommendations especially useful:

1.4.3.1 Development organisations within Lake Victoria Basin

This study contributes valuable information to the field of knowledge management and how the same can be utilised in supporting sustainable development within LVB. It is expected that the findings and recommendations, when shared with the stakeholders, will contribute towards the achievement of sustainable development.

1.4.3.2 Communities living within LVB

Through implementation of the recommendations from this study, knowledge generated will be readily accessible to the local communities, as well as the information on resources and their judicial exploitation. This will enhance the participation of the communities in the sustainable development agenda of the LVB. The recommendations could also benefit, if adapted, other organisations in other regions outside LVB that are involved in managing shared resources across borders.

1.4.3.3 The academia

The study contributes valuable knowledge to the field of knowledge management for sustainable development. This should add to both the theory and practice in this field as the academia strives to link knowledge management and sustainable development of a region.

1.5 Definition of key concepts

Knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experience and information (Davenport 1998:5). Knowledge can be categorised into two types: tacit and explicit as identified by Collins (2010), Dalkir (2005), Awad and Ghaziri (2007), and Nonaka and Takeuchi (1995).

Tacit knowledge is embedded in the individual's mind through work experience. It includes lessons learnt, know-how, judgement, rules of thumb and intuition, which are characteristics of

learning organisations (Wen 2005). It also includes values and work related instincts that emanate from day to day work experience. Tacit knowledge represents internalised knowledge that an individual may not be consciously aware of, like how he or she accomplishes particular tasks using processes that have not been documented. Little, Quintas and Ray (2002:11) observe that it is largely intuitive and involves personal beliefs, perspectives and values. According to Mutula and Wamukoya (2007) tacit knowledge can be acted upon, but cannot be expressed.

Explicit knowledge is the knowledge that is codified and transmittable in databases, documents and manuals (Botha, Kourie and Snyman 2008). Explicit knowledge represents knowledge that the individual holds consciously in mental focus, in a form that can easily be communicated to others (Niebuhr 2000:23). It is therefore fairly easy to identify, store, and retrieve (Wellman 2009).

Both types of knowledge, tacit and explicit exist in all organisations. A well-structured and established organisation will have both types of knowledge in balance. It simply means that tacit knowledge confined in the staff is actively captured and transformed into explicit knowledge. However, for most of the organisations, tacit knowledge is the main knowledge type as the activity of transforming the knowledge into documented and digitised form are not easily done. Whichever type of knowledge that is available in the organisation, the knowledge must go through processes that will eventually make the knowledge valuable and usable to the organisation.

Knowledge management is the deliberate and systematic coordination of the organisation's people, technology, processes and organisational culture in order to add value through reuse and innovation (Dalkir 2005)

Sustainable development is the “ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED (1987). To build on this definition the Nordic Council of Ministers (2001:7) notes that sustainable development is a process of change in which the utilisation of resources, management of investments, the direction of technological developments, and institutional

changes are brought in line with the present as well as future needs. Roosa (2010:44) defines sustainable development as the ability of physical development and environmental impacts to sustain long term habitation on the planet earth by human and other indigenous species while providing:

- i. An opportunity for environmentally safe, ecologically appropriate physical development;
- ii. Efficient use of natural resources;
- iii. A framework which allows improvement of human conditions and equal opportunities for current and future generations; and
- iv. Manageable urban growth.

1.6 Research methodology

The focus under this section was to briefly address research methodology that was used in this study. The detailed information on research methodology has been given in Chapter Three. In investigating the role of knowledge management in sustainable development of Lake Victoria Basin, a quantitative approach was used. Quantitative research is more formalised and controlled than qualitative research and it has the possibility of replication using different groups as subjects (Ngulube 2009). According to Cooper and Schindler (2008), Oso and Onen (2009) and Ngulube (2009), quantitative research utilises the following methods and techniques:

- i. Conceptualisation of concepts that can be operationalised through measuring instruments;
- ii. Data collection techniques such as structured questionnaires;
- iii. Data analysis techniques that seek to reduce or arrange large amounts of possibly confusing data in graphical form or numerical summaries with the objective of revealing the pattern and answering the research questions.

1.6.1 Research design

Research design is the overall strategy that guides a researcher in collecting, analysing and interpreting data and giving meaning to it (Ngulube 2009:62). This study was conducted through a survey approach. Surveys are used to investigate populations by selecting samples to analyse

and discover occurrences (Oso and Onen 2009). This descriptive design was thus selected to facilitate rapid cost effective collection of data and for its ability to enable one extrapolate the findings from a sample to the whole population. The survey approach was used by Oluikpe, Sohail and Odhiambo (2009) in their study of the role of knowledge management in enabling project management.

1.6.2 Research population and sampling

A research population refers to a body of people or to any other collection of items under consideration for research purposes (Collies and Hussey 2003). For this research, the research population under study consisted of the 26 organisations and institutions involved in development projects in the Lake Victoria Basin (LVB) (EAC 2007 and Ochola 2006). A sample frame was generated. A sample frame is “a list or other records of the population from which all the sampling units are drawn” (Vogt 1993:202). Cooper and Schindler (2008) point out that a sampling frame should be a complete and correct list of research population members only. From the population, a sample of respondents was taken from each of them.

Multiple sampling techniques were utilised in identifying the unit of study. This included cluster sampling, convenience sampling and purposive sampling techniques. Cluster sampling was used to segregate the population into five distinct sub-populations representing the five major geographical divisions of the LVB, a division representing a Partner State. From each cluster isolated, a proportionate number of institutions were picked by convenience sampling technique. The 26 institutions identified were as per the distribution shown in Table 1.1.

Purposive sampling was then used to identify key informants and respondents knowledgeable in the field of study. Lwoga (2009) used this sampling technique because it involves selection of individuals or objects that yield the most information about the topic under investigation. Additional secondary data was also obtained from reports, publications and journals.

The sample was obtained from all the 26 organisations and institutions involved in development projects in the LVB. The respondents were chosen using a non-mathematical/convenience method. The respondents for each cluster were judgmentally determined, disproportionately

based on the idea that each was large enough to secure adequate confidence levels and error range estimates (Cooper and Schindler 2008). Table 1.1 below shows the distribution of respondents by their clusters as determined by the researcher.

Table 1.1: Cluster sample

| Samples by Division | Number of organisations | Number of respondents |
|---------------------|-------------------------|-----------------------|
| Kenya | 10 | 40 |
| Uganda | 6 | 24 |
| Rwanda | 2 | 8 |
| Burundi | 3 | 12 |
| Tanzania | 5 | 20 |
| Total | 26 | 104 |

1.6.3 Data collection

This section discusses the two data collection techniques that were used in this study, namely; questionnaires and document analysis.

1.6.3.1 Questionnaires

A questionnaire is a research instrument consisting of a series of questions to which a respondent is expected to react, usually in writing (Oso and Onen 2009). A covering letter (Appendix I) together with a questionnaire (Appendix II) was administered to each of the respondents from the selected sample population who comprised of senior managers/executives, project coordinators, information specialists and information technology officers. Given the vast geographical coverage of the study, Lake Victoria Basin, this tool provided the researcher with the capability to collect information cost-effectively over a short period of time. Pre-coded close ended questionnaires were used to enable a speedy process and included open ended sections that allowed respondents to share views that may not have been previously envisaged by the researcher. Pre-coded close ended questionnaires were used by Tyler, Bibri and Tyler (2007) in their survey on strategic sustainable development and knowledge management.

1.6.3.2 Document review

Document review is the critical examination or review of existing public or private recorded

information, published or unpublished documents, articles and project documents and reports related to the topic under investigation. The motivation for such an analysis was to establish patterns of interest within the area of study (Myers 1997). The researcher conducted review of documents from the selected organisations/institutions, reviewed documents served as sources of information to answer the research questions and subsequently meet the research objectives.

1.6.4 Data analysis

The data collected was organised and presented according to the research questions. This ensured that all relevant data for the exact topic of concern to the researcher was drawn together and also preserves the coherence of the material (Cohen, Manion and Morrison 2007). Once data was collected from the field, and given that the questionnaires were pre-coded, data entry was undertaken using Statistical Package for Social Scientists [SPSS]. This was to allow for the manipulation and viewing of the data. The idea was to try and collect data into a manageable form and construct a narrative around it. The analysis was given by means of descriptive statistics in percentages (Huberman and Miles 1994; Cooper and Schindler 2008).

1.7 Organisation of the dissertation

This dissertation has five chapters organised to give the reader clarity and clear understanding of how the study conclusion and recommendations were arrived at.

Chapter One provides the background information to the study. The chapter also provides the research problem, research purpose, the study objectives and research questions around which the study was conducted. It also defines the key concepts.

Chapter Two is a detailed review of the literature on:

- i. knowledge management;
- ii. the challenges and barriers that hinder effective knowledge management;
- iii. the tools and technology that can be used in enhancing knowledge management;
- iv. strategies used by organisations to manage knowledge generated; and
- v. the role of knowledge management in sustainable development;

A summary and conclusion is made on the literature review and the research gaps that the study deals with are identified.

Chapter Three covers the research methodology used in the study. The chapter details the research design, population and sampling, data collection, validity and reliability, data analysis and interpretation, ethical considerations and how the pilot study was conducted.

The fourth chapter deals with data presentation, analysis and interpretation. The data is presented using tables, figures and narratives and is organised based on the research questions.

Chapter Five is the final chapter and consists of the discussions on the findings in relation to the reviewed literature, conclusions from the study and recommendations. The recommendations are two-pronged: recommendations to institutions and policy makers on areas of improvement and recommendations on areas that could be covered in future research investigations.

1.8. Summary

Chapter One has introduced the study and provided background information on the Lake Victoria Basin. It has also the rationale for undertaking this study as well as the research problem, the aims and objectives, definitions of key concepts discussed, and an overview of the research design and methodology used in the study. It has also outlined the proposed structure of the thesis and a summary of the other chapters that constitute the dissertation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature review is an account of what has been published on a topic by accredited scholars, organisations and researchers. Literature review is a key stage in conducting research because it places the study in context of what others have written (Mouton 2008 and University of Melbourne 2010). The importance of reviewing existing literature, according to Mouton (2008) and Neuman (2006) is to assist the researcher to establish how other researchers have investigated similar problems. Conducting a literature review enables the researcher to understand and internalise the literature of the topical subject at hand in order to show the relevance of the findings relative to the existing body of literature (Henning, Rensburg and Smith 2004:27).

This chapter presents a review of literature in relation to the specific objectives of the study as outlined in Chapter One. Information searches were conducted using reputable electronic journals and books as provided by the library at University of South Africa (UNISA). The researcher also reviewed publications by organisations involved in sustainable development such as the World Bank, United Nations (UN), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), International Monetary Fund (IMF), Organisation for Economic Cooperation and Development (OECD) and the World Commission on Sustainable Development (WCSD). In this chapter, the literature review respectively addresses the following issues: knowledge management; role of knowledge management in sustainable development; the challenges and barriers that hinder effective knowledge management; the tools and technologies that can be used in enhancing knowledge management; and, the strategies used in managing the knowledge generated for sustainable development.

2.2 Knowledge management

Reviewing existing literature on knowledge management informs the current study that there exists multiple and varied definitions of knowledge management. Singh, Shankar, Narain, and

Kumar (2006:110) classified the definitions based on the different theoretical perspectives like the need for knowledge management, its demands, knowledge management practices, knowledge management and information technology, knowledge management processes and the holistic nature of knowledge management.

O'Dell and Grayson (1997:4) view knowledge management as a conscious strategy of getting the right knowledge to the right people at the right time, and helping people to share and place the information into action. This enables the organisation to improve its performance. In their definition, O'Dell and Grayson (1997:4), emphasise three key elements, namely:

- i. Knowledge management as a conscious strategy developed through planning;
- ii. People who generate, transfer and share knowledge through knowledge management processes; and
- iii. The objective of knowledge management is regarded as the improvement of organisational performance.

Other researchers have either supported or questioned this definition. Beckman (1997:30) states that “formalisation of and access to experience, knowledge and expertise that creates new capabilities enables superior performance, encourages innovation, and enhances customer value.” This statement clearly supports the definition of O'Dell and Grayson (1997:4) in that the aspect of planning, people and process is clearly brought out. However, Beckman (1997:30) brings out the issue of creating innovation leading to customer satisfaction. Unlike O'Dell and Grayson's (1997) approach, Davenport and Prusak (1998) view knowledge management as intellectual capital. Davenport and Prusak (1998) contend further that knowledge management is concerned with the exploitation and development of the knowledge assets of an organisation, with a view to furthering the organisation's objectives. Nevertheless, their definition also focuses on planning and processes to achieve the required objectives.

Other definitions that have been given by various researchers have, more or less, the same meaning to that given by O'Dell and Grayson (2007). Gartner Group (2000), for instance, summarises knowledge management as a discipline that promotes an integrated and collaborative

approach to the process of information creation, capture, organisation, access and use. Alavi and Leidner (1999) on their part view knowledge management from a holistic perspective and define it as: a systematic and organisationally specified process for acquiring, organising and communicating, both tacit and explicit knowledge from employees. This process is to enable the employees to utilise the knowledge generated to be more effective and productive in their work. Bounfour (2003:12) defines it as: a set of procedures, infrastructure, technical and managerial tools, designed towards creating, sharing and leveraging information and knowledge within and around the organisation. The definitions given by Alavi and Leidner (1999:5) and Bounfour (2003:12), nonetheless, encompass all the three elements of planning, people and process, also cited by O'Dell and Grayson (2007).

Dalkir (2010:3) defines knowledge management as “the deliberate and systematic coordination of an organisation’s people, technology, process and organisational structure in order to add value through reuse and innovation”. Further Dalkir (2010) points out that coordination is achieved by creating, sharing and applying knowledge as well as through feeding the valuable lessons learnt and incorporating the best practices into corporate memory in order to foster continued organisational learning. In so doing, he has not only encompassed all the three elements of planning, people and process as implied by almost all other researchers, but he has also included the aspect of technology.

In this study, the researcher has adopted the definition by Dalkir (2010) which encompasses the aspect of technology addition to the other three elements of planning, practice and process in knowledge management. Dalkir (2010) approaches knowledge management from a holistic perspective in which knowledge management is pegged on three components; people, technology and process (Alavi and Leidner 2001; Dalkir 2010; NHS National Library for Health 2005). The most critical addition to this definition is the aspect of technology application in knowledge management, which is lacking from most other definitions. With the current advancement on several fronts throughout the world, it is the contention of the researcher that aspects of technology in knowledge management cannot be ignored.

2.2.1 Benefits of knowledge management

There are many potential benefits associated with knowledge management as identified by different authors. The knowledge management champions, including Drucker (2003), commonly use the quote “if only we knew what we know” by O'Dell and Grayson (1997) to urge organisations to embrace knowledge management. Platt, former chief executive officer of HP famously said: “If only HP knew what HP knows, we would be three-times more productive” (Lee and Steen 2006:2). This acknowledgement was made upon the realisation of the benefits that the company could accrue from knowledge management.

Wiig (1994:19), while supporting organisational knowledge management, notes that all the factors that lead to superior performance would be improved when better knowledge is made available and used. This concurs with the findings of Robinson, Carrillo, Anumba and Al-Ghassani (2001a) that identify motivating factors as to why organisations manage knowledge. The factors, applicable to development organisations include:

- i. The dissemination of best practice;
- ii. Retention of the tacit knowledge; and
- iii. Continuous improvement.

While emphasising why organisations in Africa should seriously embrace knowledge management, Musana (2006) notes that strides should be undertaken to minimise situations where conducted studies need to be repeated because of lack of the information. Musana (2006) contends that such exercises result in a waste of resources which should rather have been used to build on the findings of past studies. Musana (2006) also notes that embracing knowledge management facilitates the transfer of best practices from elsewhere and enables organisations to map out their knowledge resources. From these resources, the organisations can determine the existing knowledge gaps and seek to bridge those gaps. By integrating efficient knowledge management within an organisation, knowledge management enables an organisation to adopt a culture based on collaboration, sharing and open communication that enable the organisation to flourish (Tobias 2000:59).

Knowledge management is also considered as an important strategy for accelerating an organisation towards cost-cutting environments and, ultimately, sustainability (Thompson 2003:13). There is a growing importance of intangible assets such as the knowledge people have, referred to as intellectual capital (Sveiby 2006:52). Today, intellectual capital, rather than physical capital, is the driving competitive force for companies, in most industries (Gottschalk 2004:2). Haslinda and Sarinah (2009:2) support Gottschalk's statement by contending that managing intellectual capital, in explicit and tacit forms enables the organisation to learn from its environment and incorporate this knowledge into business processes (Haslinda and Sarinah 2009:2).

According to Baporikar (2014:3), the term knowledge in knowledge management is seen as the ultimate power that propels unprecedented growth in a knowledge-based economy, be it in the growth of an organisation, industry, or even country.

Knowledge management could result in improvements in individual performance, organisational performance and inter-organisational performance (Gottschalk 2004:2). To perform well in today's knowledge economy, organisations have been forced to address the challenge of knowledge management; and to create, capture and transfer knowledge-based resources (Massey Montonya and Holcom 2001:1). Additionally, there are many specific trends that necessitate organisations to embrace knowledge management. According to the International Business Machines Corporation (IBM) (n.d), these include: sharing best practices; globalisation; rapid change; downsizing; managing information and communication overload; knowledge embedded in products; and sustainable competitive advantage. IBM (n.d) graphically presented the reasons behind management of knowledge as shown in Figure 2.1 below.

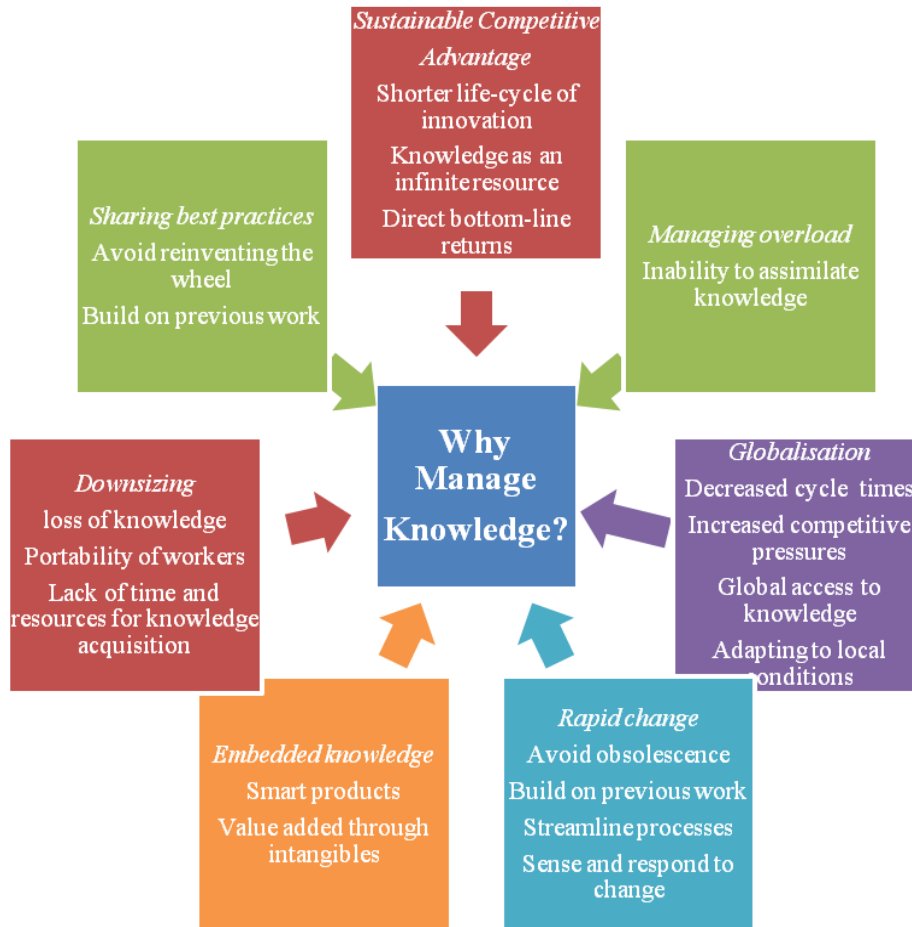


Figure 2.1: Reasons for managing knowledge

(International Business Machines Corporation (IBM) Global Services (n.d))

The United Nations Development Programme (UNDP) (2007:2) further observes that “by reflecting on and analysing own experiences; people can capture valuable insights to help improve their own performance.” According to UNDP (2007:2) “sharing of experiences means that an organisation can collectively:

- i. Avoid repeating past mistakes;
- ii. Highlight good practices to be replicated elsewhere;
- iii. Make work more relevant, effective and accessible;
- iv. Compare experiences and draw out common issues and challenges;
- v. Influence policy and strategic thinking by rooting them in experience;

- vi. Make lesson-learning, and thereafter capacity-building, a conscious and habitual process within a team and/or an organisation; and
- vii. Help develop strong networks among people.”

2.2.2 Components of knowledge management

Based on the works of Alavi and Leidner (2001), Pee and Kankanhalli (2009), Dalkir (2010) and NHS National Library for Health (2005), knowledge management can be broadly categorised into three components: people, processes and technology. *People* create, share and use knowledge, *Processes* offer methods to acquire, create, organise and transfer knowledge, and *Technology* provides mechanisms to store and provide access to data, information and knowledge created by people (Pee and Kankanhalli 2009). Knowledge management components are also identified by Frappaolo and Toms (1997) who note that there are two essential components that transform knowledge from tacit to tacit, tacit to explicit, explicit to explicit and explicit to tacit. The three components are discussed further here below.

2.2.2.1 People

Whereas all the components in knowledge management are critical, Nonaka and Takeuchi (1995) and Anantatmula (2007) reckon that the people component plays the major role in ensuring the success of knowledge management. People include individuals from both in-house and outside the organisation. Knowledge management is people-centred. Therefore, the primary focus among different stakeholders should be how to develop a knowledge-friendly culture among different players (NHS National Library for Health 2005:8).

Based on this, organisations and research institutions should incorporate the concept of knowledge management into their employees’ management policy as proposed by Yeh, Lai and Ho (2006:798). This can be achieved by creating and supporting a culture that enhances knowledge management. Such a culture would help to motivate employees in understanding the benefits of knowledge management, at all levels of the organisation and to encourage knowledge sharing (Becerra-Fernandez, Gonzalez and Sabherwal 2004). Ellis (2005) notes that people and the way they are managed are at the centre of the knowledge-based working process. He goes on

to argue that a culture of support plays a vital role in employee satisfaction and also influences the success of the knowledge management strategy.

For instance, in its efforts to develop and nurture insightful knowledge management skills among its employees, Wal-Mart Corporation, employed and integrated a skilled workforce who had been newly recruited with the firm's existing workforce. This was done in order to tap into the tacit knowledge of the newly employed skilled workforce (O'Leary 2002). Wal-Mart Corporation also blended the aspect of knowledge management with its employees' management policy through various activities such as formal apprenticeship, discussion forums, corporate libraries, mentoring programmes and professional training. The company also employed specific adaptations of technologies, like expert systems, knowledge bases, group decision support systems, intranets, knowledge repositories and computer supported cooperative work (Alavi and Leidner 2001; O'Leary 2002).

Instilling proper knowledge management notion in staff requires that employees should be enthusiastically motivated and willing to participate in obtaining and sharing knowledge freely (Szulanski 1996:28). Nonaka and Takeuchi (1995) note that a key element for a knowledge management programme is to encourage staff to communicate and share their knowledge freely. This can be achieved by engaging well-grounded knowledge management professionals, who understand knowledge management principles and processes, possess excellent communication skills and abilities to offer specialist skills. The expertise could be in fields such as electronic systems and resources and/or experience of planning and delivering training. They should also have skills in persuasion, reasoned argument and interpersonal communication skills for transferring tacit knowledge to explicit knowledge (Tobias 2000:69). In addition, the knowledge management professionals should be able to encourage people to identify and share their relevant ideas, knowledge and information. Some people hesitate to share their knowledge because of insecurity, fear and a general lack of processes to convert tacit knowledge to explicit knowledge (Tripathy, Patra and Pani 2007:83).

2.2.2.2 Knowledge management processes

Knowledge management processes are the social and technological steps that enhance the contribution of knowledge in the organisation (Nonaka and Takeuchi 1995:77). Knowledge management processes maximise the value of knowledge assets through collaboration, discussions and knowledge sharing (Mohamed, Murray and Mohamed 2010:11). Together these processes can be used to manage and grow an organisation's intellectual capital (McNeil 2011:21). According to Raub and Sthapit (2001:63), the knowledge management processes encompasses the action steps used to identify the knowledge needed and the manner in which it is collected, adapted and transferred across various institutions and organisations. Martín, Sáez and Navas (2008:224) identified the key purposes of knowledge processes as:

- i. Connecting people for knowledge sharing;
- ii. Connecting people with knowledge repositories;
- iii. Encouraging knowledge creation;
- iv. Allowing knowledge encoding for easier transfer; and
- v. Disseminating knowledge in the organisation.

According to Rastogi (2000:54), knowledge management processes include the identification, mapping and capturing, acquiring, storing, sharing and application or reuse of new information. Similarly, Ramachandran, Siong and Ismail (2009) identified six common knowledge management processes that are almost similar to those identified by Rastogi (2000:54). These include knowledge creation, capture, organisation, storage, dissemination and application.

On the other hand, Gupta and Govindarajan (2000), while defining knowledge management from a processes' perspective, identified the processes as knowledge development, storage, retrieval, and dissemination of information and expertise within an organisation. Similarly, Handzic and Zhou (2005) classify knowledge management processes as knowledge creation, knowledge storage and retrieval, knowledge sharing and transfer and knowledge application. Sharma, Chia, Choo, and Samuel (2010) categorise knowledge management processes as consisting of six key activities, namely: to create, capture, organise, store, search and transfer. It is clear from these various definitions that knowledge management processes tend to follow certain steps. The core

processes as identified by Gupta et. al. (2000), Handzic and Zhou (2005) and Sharma, Chia, Choo, and Samuel (2010) include knowledge creation, storage, dissemination and application.

This study has adopted the knowledge management processes as highlighted in the six sequential steps identified by Bouthillier and Shearer (2002) for they incorporate all the steps. These are: knowledge discovery, acquisition, creation, storage and organisation, sharing and use or application as represented in figure 2.2 below. This figure is a conceptual framework developed by Bouthillier and Shearer (2002) on the knowledge management processes.

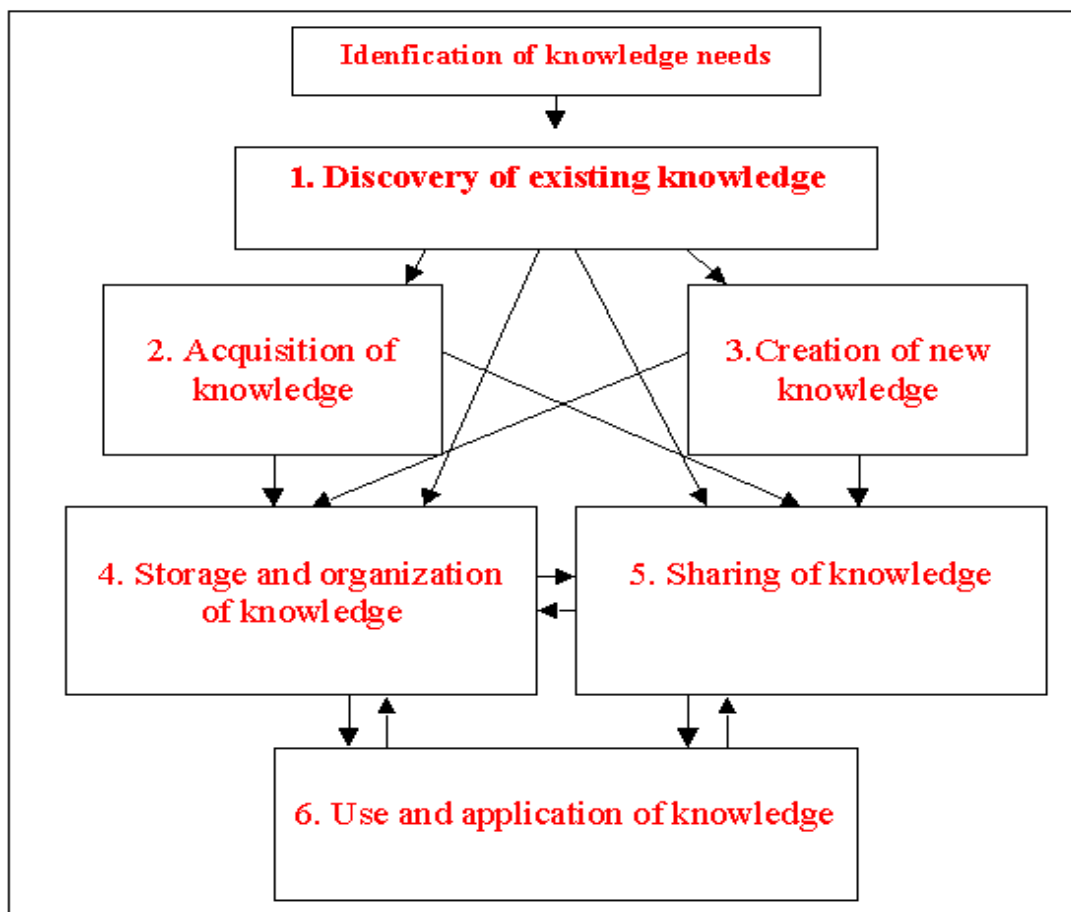


Figure 2.2 Bouthillier and Shearer’s conceptual framework on the knowledge management processes (Bouthillier and Shearer 2002)

The six knowledge management processes as identified by Bouthillier and Shearer (2002) are further discussed below:

i. Discovery

Discovery of existing knowledge involves tracing internal tacit as well as explicit knowledge in an organisation. Discovery entails three activities: First, find out what the people in the various research organisations and institutions know. Second, establish where the knowledge resides in the various departments or persons in these organisations. Third, locate the people with specific knowledge, expertise and experience (Tripathy, Patra and Pani 2007:66). Discovery of existing knowledge enables different organisations to map out knowledge resources. Mapping out facilitates the identification of knowledge gaps, which in turn informs further research.

ii. Acquisition

The next step as identified by Bouthillier and Shearer (2002) is knowledge acquisition. This involves bringing knowledge into an organisation from external sources. The purpose of this is to fill identified gaps. Bhatt (2000) and Abou-Zeid (2002) identify ways used by organisations to acquire such knowledge. These include imitation, benchmarking, replication, substitution, purchasing, outsourcing and discovering (Bhatt 2000:19; Abou-Zeid 2002:488). Tripathy, Patra and Pani (2007:66) further note that knowledge creation uses technological components such as brainstorming, decision support systems, enterprise information portals, artificial intelligence, business intelligence, data mining and knowledge discovery tools.

iii. Knowledge creation

Nonaka and Takeuchi (1995) articulate one of the most comprehensive models of organisational knowledge creation known as the Socialisation, Externalisation, Combination and Internalisation (SECI) model. According to this model, knowledge creation is about continuous transfer, combination and conversion of the different types of knowledge. As users practice, interact and learn, they engage in social and collaborative processes (Karadsheh, Mansour, Alhawari, Azar and El-Bathy 2009:62). An important aspect of organisational knowledge creation, according to Nonaka and Takeuchi (1995), is the provision of organisational mechanisms and resources that support all four modes of knowledge creation.

iv. Storage and retrieval

Storage and retrieval of knowledge involves an important aspect of effective knowledge management. Organisational memory is a type of knowledge that is stored and must be retrievable. Tyler, Bibri and Tyler (2007:63) define organisational memory as the means by which knowledge from past experiences and events influence present organisational activities. Organisational memory extends beyond individuals' memory. It includes other components such as organisational culture, transformations (production processes and work procedures), structure (formal organisational roles), ecology (physical work setting) and information archives (both internal and external to the organisation) (Tripathy, Patra and Pani 2007:67). Organisations create knowledge, learn and also forget (Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udejaja (2006:19). Therefore, there is need for effective technological tools and technology that can facilitate storage and easy retrieval of knowledge.

Tripathy, Patra and Pani (2007:3) identified a knowledge repository as the storage medium for the knowledge collected. A knowledge repository is viewed as essential for storing organisational memory and the retention of knowledge assets. According to Taft (2000:15), knowledge repository must have sufficient storage media to accumulate knowledge. For the repository to remain relevant, updating the knowledge kept in the repository remains a key challenge. A particular knowledge worker should be assigned the task of maintaining and updating the information. An additional task might include removing obsolete information (Taft 2000:15).

v. Knowledge sharing

Knowledge sharing and transfer, which refers to the activities associated with the flow of knowledge from one party to another (Newman and Conrad 1999). Similarly, Simpson (2006:15) describes it as the movement of knowledge across contexts – inter-regional, intra-regional or between organisations. Jackson, Chuang, Harden, Jiang and Joseph (2006:31) take a different perspective while describing knowledge sharing. According to Jackson, Chuang, Harden, Jiang and Joseph (2006:31) knowledge sharing is a fundamental means through which staff members can contribute to knowledge application, innovation, and ultimately the competitive advantage of the organisation. To build on this, Cabrera and Cabrera (2005:725) and Davenport and Prusak (1998) note that, knowledge sharing among staff and within and across teams allows

organisations to exploit and capitalise on knowledge-based resources. The World Bank (2008), being among the first international organisations to embrace knowledge as a tool for development, acknowledged knowledge sharing as a critical element for economic development that goes beyond the dissemination of information.

Similarly, Martin (2004:78) and Campbell (2005:72) point out that the most important objective of knowledge management is: to bring together intellectual resources and make them available across organisational boundaries. Robertson (2002:13) observes that organisations often waste their resources and lose money by repeating mistakes, duplicating projects and being unaware of each other's knowledge due to the lack of knowledge transfer and sharing. Knowledge transfer and sharing is fundamentally driven by communication processes and therefore effective communication forms an important and critical part of knowledge management (Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udejaja 2006:27). According to Trepper (2000:44), the linkage between those who need to know and those who possess the required knowledge does not occur automatically and needs to be explicitly supported in organisations.

Riege (2007:49) proposes that organisations can gain significant learning benefits through sharing knowledge between units and people. Knowledge transfer tends to improve competence of both sides that transfer and share knowledge. This is because knowledge does not leave the owner when it has been transferred. As a result, the value of knowledge grows each time a transfer occurs. The key to value creation lies in how effective knowledge has been transferred throughout the organisation (Sveiby 2001:346).

Gan (2006) states that knowledge sharing enablers can be broadly classified into either a social or technical perspective. The social perspective of knowledge management enablers includes collaboration, mutual trust, organisational incentives and rewards. The collaborative culture is paramount, as it allows for increased levels of knowledge sharing and exchange (Lee and Choi 2003:1859). Mutual trust plays a key role in enabling knowledge management through sharing information freely. According to Robbins, Millett and Cacioppe (2001), mutual trust exists in an organisation when its members believe in the integrity, character and ability of each other. A major barrier to knowledge sharing, however, is that knowledge can be considered as a source of

power and superiority (Gupta and Govindarajan 2000:73). This scenario often leads to knowledge hoarding to avoid losing the perceived power.

vi. Application of knowledge

The sixth and the final step of knowledge management process are the use and application of knowledge. Davenport and Marchand (2000:165) are of the opinion that knowledge, like information, is of no value unless applied to decisions and actions in a purposeful organisational context. They observe that organisations are keen to build knowledge repositories, without paying much attention to how effectively their staff apply and use the knowledge already available. As argued out by Igberaese and Onyeaghalaji (2009:6), adequate knowledge application and utilisation helps the society to overcome formidable problems and challenges that affect human development.

The processes identified require appropriate technology, the third component of knowledge management discussed here below.

2.2.2.3 Technology

The third component of knowledge management is technology (Frappaolo and Toms (1997). Technology plays an important role in knowledge management. Rubanju (2007:201-202) contends that though it is said that knowledge management is 10% technology, and 90% people, an organisation cannot exploit its capabilities and incentives without the help of technology to aid the knowledge management process of knowledge capture, creation, sharing, dissemination, acquisition and application.

The rapid advancement development of the information and communication technology has led to increased sharing of information and accumulation of knowledge. According to Abdelrahman (2013) information and communication tools and technologies are expected to play a major role in enhancing the management of knowledge within organisations as new challenges of harnessing and utilising knowledge resources emerge. Kulkami, Ravindran and Freeae (2006) note that effective technologies and tools automate the input, storage, transfer and retrieval of knowledge, and includes tools for capturing various types of knowledge from useful lessons

learnt, classifying knowledge documents, locating the relevant experts and expertise. According to Yeh, Lai and Ho (2006:794), information technology is a fundamental building block that supports and coordinates knowledge management. Further Edwards (2009) notes that there is need to consciously coordinate people, processes and technology, while addressing knowledge management and in effect the need to make the right choice of tools and technology. Mills and Smith (2011) contend that the component of technology in knowledge management enables the creation, transfer, storage and safe keeping of an organisation's knowledge resources. Similarly, Ray (2008) and Grimaldi and Rippa (2011:47), are in agreement that information technology provides knowledge management processes with appropriate tools that facilitates knowledge capture, retention and management. Further on, Kazemi and Allahyari (2010) note that knowledge management technologies facilitate the linking of the right information and knowledge to the right people at the right time. Zyngier (2001) conducted a study to establish the role of technology in knowledge management and concluded that technology is a facilitator and tool of knowledge management.

The importance of technology is further underscored by Biloslavo and Zornada (2004) who notes that technology has made it possible to preserve valuable explicit knowledge for the future. Further, technology has enabled organisations to share a huge amount of information unconstrained by the boundaries of geography and time. According to Du Plessis (2007) information technology facilitates communication and exchange of knowledge across diverse organisations that share knowledge and experiences.

According to Arora, Fosfuri and Gambardella (2002:6), information technology infrastructure is a necessity for the success of knowledge management. Mohamed, Murray and Mohamed (2010) evaluate the importance of information and communication technology for sustainable development. These authors, similarly, conclude that information and communication technology is a significant tool of knowledge management. They establish that due to the geographical separation and multifaceted nature of organisations, the support of information and communication technology is critical in attaining sustainable development. Mohamed, Murray and Mohamed (2010:744), however, quip that for the technology infrastructure to be translated into worthwhile returns, the organisations involved must adopt knowledge-oriented information

and communication technology infrastructure. Their study further points out that, the role of technology infrastructure for sustainable development is to assist in collating, synthesising, exploiting and disseminating the knowledge generated. The alignment of knowledge management activities with resilient open information and communication technology infrastructure is critical for sustainability (Mohamed, Murray and Mohamed 2010:745). It is however important to note that development and research organisations' approach to the use of ICT in knowledge management is not integrative as each organisation has its own approach and strategy that is in harmony with the overall strategic plan (Voccia 2011:96).

Aidemark (2009:5) underscores the importance of technology as a mechanism to help people and even organisations create, capture, store, exploit, share and apply knowledge. Mohamed, Murray and Mohamed (2010:747) conducted a study on how information and communication technology (ICT) contributes to knowledge management. They conclude that, the use of ICT in managing knowledge, leads to reduction of cost associated with re-inventing the wheel or repeated mistakes. This is achieved by applying lessons-learnt from previous projects of a similar nature.

Technology and tools for knowledge management are further discussed in section 2.3 below.

2.3 Knowledge management tools and technology

Knowledge management tools and technologies are key enablers of knowledge management (Wong 2005:9). The role of information technology has moved from storage and archiving to connecting people in organisations and people to information. Wong (2005:9) further notes that technology can enable rapid search, access and retrieval of information, and can support collaboration and communication between members of an organisation. As the knowledge goes through the process cycle, different types of technologies are used to support the processes. These technologies are referred to as the knowledge management technologies and tools, which are described by Ruggles (1997) and cited by Dalkir (2005:218), as tools that enhance and enable knowledge generation, codification, and transfer; generate knowledge; code knowledge; and transfer knowledge. Consequently, different technologies are applicable to different knowledge processes. This implies therefore, that there exist knowledge capture and creation technologies;

and knowledge sharing and dissemination technologies which can be integrated into an organisation's technological platform (Wong 2005:9).

2.3.1 Knowledge capture and creation tools and technologies

Knowledge capture and creation calls for technologies that allow acquisition and synthesis of knowledge (Benbya, Passiante and Aissa, 2004:212). Dalkir (2005:79) opines that knowledge capture is not a purely technological issue "because it has to do with the discovery, organisation, and integration of knowledge into the 'fabric' of the organisation". However, this is not to imply that technology has no part to play. Writing later on knowledge management tools, Dalkir (2005:218-220) categorises technologies that can be used for knowledge capture and creation into two: content creation and content management. Technologies that can be used to create knowledge include: authoring tools; templates; annotations; data mining; expertise profiling; and blogs. For content management, technologies applicable comprise of: metadata tagging; classification; and archiving.

Asian Productivity Organisation (APO), (2010:13-14) observes that the ever ongoing conservation and collaborative work environment is leading to new ideas and learning in organisations. The problem though is the failure to capture these new ideas and learn. Olukepe (2007:60) identifies storage, search and retrieval technologies as those which are mainly used as central repositories, or web portals where lessons learnt, best practices, project status, benefits accruable from the project, innovative features of the project and future areas for research can be stored. According to Kumar and Anwarul (2014:333-334) in knowledge capture and or creation, tacit knowledge is identified or captured; explicit knowledge is organised or coded or new knowledge is created. Knowledge creation is as a result of interaction involving a number of individuals working collaboratively. Some of the technologies that aid in knowledge capture include computers for documents, emailing, notes and databases; spontaneous and structured learning, ideas, and insights can be captured by use of blogs and K-Logs (knowledge Blogging); pictures, events and experiences can be captured using videos and cameras; a scanner is used to digitise information (APO 2010:13-14; Kumar and Anwarul 2014:333-334).

2.3.2 Knowledge sharing and dissemination tools and technologies

One of the key processes of knowledge management is knowledge sharing and dissemination. Technologies help a great deal in this aspect (Birkinshaw 2001). Citing Nonaka and Takeuchi (1995), Benbay, Passiante and Aissa (2004:213) reiterate that knowledge must be shared and disseminated within the organisation for it to be best used and explored, and technology makes this possible. Benbay, Passiante and Aissa (2004:204) make a case for a corporate portal as a technology that can be used in knowledge sharing and dissemination. Corporate portals are web-based applications which provide a single point of access to online information (from both in-house and external sources). Portals enable people and organisations to share their knowledge. According to Benbay, Passiante and Aissa (2004:204) corporate portals present the potential of providing organisations with a rich and complex shared information workspace for the creation, exchange, retention and reuse of knowledge. Benbay, Passiante and Aissa (2004:204) further identify the components of corporate portal as profiling; push/pull technology and publishing. Profiling allows the distribution of the “right information to the right person”. Push/pull technology allows for delivering of knowledge through the web. Publishing enables publishing of documents in different formats like HTML, PDF and XML. Corporate portal as a knowledge enabler technology helps knowledge workers in knowledge application by enabling them to access and index information from disparate data stores such as file servers, databases, business systems, Groupware systems document repositories and the web (Benbay, Passiante and Aissa 2004:213-214).

Another important technology in sharing tacit knowledge as identified by Carlson (1999) is GroupWare. According to Carlson (1999), successful organisations such as the World Bank, National Semiconductor, Buckman Laboratories and Texas Instruments used Lotus Notes as a tool for knowledge sharing. A good case study is Andersen Worldwide which developed a system based on using Lotus Notes called ANet, which was used to link the organisation’s worldwide operations in seventy six countries. Company employees post customer’s problems on the organisational forum and receive information and ideas from other users on how to help the customer.

Technologies that enable workers to acquire (understand) and apply (make use of) knowledge are broadly categorised by Dalkir (2005:236) into E-learning technologies and Artificial Intelligence (AI) technologies. In the application phase of knowledge management cycle, the knowledge worker uses the retrieved knowledge to perform a number of tasks. Such tasks will encompass problem solving, decision making, research, and learning. Knowledge application is the most essential task of knowledge management.

Kumar and Anwarul (2014:339) highlight the following as some of technologies that aid in knowledge acquisition and use:

- i. Content management: they create solutions to manage all content created by the organisation;
- ii. Event scheduling: important in scheduling common time when knowledge workers can meet;
- iii. Expertise locator: for connecting people with knowledge needs to experts;
- iv. Project management: for planning, organising and managing resource polls and developing resource estimates; and
- v. Work grouping/team collaboration workspaces: groups of users can easily access a set of related sheets, reports and templates.

Dalkir (2005: 225) notes that although a distinction between communication technologies and collaboration technologies is made, drawing the line between the two is not easy. This is because both are so intertwined, and perform the same function of sharing and dissemination of knowledge. Some communication and collaboration technologies in this category include: telephone; fax; video conferencing; chat rooms; instant messaging; internet; telephony; e-mail; discussion forums; groupware and, workflow management. Networking technologies include intranets and extranets; web servers, browsers; knowledge repositories and portals.

Collaborative virtual workspace is technology that also aids in knowledge sharing. This technology enables people to work together, irrespective of where they are physically located. The technology allows for document sharing, collaborative editing, and audio/video conferencing. This technology allows organisations to access the best skills anywhere in the

world; reduces travel costs; allows people to work from wherever they are; and information can be accessed any time it is needed (APO 2010:64).

The intranet has emerged as collaborative technology which acts as organisations' internal websites. According to Parikh (2001), intranet provides a suitable platform for knowledge sharing. This is similarly noted by Sheng and Sun (2007:42) who observe that intranets have emerged as one of today's most effective ways of sharing information and knowledge in organisations. According to Kim (2003:66), the intranets act as the nervous and circulatory systems for organisations by supporting flow of information. The intranet, O'Dell and Grayson (1998: 94) posit, has many benefits for knowledge sharing. These benefits include:

- i. Decreased communication costs;
- ii. Making information more available and quick to access; and
- iii. Providing an easier ability to collaborate amongst teams.

In addition, the report by O'Dell and Grayson (1997: 94) on market research done by Meta Group of 55 companies in 1997 showed that intranet applications provide the firms with positive return on investment (ROI). This shows that besides helping with the sharing and dissemination of information, technologies can generate a positive ROI.

Other collaboration technologies that are used for knowledge sharing and dissemination according to (Kumar and Anwarul 2014:336-337) include:

- i. File sharing: for distributing or providing access to information stored digitally as files;
- ii. Group communication/private social network for the organisation: a software platform that implements some form of group communication;
- iii. Large audience webinars: a web-based seminar, lecture, presentation or workshop given over the web using web presentations; and
- iv. Virtual three-dimensional immersive collaboration: collaboration between virtual teams via technology mediated communication and using personalised avatars.

According to Wiig (2004:246), the effectiveness of a knowledge management intervention, in a particular organisation, is determined by the selection of appropriate tools, approaches and practices. As illustrated by the cartoon below, technology is just as good as the people using it. Having the latest technology is not enough. People must use it and take advantage of it. For most knowledge management systems, the use of appropriate and user-friendly information technology is quite fundamental and important to ensure that new technology is utilised effectively (Ragsdell 2009). Harvey (2003) observes that management of knowledge will not result from investment in technology itself, but from additional investment in people who will use the technology to benefit from knowledge created. This is echoed by Makani (2008:145), who notes that technology is an enabler and not the driver of knowledge management. In tandem with the preceding views, Albers (2009) cautions that organisations must not place too much emphasis on ICT while implementing knowledge management at the expense of people and processes. Albers (2009) further notes that, although information technology is an enabler in creation, capture and sharing and integration of knowledge, it does not bring about behaviour, cultural or organisational change. It is thus clear that while organisations and institutions may boast of having the latest technology; it is imperative that they also ensure that they have the right staff with ability to utilise that technology effectively.



“What good is technology if it takes six seconds to send a message but six months to get someone to act on it?!”

Source: www.glasbergen.com

2.4 Challenges and barriers

According to Pirkkalainen and Pawlowski (2013:5), barriers to knowledge management is “any challenge, risk, difficulty, obstacle, restriction or hindrance that might prevent a single person, or a group or an organisation to reach an objective and success in a specific context when the challenge is related to acting or working in a collaborative cross border setting.” Barriers to knowledge management can therefore, be said to be whatever hinders the successful implementation of knowledge management initiatives in an organisation. Different researchers have identified varied barriers to knowledge management. Abrahamson and Goodman-Delahunty (2014:1) in their research on knowledge management in Canadian policing identify: processes/technology; individual unwillingness; organisational unwillingness; work overload; location/structure; leadership; and risk management, as barriers to knowledge management. Ajmal, Helo and Kekale (2010:156) study establishes that lack of incentives and the absence of appropriate information systems are key barriers to knowledge management. The findings of that study concur with Bollinger and Smith (2001:64) observations that knowledge management can be hindered by obscurity of obvious benefit to the workers in question. Furthermore, additional

work required to document team processes and the difficulty to codify tacit knowledge also act as barriers.

Akhavan, Reza and Hosein (2014:98) categorise barriers to knowledge management into five: individual; organisational, technological, contextual, and inter-project. Bollinger and Smith (2001:14) single out organisational, team/group, and individual as major impediments to knowledge management. Lotti's (2014: 1071) study of large Brazilian companies shows that the five main barriers to knowledge management are: lack of interest from employees; inefficient communication; lack of culture in sharing; lack of competence of staff and lack of incentive. Herrmann (2011:32-35) found out that technology, content; routines and procedures, organisation and personnel are the main barriers to knowledge management.

Ray (2014:49-51) discusses cross cultural barriers to knowledge management. The barriers are grouped into:

- i. Individualism which is characterised by selfishness and lack of team work; power distance which occurs when leaders assume an authoritative leadership style; and uncertainty avoidance which is displayed when people do not adopt change;
- ii. Masculinity which is characterised by knowledge hoarding and low interest in sharing knowledge; and
- iii. Long-term orientation which is expressed in fear of losing face or looking stupid, holding traditions on high esteem and emphasis on quick results.

Riege (2005: 23) extensively discusses barriers to sharing knowledge in three levels: individual; organisational; and technologically. Shokri-Ghasabeh and Chileshe (2013:108) identifies barriers to capturing lessons learnt from Australian construction contractors. The study reveals lack of time by employees, resources and clear guidelines as the three major barriers, while the lack of management support is the least ranked barrier.

Sigh and Kant (2008) reviews barriers to knowledge management and consecutively lists nine of them as:

- i. Lack of top management commitment;
- ii. Lack of technological infrastructure;
- iii. Lack of methodology;
- iv. Lack of organisational structure;
- v. Lack of organisational culture;
- vi. Lack of motivation and reward;
- vii. Staff retirement;
- viii. Lack of ownership of problem; and
- ix. Staff mobility.

Ujwary-Gil (2011) identifies three levels in an organisation and types of barriers to knowledge management at each level. At employee level we have psychological, technological and financial factors as types of barriers to knowledge management. At organisational level, we have psychological, social, organisational and technological factors. At sector and economy level, we have psychological, social, technological, systematic, legal and financial factors.

Barriers to knowledge management in organisations are varied. However, in this study barriers as identified by Brandt and Hartmann (1999) and cited by Lotti (2014: 1056) will be adapted. Brandt and Hartmann (1999) identify TOP typology of knowledge management barriers. TOP is an acronym for barriers to knowledge management related to:

- i. Technology;
- ii. Organisation; and
- iii. People.

2.4.1 Technological barriers to knowledge management

Technology is a knowledge management enabler that provides a platform to knowledge management and enhances its impact in an organisation by helping and leveraging its knowledge systematically and actively (Singh and Kant 2007). In addition, technology enables organisations to overcome the barriers of time and space. It also serves as a repository in which knowledge can be reliably stored and efficiently retrieved (Chua, 2004). Having said that, technology can also

hinder knowledge management (Hartmann 1999, Thoben, Weber and Wunram 2002:3, Riege 2005, Sigh and Kant 2008, Ajmal, Helo and Kekale 2010:156, Hertmann 2011:32-35, Ujwary-Gil 2011, Akhavan, Reza and Hosein 2014). The major technology related hindrance for knowledge management is the inability of organisations to select the right tools and technologies. As noted by Wenger (1999:14), after the identification of the right people, processes and proper definition of knowledge for different audience; the challenge lies in the identification of systems, both electronic and human, that should be in place to ensure efficient flow and distribution of knowledge. Incompatibility of assorted information technology systems and processes can hamper knowledge management (Thoben, Weber and Wunram 2002:3; Riege 2005:29). Lack of technical support and maintenance cost of technology could lead to obstruction of work routines and communication flow thus becoming a barrier to knowledge management implementation.

Other obstacles to knowledge management that are technologically related according to Ajmal, Helo and Kekale (2010:160) are connectivity, usability and over-reliance on technology. Connectivity problems arise when the infrastructure is not adequate enough for people in the organisation due to bandwidth limitations. Usability refers to the inability of knowledge workers to use a given knowledge management technology because it is too cumbersome or complicated to be used. There is a danger of neglecting tacit aspects of knowledge when knowledge workers become too accustomed to technology. Technological solutions are expensive, become obsolete pretty fast, and the cost of changing over to new technologies makes technology costly in terms of upgrading, overhauling and training.

The technological barriers to knowledge management are summed up by Reige (2005:29) who enumerated the following obstacles:

- i. Failure to align IT systems and processes with the way people do things;
- ii. Unrealistic expectations of knowledge workers on what can be achieved by using technology;
- iii. Disparity between individuals' requirements and the integrated technology;
- iv. People's refusal to use technology because they are not familiar with it and have no experience with the technology;
- v. Failure to train workers on how the technology works; and

- vi. Lack of communication and demonstration of all the advantages of any new systems over the existing ones.

2.4.2 Organisational barriers to knowledge management

Barriers to knowledge management emanate also from the organisations' structures and culture. Singh and Kant (2008:148) investigated knowledge management barriers in organisations and identified lack of top management commitment, lack of methodology and lack of organisational structure as the key barriers to knowledge management. Out of the three barriers, poor leadership and lack of commitment from the top was singled out as the most important. For the successful implementation of knowledge management initiatives, the top management must develop a strategy and structure for capturing and sharing knowledge. In addition, the staff and other stakeholders must be sensitised and motivated to share what they know. Conducting knowledge audit helps the leadership in choosing the right set of processes and tools for their organisation (Peteremode 2008:21). Management may also appear to be keen on knowledge management when initiating it, but when problems emerge, the management falters on its commitment (Ajmal, Heloand Kekale 2010:160). A research on knowledge management in government entities in Dubai differ with Singh and Kant (2008) with regard to the role of top management. The study showed that resistance to knowledge management emanated from middle management, administrators and officers, who indicated that they were comfortable with status quo and feared the outcomes of unknown initiatives like knowledge management (Al Mansoori and Narayanaswami 2011:9-10).

Another organisational barrier to knowledge management can also arise when knowledge management is badly role modelled by those highest in an organisation's hierarchy. Junior employees are likely to behave like their superiors in an organisation. So, if the seniors do not share knowledge neither do they encourage sharing of knowledge. Consequently, it will be hard for the juniors to share information (Herrmann 2011:33-34). Closely related to this, is that organisation structures can hinder knowledge management in an organisation. Ranks, roles and the location and coordination of organisational units, divisions and/or agencies are some of the issues touching on organisation structures. The structures can affect, positively or negatively, the desired goals and outcomes of the organisation (Abrahamson and Goodman-Delahunty 2014:4).

Lugger and Kraus (2001:491), list the following as organisation barriers to knowledge management: closed corporate culture; rigid hierarchies; red tape; tedious search routines without appropriate support; no or insufficient dissemination of information among staff; no available contacts; constant time pressures; quick fix solutions prevailing; outdated procedures being left unchanged; management lacking understanding and, procedures being kept vague.

CORMA (Practical Tools for Corporate Knowledge Management) project established the following as organisation barriers to knowledge management in over 500 companies investigated: the organisations were unaware of knowledge management strategies and tools; unavailability of individuals, that is tracking or locating individuals with special knowledge in a given subject; since most of these companies are global, different working times hinders communication (Thoben, Weber and Wunram 2002:3).

Organisational culture is a major organisation barrier to knowledge management (Chase 1997: 40). Several scholars, including Wong (2005:269), Chong (2006:233) King (2008:36) and Yeh, Lai and Ho (2006:797) have described organisational culture as critical to success in knowledge management. Organisation culture refers to shared assumptions, beliefs, values and norms within an organisation (Schein, 2004). It further encompasses the sub-cultures that exist within the various units, sections, or departments within the organisation (Hofstede 1998). Various scholars including Davenport, De Long and Beers (1998) Oliver and Kandadi (2006) and Choo, Bergeron, Detlor and Heaton (2008:802) have linked organisational culture to effective or ineffective knowledge management. This is because culture represents the source of values and beliefs which influence organisational behaviour (Denison 1990). Furthermore, culture considers the multiple aspects mainly of collaboration and trust. Trust is one of the aspects of the knowledge friendly cultures that fosters the relationship between individuals and groups, thereby, facilitating a more proactive and open knowledge sharing (Alawi, Marzoogi and Mohamed 2007:30). Absence or minimal level of collaboration hinders the transfer of knowledge between individuals as well as groups.

According to King (2008:36), it is imperative for organisations to develop a corporate culture that will:

- i. Shape the assumption that knowledge is important;
- ii. Mediate the relationship between organisational and individual knowledge;
- iii. Create a context for social interaction; and
- iv. Shape processes for creation and adoption of new knowledge.

From the literature reviewed, there is a positive relationship between knowledge and culture that ensures people are not inhibited when sharing knowledge. An organisational culture that is conducive has been cited as one of the most difficult factors to achieve as well as one of the biggest barriers to the success of knowledge management success (Conley and Zheng 2009:337). This is in agreement with Davenport and Prusak (1998) who note that lack of knowledge sharing culture is a major barrier to the effective management of knowledge in organisations.

Barriers to knowledge management resulting from inappropriate organisational culture as singled out by Ujwary-Gil (2011:90) include: reluctance to share knowledge; people's mentality, as our nature encourages us to build our competitive advantage on the basis of possessed knowledge; bad habits and customs, manifested in avoiding cooperation, unwillingness to delegate authority and lack of knowledge of foreign languages and, inability to use some information tools.

Rivera-Vazquez, Ortiz-Fournier and Flores (2009:260) discuss three organisational cultural dimensions' indexes as follows:

- i. Power distance: this refers to the distance between top management and junior staff. The smaller the power distance, the higher the knowledge sharing. This makes flow of information easier; junior staff can freely share ideas with the top management.
- ii. Collectivistic index: the awareness among staff that teamwork yields better results than individual work is high. This promotes knowledge production and sharing in the organisation.
- iii. Femininity: this refers to the environment of cooperation where colleagues in an organisation feel secure to share knowledge with each other.

- iv. Low level of uncertainty: this refers to organisations that do not have rules and regulations that forbid communication with colleagues within and without the organisation.

Politics, knowledge sharing, perceived image, and management commitment are also other organisational barriers to knowledge management. Politics come to play when the knowledge management initiative is used as a vehicle to gain control and authority in the organisation. Staff in an organisation may refuse to share knowledge because of issues such as lack of trust and knowledge hoarding mentality. Some staff may perceive using another staff's knowledge as a sign of weakness.

According to Riege (2005:25-26) organisational barriers to knowledge management could be caused by:

- i. Failure to integrate knowledge management strategy with organisation's goals;
- ii. Lack of leadership and managerial direction;
- iii. Having no adequate space to allow people to share, reflect and generate new knowledge;
- iv. Lack of a reward and recognition systems that would motivate people to share their knowledge more;
- v. Corporate culture that does not encourage knowledge sharing;
- vi. Poor knowledge retention strategies;
- vii. Lack of appropriate infrastructure and inadequate resources to support knowledge sharing;
- viii. Failure to appreciate knowledge from other units within the organisation or competing organisations;
- ix. Unidirectional flow of knowledge and communication, usually top-down;
- x. Restrictive physical work environment and layout of work areas;
- xi. Red tape in organisation; and
- xii. An organisation that is too big can make sharing knowledge more difficult.

2.4.3 People barriers to knowledge management

People working in an organisation can also be a barrier to knowledge management. This could be caused by ignorance among the people of what knowledge management is all about. Besides, personnel may not see the need to share information because they are not motivated to do so. Knowledge is also considered as a source of power and a job security weapon. According to Tripathy, Patra and Pani (2007:71), people hesitate to share their knowledge because of insecurity and fear of passing their tacit knowledge to colleagues. Quinn, Anderson and Finkelstein (1996:75) note that professional knowledge is perceived as a source of power that leads people to have feelings of ownership and thus, hoard knowledge. Rising above this fear and motivating such people is the biggest challenge of knowledge management. Lack of skills to handle knowledge management technologies may cause employees to be reluctant to implement knowledge management in the organisation. Anumba and Khan (2003:95) note that the problem facing knowledge management is the inability to share generated knowledge. They further observe that most knowledge in organisations is stored in journals and people's minds, never to be shared out. As people leave an organisation, so does the knowledge and as a result, valuable time is wasted in re-inventing the wheel, or re-discovering what they already knew. In order to overcome this hurdle, there should be knowledge capturing tools, like end-of-project interviews, focused documentation efforts, document storage and archival mechanism to convert this immeasurably valued tacit knowledge to well-documented explicit knowledge for future use (Smith 1999:31).

People could also be harbouring different interests and having hidden agenda, and therefore refuse to share knowledge. People also may opt to implement aspects of knowledge management initiatives that tilt the balance in their favour and avoid those they think will militate against their interests (Herrmann 2011:34-35).

Competition among professionals, sense of worth and status due to expertise, and fear of diminishing value could hinder knowledge management in an organisation. Besides these, other factors include prejudices, too much concern for other people's opinion, fear of criticism, lack of confidence and poor communication skills (Bollinger and Smith 2001:14; Lugger and Kraus 2001:491). Lack of trust is also another barrier caused by people in knowledge management

(Stolovitch, Pershing and Keeps 2006). When people lack interpersonal trust, they do not share knowledge, thus creating a bottleneck in the knowledge management process. Coupled with this, is the lack of physical proximity to colleagues, thus people may not know the experts that can be contacted for help within the organisation (Al Mansoori and Narayanaswami 2011:10; Lilleoere and Hansen 2011:63).

According to Singh and Kant (2008:148), lack of top management commitment, methodology and organisational structure are the key barriers to knowledge management in organisations. Singh and Kant (2008) further singled out poor leadership and lack of commitment from top management as the most critical barrier. This is due to the fact that the strategies and structures for capturing and sharing knowledge are developed by the top management. Conducting knowledge audit helps the leadership in choosing the right set of processes and tools for their organisation (Peteremode 2008:21). Further commitment from top leadership in an organisation often motivates staff to share what they know.

With regard to information overload, organisations are today faced with information explosion, both from internal and external sources. Without proper information and knowledge management practices, the people who are supposed to benefit are unable to incorporate it, due to the large volume and lack of appropriate tools. Knowledge is a perishable asset which if not utilised at the right time becomes obsolete. One of the benefits of implementing knowledge management is to ensure that the knowledge is accessed at the right time. On the same note, McNeil's (2011:73) study on knowledge management and sustainable development in institutions of higher education found that despite the institutions having vast amounts of knowledge generated, there were impediments to its use. Furthermore, the article concluded that resource limitation in terms of time and lack of dialogue were impeding the management of knowledge.

Angel and Koskinen (2009:9) are of the view that challenges of knowledge management depends on the nature of an organisation. They contend that projects undertaken by project-based organisations are characterised by uniqueness, uncertainty, complexity and challenges in the aspect of knowledge transfer (Koenig and McLenerney (2011:53) citing Burns and Stalker (1961:11)). Project-based organisations often include team members who have never worked

together and the existence of the team is temporary. Furthermore, Angel and Koskinen (2009:9) note that organisations fail to apply lessons learnt from completed projects to others, leading to the same mistakes. Obaide (2008:2) identifies lack of concern as a major challenge which arises because people in organisations are more concerned with tasks upon which their performance is evaluated than those involving knowledge management activities.

People as a barrier to knowledge management, furthermore, results from diverse reasons as identified by Riege (2005:22-23):

- i. Lack of time to reach out to colleagues in need of specific knowledge and share;
- ii. People are not aware of the value and benefit of the knowledge they possess to others;
- iii. Difficulty in sharing tacit knowledge such as know-how, and experience that requires hands-on learning, observation, dialogue and interactive problem solving;
- iv. Failure to learn from past mistakes because they are not sufficiently captured, and evaluated;
- v. Poor communication and interpersonal skills;
- vi. Differences in age, gender, and work experience;
- vii. Lack of trust in the accuracy and credibility of knowledge because of the source; and
- viii. Differences in language, national culture, ethnic background; and values and beliefs.

2.5 Knowledge management strategy

A key driving force behind successful implementation of knowledge management in an organisation is to have a clear and well-planned strategy (Liebowitz 1999). Asian Development Bank (ADB) (2009) defined knowledge management strategy as simply a detailed plan outlining how an organisation intends to implement knowledge management principles and practices in order to achieve organisational objectives. This definition was later adopted by United Nations Industrial Development Organisation (UNIDO) in 2012 while developing a glossary for knowledge management and sharing (UNIDO 2012). Knowledge management strategy describes how an organisation will manage its knowledge better for the benefit of that organisation and its stakeholders (United Nation Development Programme (UNDP) 2007:60). The view by UNDP was supported by (Ronen and Edna 2011:38) who noted that knowledge should not be managed

ad hoc. A good knowledge management strategy is closely aligned with the organisation's overall strategy and objectives (Aidemark 2009:4). Snyman and Kruger (2004:17) concur that knowledge management strategy should be an integral part of an organisation's strategy. According to Dalkir (2005), "decisions on knowledge management ought to be based on who (people), what (knowledge), and why (business objectives) and save the how (technology), for last".

O'Dell and Hubert (2011) note that the most imperative motivation for top management to become involved in the organisation's knowledge management programmes is to ensure that all knowledge management efforts are aligned to the overall strategy and vision of the organisation. The other reasons that top management needs to be involved in implementing knowledge management is that they play a critical role in establishing organisational infrastructure that enhances and facilitates knowledge management (Von Krogh, Nonaka and Rechsteiner 2011). According to Wong (2005), there are numerous knowledge management strategies. However, the most appropriate knowledge management strategy is one that is crafted on the basis of the highly contextual needs of each individual organisation. This statement is in agreement with the views of Robertson (2004), who posits that a knowledge management strategy should identify the key organisational needs and issues and provide a framework for addressing them.

With the advent of internet coupled with the rapid growth of ICT, organisations are experiencing information overload. There is a need for a well-defined knowledge management strategy, which will lead to the utilisation of the knowledge generated. According to Eunson (2012:539), an organisation may be awash with data, but unless that data is organised into information and unless human minds can synthesise and learn from information to create knowledge, then very little advantage is made of it. A good knowledge management strategy, will therefore, provide a framework that will filter the information and match the organisation's knowledge needs.

Knowledge management strategy is an enabler of knowledge management activities and processes in an organisation (Oluikpe, Sohail and Odhiambo 2010:28). However, though organisations are beginning to appreciate knowledge management and the potential benefits that may be realised, most organisations have failed to develop a strategy to guide their knowledge

management initiatives. This view is expressed by UNESCO (2006:5) which notes that while most organisations develop and distribute knowledge, a knowledge management strategy attempts to be more intentional and coordinated in that approach. According to the United Nations Economic and Social Commission for Western Asia (UNESCWA) (2003), approaches adopted when establishing a knowledge management programme in an organisation must be done in a well coordinated and systematic manner.

Anumba and Khan (2003) while presenting a paper on knowledge management in development projects to the 29th WEDC International Conference in Abuja, Nigeria, noted that an effective knowledge management strategy can ensure that:

- i. Project knowledge is captured, organised or stored properly so that it can be retrieved easily, since the speed at which knowledge is available can affect project decision making;
- ii. Project knowledge is shared and transferred to the relevant project team members at the right time, right place, using the right medium so that project decisions can be made effectively;
- iii. Project knowledge is combined to create new knowledge to solve problems or the search for new answers to solve problems during project delivery; and
- iv. Key project knowledge and lessons learnt are archived properly for future use.

There are two common types of strategies, namely, personification and codification strategy (Hansen, Nohria and Tierney 1999). Personification strategy focuses mainly on tacit knowledge, how it is stored in the human mind and transferred between persons. This strategy recognises that knowledge is intertwined with the person who developed, or is holding it. Tacit knowledge is mainly shared through personal contacts (Choi and Jong 2006:8). The objective of the personalisation strategy is to transfer, communicate, and exchange knowledge via knowledge networks such as discussion forums (Martina, Tilo and Helmut 2007:5). In personification, organisations encourage development of communities for practice and networks for linking person to person (Subramanian 2003:77). Use of collaboration tools is also encouraged to facilitate knowledge sharing.

On the other hand, codification strategy focuses mainly on explicit knowledge. In this strategy, knowledge is codified and stored in databases for access and retrieval. The objective of codification strategy is to collect knowledge, store it in databases, and provide the available knowledge in an explicit and codified form (Martina, Tilo and Helmut 2007:5). This view is supported by Keskin (2005:170) who observes that codification strategy is aimed at increasing the codification capability of the firm, thereby, reducing the complexity of access and reuse of knowledge via information technologies. This strategy emphasises development of systems that will link people to documents (Subramanian 2003:77). A good example of such database is a knowledge repository. By using the codification approach, more explicit and structured knowledge is codified and stored in knowledge bases and repositories (Anzahaie and Bai 2013:198). The main role of technology in the codification approach is to help people share knowledge through common storage so as to achieve economic reuse of knowledge (Kankanhalli, Tanudidjaja, Sutanto and Bernard 2003:69).

The organisations that implement a codification strategy will invest heavily in information technology to codify, store and transfer explicit knowledge to all those within the organisation. On the other hand, personalisation strategy will require far less information technology investment as technology is only required to facilitate social relationships within the organisation (Hansen, Nohria and Tierney 1999).

2.6 Sustainable development

Various organisations and authors define sustainable development differently. According to Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udeaja (2006:17), sustainable development is a knowledge-based set of practices aimed at addressing environmental challenges for the overall wellbeing of the environment. The Organisation for Economic Cooperation and Development (OECD) (2001:2) defines sustainable developments as a development path along which the maximisation of human well-being for today's generation does not lead to declines in the future well-being. Taft (2000:15) reported that a sustainable society is considered to be one that has attained sustainability through sustainable development. Onyeaghalaji and Igberaese (2010:270) summarised sustainable development, as the development that is stable, enduring and

consistent. It is development that lasts and does not crumble in the face of formidable problems. The most widely recognised definition of sustainable management is that which was given by the Brundtland Commission of 1987 as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This study utilises the Brundtland Commission's definition of sustainable development since it takes into consideration the wellbeing of both the present and future generations.

According to Carrillo (2005), the challenges facing modern societies call for knowledge-based development strategies. Knowledge-based sustainable development connotes the process of using knowledge management combined with a decision support system to help decision makers to make informed decisions (Ovalle, Marquez and Salomon 2004). According to Terra and Angeloni (2008), a knowledge-based society and knowledge-sharing environment can make the development process sustainable and goals of the development process achievable (Terra and Angeloni 2008:91). Carrillo (2005) further explains that a knowledge-based society can lead the way to a global society in which all the basic human needs can be satisfied while maintaining a health, physically attractive and biologically productive environment. Sustainability means using methods, systems and materials that will not deplete resources or harm natural cycles. A knowledge repository of development activities is vital for the sustainability of a development process (Tyler, Bibri and Tyler 2007:22). This is because such a repository is the tool used for capturing and disseminating knowledge generated throughout the organisation. The captured knowledge is in turn used to inform development activities and the decision making process.

According to Okonkwo (2013:738), attaining sustainable development requires elimination of negative external factors such as human activities and developmental projects that are responsible for natural resource depletion and environmental degradation. Okonkwo (2013:738) further notes that attaining sustainable development requires securing public goods essential for economic development to last, such as those provided by well-functioning ecosystems, a healthy environment and a cohesive society. According to Roosa (2010:8), sustainable development demands that the current generation considers the future repercussions of decisions made today. One of the greatest challenges is for the current generation to meet their needs without diminishing the capacity required by future generations. A proper repository of knowledge on

sustainable management can thus help the current generation make the right decisions as far as protection of the environment is concerned.

Stevens (2005:30) identifies three dimensions of sustainable development which are social, economic and environmental sustainability. These three dimensions were also identified by Azapagic and Perdan (2000). They noted that sustainable development is about achieving environmental, economic and social welfare for present and future generations. This is consistent with the outcome of the United Nations Conference on Sustainable Development (UNCSD 2012) popularly known as Rio+20. At this event, proposals were made which focussed on sustainable development and the inter-linkages between three key components – economic, social and environmental – to guide policy formulation and action. Knowledge on the inter-linkages of these three components can only be useful for sustainable management of the environment, if it is well managed and disseminated to all stakeholders.

The fundamental role of knowledge management in sustainable development is that it encompasses the processes for communicating, learning, sharing knowledge and people involvement in the organisations (Woog 2010:1446). According to Finish National Commission on Sustainable Development (2006:48), the following principles apply to all dimensions of sustainable development:

- i. The mutual dependence of the economic, ecological, social and cultural dimension of sustainable development;
- ii. Extending beyond the current generation and the long term nature of policies;
- iii. Global, national and local consistency between various sectors;
- iv. A strong scientific foundation and an approach based on the assessment of risks and possibilities; and
- v. Strengthening of human resources by offering better prerequisites for sustainable choices and equal opportunities for individuals to attain self-fulfilment and influence society.

Sustainable development was further described by Omotola (2006:44), as stable and consistent development. The author further noted that sustainable development lasts and does not crumble

in the face of formidable problems (Omotola 2006:64). Meanwhile, the World Bank (2002) and Steer and Lutz (1993), contend that sustainable development can be viewed as self-sustaining and meeting the needs of present and future generations (World Bank 2002; Steer and Lutz 1993). It is also multi-faceted and promotes spatial, social, political, economic and psychological linkages, not only among the different sectors of the economy but also among the different regions of the national economy (Omotola 2006:46). According to Stevens (2005:32), sustainable development therefore implies interdependence of the various strata of the society in the pursuit of enduring economic, social, political, technological, cultural and environmental development.

The benefits of sustainable development are: the general human comfort, increase in educational levels, high degrees of economic comfort, low levels of poverty and high levels of equality, freedom and adequate management of the economy. Thus, sustainable development indicates a harmonisation of the values, powers and natural, cultural and social resources for human well-being, both for the present and the future (Omotola 2006:84). Therefore, to be strategic in moving towards sustainability, a clear understanding of sustainability is required (Koenig and McLenerney 2011:63).

Sustainable innovation is achieved by successfully managing the positive feedback mechanism or responses aimed at stimulating innovation. This can be achieved through the creation and sharing of knowledge and using the knowledge acquired from the innovation processes to feed into the organisational knowledge base (de Sousa 2006; Trepper 2000:64). Strandberg (2004) conducted a study to investigate the importance of local anchoring and active participation of the local communities in the projects focussed on sustainable development. The study contended that for development to occur, there is need to empower the affected communities by actively involving them in the process. This may ultimately equip them to control the process and improve their livelihoods in the long-term (Strandberg 2004:37).

Wong (2010:1445) observes that sustainable development is essential to sustain the ecosystem and the natural resources from depletion. Indeed, the United Nations Conference on Environment

and Development, held in Rio de Janeiro, Brazil, in June 1992, emphasised the need for sustainable development to secure the survival of future generations.

2.7 Role of knowledge management in sustainable development

Knowledge is the most powerful weapon against unsustainable development in Africa, which is characterised by interrelated high levels of poverty, hunger, illiteracy, illness, insecurity, superstitions, joblessness, cultural rigidities, eco-degradation and international dependence (Hamel 2005). Wong (2010:1444) posits that knowledge management and sustainable development was coined slightly over more than a decade ago, as the essential solution to global crisis of depleting natural resources coupled with high population. Wong (2010) further posits that in the current era of knowledge-driven society, knowledge is a critical resource for sustainable development. This implies that knowledge management is basic and a resource for sustainable development in any society that does not want to go extinct (Wong 2010). This view was supported by Igberaese and Onyeaghalaji (2009:5) argue that knowledge management is a necessity for sustainable development. Doodewaard (2006:40), further points out that knowledge is at the heart of sustainable development. Similarly, Fink (2008:1) and Roth (2003:72) agree that knowledge should be seen as a pre-condition for effective governance structures focusing on sustainable development. Further, Roth reckons that knowledge management is an organic part of sustainable development and a pre-requisite for furthering the process of development.

The United Nations Conference on Environment and Development (UNCED), while developing the global action plan for sustainable development, places emphasis on knowledge management as a precondition for effective governance structures focusing on sustainable development (UNCED, 1992:6). The United Nations (2004:77) further acknowledges that knowledge management is among the primary resources that can facilitate progress towards the Millennium Development Goals (MDGs). The MDGs were set by the World Bank and International Monetary Fund (IMF) and are meant to encourage development by improving social and economic conditions in the world's poorest countries (UNDP). Okurut (2012:5) sums it up by saying that enhancing the attainment of sustainable development and MDGs within the LVB, requires a wholesome approach including the use of technology, efficient utilisation of current available knowledge and continuously seeking new knowledge. This view had been expressed

earlier on by Maitima, Olson, Mugatha, Mugisha and Mutie, (2010:202) who conducted a study on the sustainability of land use in the LVB. Maitima, Olson, Mugatha, Mugisha and Mutie (2010), conclude that in order to achieve sustainable resource management, there is need to include the component of knowledge and information systems that will document and share successes.

From the above discussion, it is evident that knowledge management is critical for sustainable development. Hanson and Kararach (2011:4) describe knowledge management as systematically and routinely creating, gathering, adapting, organising, sharing and utilising knowledge for sustainable development. Through the principles and processes of knowledge generation, knowledge storage and knowledge utilisation, knowledge management facilitates creation, access and reuse of knowledge (Igberaese and Onyeaghalaji 2009:5). Such processes of knowledge generation, storage, utilisation and management according to Tripathy, Patra and Pani (2007:45), involve finding out:

- i. What the people in the society know;
- ii. Where the knowledge resides in the organisation or various sectors in the society;
- iii. How to locate people with specific knowledge, expertise and experience; and
- iv. How to share and utilise the accumulated knowledge.

These processes are also singled out by Tyler, Bibri and Tyler (2007:27), while investigating strategic sustainable development and knowledge management. These scholars conclude that the practice of knowledge management adds value and solves organisational problems. According to their framework, knowledge management is about harnessing the internal knowledge in peoples' minds (tacit) and turning it into usable knowledge (explicit), which can then be utilised to solve problems. Muresan and Cantemir (2011:21) conducted a research study aimed at creating a regional knowledge management platform as a resource for a regional development strategy. They acknowledge that in order to meet sustainability priorities and address regional challenges, the development requirements should focus on knowledge and the integration of good expertise. A major initiative undertaken by three riparian countries (Kenya, Tanzania and Uganda) in LVB to reverse the LVB deterioration was the Lake Victoria Environmental Management Programme,

Phase I (LVEMP I) (Kayombo and Jorgensen 2006:432). LVEMP I, which was implemented between 1997 and 2004, with funding from the Global Environmental Facility (GEF), was aimed at re-habilitating the Lake Basin environment and alleviating poverty. After its completion, Bachou, Nyantahe and Ichang'i (2005:43) drew out lessons learnt on the institutional framework of Lake Victoria Environmental Management Programme, Phase I (LVEMP I). These lessons provided guidance in the formulation of LVEMP II. The consultants noted that LVEMP I had no effective management information system and communication strategy. Thus, the accumulated knowledge acquired by LVEMP I programme was not readily available. The subsequent project design lacked knowledge which resulted in limited information available for the project and the affected stakeholders. In addition, the findings of the studies carried out by LVEMP I were not properly packaged and disseminated to the key stakeholders such as policy makers, the local communities, government agencies, among others.

This situation in the Lake Victoria Basin was further identified by Kayombo and Jorgensen (2006:444). These scholars carried out a review of the management situation of Lake Victoria and drew lessons such as weaknesses in knowledge sharing and dissemination. Such lessons are useful in the current and future management of the lake. They discovered that several projects had/are being undertaken in the LVB, which have produced new knowledge on Lake Basin management. However, the mass of the information and knowledge from past projects has yet to be assembled into management-friendly and community-friendly formats. A study by Chua and Lam (2005:7) on why projects fail to have an impact noted that many project-based organisations lack the expertise to handle their knowledge assets and also to build on previous findings and experiences. According to Alavi and Leidner (2001:113), the need to manage knowledge is mainly brought by problems faced by institutions in locating, preserving, disseminating/sharing and using knowledge both within and outside their organisations.

2.8 Summary

Chapter Two has reviewed the literature on knowledge management and its importance to organisations in relation to sustainable development. To understand knowledge management, the fundamentals of knowledge management and the processes involved in implementing knowledge

management in organisations were explored. It also addressed the challenges that organisations face such as the technological tools required as well as the strategy used by organisations. One central argument of this study is that for LVB to achieve sustainable development, the organisations involved must internalise and embrace knowledge management. Several of the reviewed scholars like Roth (2003:72), Strandberg (2004), Doodewaard (2006:40), Mchombu (2007), Igberaese and Onyeaghalaji, (2009), Maitima, Olson, Mugatha, Mugisha, and Mutie (2010:202) agree that knowledge management significantly contributes to sustainable development. In addition, literature provided by several international organisations including the World Bank (1998), UNDP (2003) and international non-governmental organisations (Ramalingam 2004), have acknowledged the significance of knowledge management to sustainable development. In view of the studies reviewed above, knowledge can be described as the greatest resource in achieving sustainable development of a region.

While recognising that knowledge management has become critical in achieving sustainable development, the current study addresses the need for institutions in the Lake Victoria Basin (LVB) to integrate knowledge management in the conduct of their business to be able to achieve their common goal, which is the sustainable development of LVB. It is imperative that organisations in the LVB must seek to consolidate their knowledge bases. By doing so, this will allow timely distribution and access of relevant knowledge among stakeholders. This can be done by continuously documenting lessons learnt and best practices to allow possible replication. Okurut (2012:31) sums it up by saying that for sustainable development to be achieved, there is need to use a wholesome approach. This includes efficient utilisation of current available knowledge and continuously seeking new knowledge. Chapter Two outlines the research methodology and how this study was conducted in order to achieve the set objectives.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter Two provided a review of literature pertinent to the study as per the research questions

guiding the investigation on knowledge management. The objective of the literature review was to obtain understanding of the theoretical issues that provided the framework for the study. In order to conduct the study on knowledge management, as practiced by institutions/organisations within the Lake Victoria Basin, the study was organised around the quantitative research methodology which is the focus of the chapter. Conducting a credible study requires a systematic approach that can also be replicated elsewhere and achieve the same results.

This chapter describes the procedures followed in conducting this study. It gives an overview of the processes followed and the methodology used in collecting data for the study. The chapter highlights the target population, describes the sampling technique used, the validity and reliability issues as well as ethical considerations. The instruments that were used in data collection and their validation are also discussed.

3.2 Quantitative research

Research approaches can be classified as quantitative, qualitative or mixed methods (Jackson 2009). This study assumed a quantitative approach. Quantitative research is more formalised and controlled than qualitative research and has the possibility of replication using different groups of subjects (Ngulube 2009). The quantitative approach underlies the natural-scientific method in human behavioural research and holds that research must be limited to what can be observed and measured objectively (Welman, Kruger, Mitchel and Huysamen 2005:6). Denzin and Lincoln (2005:13) point out that this method requires the use of standardised measures so that the varying perspectives and experiences of people can be fitted into a limited number of predetermined response categories to which numbers are assigned. The quantitative approach is also referred to as the traditional, experimental positivist or post-positivist approach (Creswell 2003:18).

According to Cooper and Schindler (2008), Oso and Onen (2009) and Ngulube (2009), quantitative research utilises the following methods and techniques:

- i. Conceptualisation of concepts that can be made operational by measuring instruments;
- ii. Data collection techniques using tools such as structured questionnaires; and

- iii. Data analysis techniques that seek to reduce or arrange large amounts of confusing data in graphical form, or numerical summaries with the objective of revealing the pattern and answering the research questions.

Quantitative methods have the following advantages: they state the research problem in very specific and set terms, they clearly and precisely specify both the independent and the dependent variables under investigation and follow firmly set research goals, they enable the study to arrive at more objective conclusions (Creswell 2003). The techniques applied in quantitative studies also enable a researcher to eliminate or minimise subjectivity of judgment (Creswell 2003).

The quantitative approach was thus chosen for this study due to the advantages stated above. The quantitative approach was effectively used in a study by Tyler, Bibri and Tyler 2007) on strategic and sustainable development and knowledge management.

Quantitative research method, however, also has its weaknesses which according to Moabelo (2008) include:

- i. Failure to provide the researcher with information on the context of the situation where the studied phenomenon occurred;
- ii. Inability to control the environment where the respondents provide the answers to the questions in the survey;
- iii. Limited outcomes to only those outlined in the original research proposal due to the closed nature of questions and the structured format of the questionnaire; and
- iv. Discouraging the evolution and continuous investigation of a research phenomenon.

3.3 Research design

A research design is the overall plan that guides a researcher in collecting, analysing and interpreting data and giving meaning to it (Ngulube 2009:62). Du Plooy (2001) defines a research design as a plan of how the research will be conducted, indicating who or what is involved and where and when the study will take place. Research design is the conceptual structure within which research would be conducted. The function of research design is to provide a framework for the collection of relevant information with minimal expenditure of

effort, time and money (Kothari 1985; Kumar 2005; Dawson 2002).

This study also used the descriptive survey research method. Surveys are used to investigate populations by selecting samples to analyse and discover occurrences (Oso and Onen 2009). According to Stangor (2011:107), surveys are the most widely used methods of collecting descriptive information about a group of people within a short space of time. Surveys involve selecting a representative and unbiased sample of subjects drawn from the group you wish to study. The main methods of obtaining information from respondents include face-to-face or telephone interviews, use of questionnaires or a mixture of the two. Survey research is a quantitative social research method in which one systematically asks many people the same questions, then records and analyses their answers (Neuman 2006:546). Dane (1990:120) states as follows of a survey research: “surveys involve obtaining information directly from a group of individuals. More often than not, it includes interviews and questionnaires.”

Dane (1990) argues that there are three different types of information that may be obtained from surveyed respondents: facts, opinions and behaviours. Neuman (2006:273) is of the view that a survey can aid in answering questions about behaviour, attitudes, beliefs, opinions, characteristics, expectations, self-satisfaction and knowledge. There are two main types of survey: first, a descriptive survey which is, concerned with identifying and counting the frequency of a particular response among the survey group, or second, an analytical survey which analyses the relationship between different elements (variables) in a sample group (Neville 2007).

For this particular study, large amounts of data were collected from all the 26 organisations across the five member states active in the Lake Victoria Basin. The survey method was selected to facilitate rapid cost-effective collection of data and for its potential at enabling one understand a population from a sample. Babbie (2010:254) points out that a survey is used in a study where individual persons are the units of analysis. The aim of a survey is to produce a snapshot of opinions, attitudes and behaviours of a group of people at a given time (Stangor 2011:107). The researcher found the survey method quite appropriate to use for this study considering the population, sample size and the limited time available for completing this study. The survey was

most appropriate owing to its large scale application, ability to obtain good response rates, its ability to allow the researcher to observe the attitude of the response among others advantages. A similar survey approach was used by Oluikpe, Sohail and Odhiambo (2010) in the study of the role of knowledge management in enhancing project management.

3.4 Research population and sampling

As stated in Chapter One, research population refers to a body of people or to any other collection of items under consideration for research purposes (Collies and Hussey 2003). Researchers usually draw conclusions about large groups by taking a sample. A sample is thus a segment of the population to represent the whole. Ideally, a sample should be representative and allow the researcher to make accurate estimates of the thoughts and behaviour of the larger population (Dawson 2002; Kothari 1985; Kumar 2005). For this research, the research population consisted of 26 organisations and institutions involved in development projects within the Lake Victoria Basin (LVB). From the population, a sample of respondents was taken from each of them.

When designing a sample, the following three questions were considered:

- i. Who will be surveyed?
- ii. What type of information is needed and who is most likely to have it?
- iii. How many people will be surveyed?
- iv. How should the sample be chosen?

The eventual sample size is usually a compromise between what is desirable and what is feasible. The feasible sample size is determined by the availability of resources. The acceptable practice is to try and increase the accuracy of data collection by improving the training of data collectors and data collection tools than to increase the sample size after a certain point (Degu and Yigzaw 2006).

The sampling techniques used in quantitative studies are categorised under the probability sampling techniques, namely: simple random sampling, stratified sampling, systematic sampling, cluster sampling and multistage sampling. In a simple random sample, every member of the population has a known and equal chance of being selected. For a stratified random sample; the

population is divided into mutually exclusive groups such as age groups and a random sample drawn from each group. While in a cluster sample; the population is divided into mutually exclusive groups such as blocks, and the researcher draws a sample of the group to interview. A multistage sampling procedure involves several stages of any two or more of the preceding techniques (Dawson 2002; Kothari 1985; Kumar 2005).

A sample frame was generated: this is “a list or other records of the population from which all the sampling units are drawn” (Vogt 1993:202). Cooper and Schindler (2008) point out that a sampling frame should be a complete and correct list of population members only. The sampling frame for this study was a list of all organisations and institutions involved in development programmes/projects within the LVB.

The respondents included, Chief Executive Officers/Managing Directors, Librarians, Communications Officers and Information and Technology Officers who were deemed to possess relevant information and were in a better position to understand aspects of knowledge management within their organisations.

All the 26 organisations were considered for the survey. In each of the 26 organisations, officers who were deemed to possess relevant information and were in a better position to understand aspects of knowledge management within their organisations were surveyed. The researcher selected four respondents from each organisation by virtue of their positions, that is, the Chief Executive Officer/Managing Director, the Librarian, the Communications Officer and the Information and Technology Officer. Thus, the total number of selected respondents was 104. These respondents were deemed as the key resource persons likely to give accurate responses to the questions. Lwoga (2009) used key informants since they are most likely to yield the most information about the topic under investigation. Table 3.2 (See Appendix III) shows how the researcher went on to establish the list of respondents by running a check against the 26 organisations concerning the existence of the officers sought for sampling.

The questionnaires were then distributed to the respondents. Where any of the four positions identified from the organisation did not have an occupant, the questionnaires were limited to the

other relevant positions. Out of 104 respondents targeted for the data collection during the survey, 98 respondents were identified for the survey out of which only 75 duly completed and returned the questionnaires.

3.5 Data collection

This section discusses the two data collection techniques that were used in this study, namely; questionnaires and document analysis.

3.5.1 Questionnaires

A questionnaire is a collection of items to which a respondent is expected to react, usually in writing (Oso and Onen 2009). Questionnaires may be paper-based or electronic-based. They could also be distributed over mail or computer networks (Wigg 1995:103). Paper-pencil-questionnaires can be sent to a large number of people which saves the researcher time and money, and because the responses are anonymous, people are more truthful when responding to questionnaires. However, the drawback is that some would be respondents do not return the questionnaires (Moabelo 2008).

Web-based questionnaires are relatively new but, are quickly becoming the methodology of choice for most researchers. This entails sending of an email with a link that takes one to a secure website to fill in a questionnaire. This type of research is often quick and less detailed. An obvious disadvantage is the exclusion of people who may not be connected to internet services or know how. The validity of this type of questionnaires has also been questioned since some people might be in a hurry to complete it and so might not give accurate responses (Canada's National Statistics Agency 2005). The research instrument of choice in this study was an electronic questionnaire which was administered via email.

The questionnaires comprised of both close-ended and open-ended items. The close-ended items were used for the very reason that they are easier to categorise the responses gathered while the open-ended items were included to give opportunity to experts to express their feelings and perceptions related to the items without restriction. Myers (1997) and Dawson (2006:32) argue that open-ended questions can be used to produce qualitative evidence. These open-ended questions enabled respondents to give their own opinions with regards to knowledge sharing and

knowledge retention in their respective organisations. Based on the basic research questions and in light of the review of related literature, the questionnaire was prepared in English since this is the language common to all the organisations being investigated and it was believed to be well understood as per the educational level of the respondents being investigated.

Questionnaires were administered to respondents from the target population. A self-administered questionnaire was used in administering questionnaires to the respondents from the target groups. This is a set of fixed-format, self-report items that is completed by respondents at their own pace, often without supervision (Stangor 2011:108). Some of the issues under investigation were sensitive and so a questionnaire guaranteed the respondents anonymity thereby increasing the likelihood of obtaining information in a less threatening way. Besides, the questionnaires encouraged frankness of respondents' opinions. The self-reporting questionnaire is commonly used in knowledge management to collect large amounts of data, get frank responses from knowledge workers and managers, and cater for sensitive responses as the questionnaire encourages anonymity.

According to Babbie (2010:254), surveys use questionnaires to collect large amounts of original data. This tool provided the researcher with the capability of collecting a lot of information over a short period of time. Pre-coded close-ended questionnaires were used to facilitate a speedy process but, incorporated open-ended sections that allowed respondents to share their views that may not have been previously envisaged by the researcher. Pre-coded close-ended questionnaires were used previously by Tyler, Bibri and Tyler (2007) in their survey on strategic sustainable development and knowledge management.

The use of the questionnaire has disadvantages. According to Czaja and Blair (2005) respondents find it easy to skip questions they do not understand or do not want to answer. Questionnaires can also be quite restricting since the questions are highly structured (de Vaus 1986:7).

In this study, the questionnaire (see Appendix II) comprised of two main parts; Part I consisted of personal information such as demographics. The questions were designed to establish the gender, institution of affiliation, position, work experience and duties of the respondents. During the review of literature, the researcher observed that these factors influence knowledge management

in organisations.

Part II of the questionnaire was presented in four sections. All the four sections were devoted to obtaining responses to the research questions around which the study was structured. The first of this section addressed the issue of knowledge management; what it was according to the understanding of the respondents and what was being done by the organisations to promote knowledge management. The second section sought to investigate the methods used by the organisations in capturing, sharing, transferring and retention of the knowledge. The third section addressed the challenges and barriers to effective knowledge management. Section four sought to identify the tools and technologies that can be used to enhance knowledge management; while the fifth was designed to inquire into the knowledge management strategies that were being used by the organisations.

For this study, the researcher first established contact with the gatekeepers of the various institutions selected for investigation. This was done for the purposes of obtaining clearance from persons with authority over whom and what kind of information could be shared out. Having secured clearance, the researcher sent out questionnaires (including covering letter) through email as attachments to the identified respondents. To ensure that the response rate for the questionnaire was over 60%, the researcher followed up on the original email that delivered the questionnaire with two reminders at two-week intervals.

The researcher had also trained two research assistants to help with the data entry once the questionnaires had been received back. The training entailed aspects of checking every questionnaire for completeness and accuracy, and the type of action to be taken should the respondent fail to provide answers to some items.

3.5.2 Document analysis

Document analysis, document review or documentation (Tellis 1997; Hancock 1998) or literature survey (Singh and Jones 2007) all refer to the analysis of published and unpublished literature or documents, institutional/organisational reports, articles and memoranda of relevance to the topic under investigation. According to the University of Portsmouth (2012), document analysis is a

social research method used as a tool for obtaining relevant documentary evidence to support and validate facts stated in a research, especially during literature review. The rationale for content or document analysis is to establish patterns of interest within the area of study (Tellis 1997; Myers 1997). One of the key advantages in conducting documentary research is that the researcher is able to access information that would be difficult to get in any other way, such as respondents who might not be willing to talk in a formal research interview, or might be difficult to track down (University of Portsmouth 2012). By using document analysis, the researcher is able to eliminate biased responses from study participants (University of Portsmouth 2012). Document analysis is also useful for tracking change over time; that is, doing longitudinal research (University of Portsmouth 2012). Documents often make possible the collection of data over a longer period of time as well as larger samples than might be collected from questionnaires or interviews. Further advantages of content analysis in research include the fact that such research is relatively low cost, particularly when the documents are easily accessible (University of Portsmouth 2012). Nevertheless, documents are usually not designed with research in mind. The information obtained from document analysis may be incomplete and this could create gaps in the data (missing data) as well as coding difficulties.

Thus, in this study of establishing the role of knowledge management in the sustainable development of the Lake Victoria Basin, the reviewed documents served as sources of information for the objectives of the study that were as follows:

- i. To establish the role of knowledge management in the sustainable development of Lake Victoria Basin;
- ii. To determine the challenges and barriers that hinder effective knowledge management in Lake Victoria Basin and how to overcome them;
- iii. To establish the tools and technology that can be used in enhancing knowledge management in Lake Victoria Basin; and
- iv. To establish strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development.

Only documents mainly touching on knowledge management in sustainable development of the Lake Victoria Basin were analysed. Meanwhile those touching on sustainable development of

other basins other than the LVB were excluded. In addition, documents on the Lake Victoria Basin whose content did not focus on knowledge management and its sustainable development were excluded from the study. The researcher undertook a content analysis of documents from the sampled organisations/institutions in the course of the study for the purpose of establishing and clarifying important leads. For the purposes of this study some of the key studies where the content was deemed relevant was analysed and these included: Okurut (2012), Bachou, Nyantahe and Ichang'i (2005), Kayombo and Jorgensen (2006), Maitima, Olson, Mugatha, Mugisha and Mutie (2010), Odada, Olago and Ochola (2006) and EAC (2010). These documents were obtained from internet searches by using specific search words.

3.5.3 Pilot study

To achieve reliable and valid results, prior to conducting data collection, the survey questionnaire was pretested among 10 staff members working at the Environmental Management and Economic Development Organisation based in Tanzania and Sustainable Environment and Community Development in Kenya, but these were excluded from the main study. The two organisations where pre-testing was done shared almost similar characteristics with the 26 selected organisations within the LVB.

Based on the pre-test findings, necessary amendments were made to the questionnaire before data collection commenced. According to Riet and Durrheim (2006:94), pilot studies or pre-tests are preliminary studies on small samples that help to identify potential problems with the design and particularly the research instruments. The pilot study was conducted to check on a number of aspects so as to improve on the data collection instruments as well as the quality of data collected. Twenty questionnaires were completed during this exercise. The information that was obtained from the pilot study was used to refine the questionnaire. Babbie (2010:267) is of the opinion that questionnaire pretesting is the surest way to eliminating errors, ambiguous questions and the items that people cannot answer. The pilot study was designed to test the instruments both for appropriateness of context and the ease of completion for the prospective respondents. The instrument was modified to improve their validity and reliability.

3.6 Reliability and validity of data

Validity is the extent to which research results can be accurately interpreted and generalised to other populations. It is the extent to which research instruments measure what they are supposed to measure (Oso and Onen 2009). To control quality, the researcher endeavoured to attain validity and reliability coefficients of at least 0.70 or 70%. To establish validity, the instrument was given to two experts, namely Rev. Olive Branch of the Catholic University of Eastern Africa and Jean Paul Bunyasi of Goalquest Consultants to evaluate the relevance of each item in the instrument to the objectives and rate each item on the scale of very relevant (4), quite relevant (3), somewhat relevant (2), and not relevant (1). Validity was determined using Content Validity Index (C.V.I). $C.V.I = \frac{\text{Items rated 3 or 4 by both judges}}{\text{total number of items in the questionnaire}}$. Items with validity and reliability coefficients of at least 0.70 are accepted as valid and reliable in research (Oso and Onen 2009).

Reliability has to do with the accuracy and precision of a measurement procedure. A measurement is reliable to the degree that it supplies consistent results. It is concerned with the degree to which a measurement is free of random or unstable error. Reliability is the degree to which the indicator or test is a consistent measure over time or simply, will the respondent give the same response if asked to give an answer at a different time (David and Sutton 2004:171). Reliability is about dependability and consistency (Neuman 2006:188). It is the degree to which the results are repeatable (Van der Riet and Durrheim 2006:92). To ensure reliability, the same procedure for establishing C.V.I was undertaken and the C.V.I pegged at 0.70.

3.7 Data analysis

The data collected was organised and presented according to the research questions. This is important since it draws together all relevant data for the exact issue of concern to the researcher and preserves the coherence of the material (Cohen, Manion and Morrison 2007). The researcher did collate all the relevant data from various instruments (questionnaire and document analysis) to provide a collective answer to the research questions. After the collection of completed questionnaires, data was checked for completeness, comprehensibility, consistency and reliability, a step referred to as data cleaning. The data cleaning exercise was done to eradicate numerous problems that could arise during analysis. The quantitative data obtained through the

use of questionnaires was analysed using the Statistical Package for Social Science (SPSS) software. The results of some of the analyses were exported into Microsoft Excel for visual presentation and reporting. The open-ended questions were analysed manually by content analysis and presented in textual form. The data was analysed using descriptive statistics technique and presented using tables and figures.

3.8 Ethical considerations

The ethical issues that were considered in this study included confidentiality and acquiring informed consent from each respondent before participation in the study. This is in accordance to the University of South Africa (UNISA) Policy on Ethics (UNISA 2007).

3.8.1 Privacy and confidentiality

The respondents were made to understand that they were under no obligation to divulge information that they deemed private to themselves. The researcher also entered into agreement with the respondents that the information provided will not be passed to a third party without the consent of the respondent (Oso and Onen 2009; Cooper and Schindler 2008). This study was designed to fully comply with the UNISA ethical policy as contained in the ethical clearance form.

3.8.2. Informed consent

The respondents were adequately informed about the procedures of the study that they were being asked to participate in to facilitate their making informed consent. The researcher provided respondents with information on the purpose of the study, the expected duration and the procedure to be followed, the benefits of the participants and the extent of privacy and confidentiality (Oso and Onen 2009; Cooper and Schindler 2008).

3.9 Evaluation of the research methodology

Challenges are inevitable in any research methodology and this research study was no exception. The major challenge encountered during the study was at the stage of data collection. The key challenge faced was the slow response rate by selected respondents for the study. Ngulube (2005) reported that the response rate is a concern for most surveys, though the ability to report on it reflects on the quality of the survey.

In this study, both non-item response and null responses were encountered. For instance, in non-item response, some respondents only answered a few questions and left out others while others answered the questionnaire half way, leaving out other questions. In other instances, null responses were encountered such as question 1 of Part I (See Appendix II) where respondents were required to tick only one box as their response but, they ended up ticking more than one box making the response null. In circumstances where respondents gave two answers for one question, the question item was excluded from analysis while questions that were not answered were treated as non-response.

Out of the possible one hundred and four (104) questionnaires, only 98 were distributed and the researcher received back only seventy five (75) questionnaires. Thus, only seventy six per cent (76.5%.) of the total distributed questionnaires were duly completed and returned. In a bid to improve the response rate, the respondents were allowed enough time to fill the questionnaires; while those who did not return the questionnaires at the end of the assigned period were contacted by telephone and reminded to fill the questionnaire. Despite the efforts made, some respondents (23.5%) did not return the questionnaires.

Despite the challenges faced, the use of quantitative data collection was a good approach in view of the research problem investigated and the diverse geographic area of the study. In addition, the inclusion of different categories of employees as respondents generated a diverse range, or responses which are not likely to be biased.

Based on experiences from this study, it may be useful for researchers wishing to conduct similar studies under similar environments to take into consideration the time of conducting the study. It may also be necessary to conduct focus group discussions to supplement the information generated from interviews and questionnaires. Despite the challenges encountered, the researcher was able to form a pattern of consistency on the results obtained.

3.10 Summary

Chapter Three of this study focused on research methodology that was used to conduct the study.

The detailed research design formed the basis upon which data was collected and analysed. Chapter Four presents results of the data gathered from the questionnaires and review of the documents.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction

In Chapter Three, we discussed, the research methodology used in data collection for the study. The study used the use of both open-ended and close-ended questions in the collection of data. The questionnaire was administered to four employees, working in each of the selected 26 organisations spread across the five East African countries namely, Kenya, Tanzania, Uganda, Rwanda and Burundi, within the Lake Victoria Basin. This chapter presents findings of the study as obtained from respondents. Data was collected based on the four objectives of the study. As discussed in Chapter Three, out of the initial target of 104 respondents, only 98 respondents were identified. The study questionnaires were sent to the 98, but only 75 questionnaires were returned, giving a response rate of 76.5%.

4.2 Findings from the questionnaire

The four objectives of the study were: to establish the role of knowledge management in sustainable development; to determine the challenges and barriers that hinder effective knowledge management; to establish the tools and technology that can be used in enhancing knowledge management; and to establish strategies used by organisations in the Lake Victoria Basin to manage knowledge generated. These have been sub-divided into five sections and are discussed in this chapter, under the following subheadings: characteristics of respondents; knowledge management; challenges and barriers to knowledge management; tools and technologies for knowledge management in organisations under investigation; and institutionalisation of knowledge management.

4.2.1 Characteristics of the respondents

The researcher sought to establish the respondents' gender, institution, number of years the respondent has been in their current job and the areas of work they have performed in the past.

4.2.1.1. Gender of respondents

With regard to gender of the respondents, 51.2% were male, while 48.8% were female (Table 4.1). That means the ratio of male to female in the knowledge industry is just about 1:1.

Table 4.1 Gender of respondents

| Attribute | Frequency | Percent |
|--------------|-----------|--------------|
| Male | 50 | 51.2 |
| Female | 48 | 48.8 |
| Total | 98 | 100.0 |

4.2.1.2 Institution of respondent

Respondents were drawn from a total of 26 institutions spread across the five East African countries namely, Kenya, Tanzania, Uganda, Rwanda and Burundi.

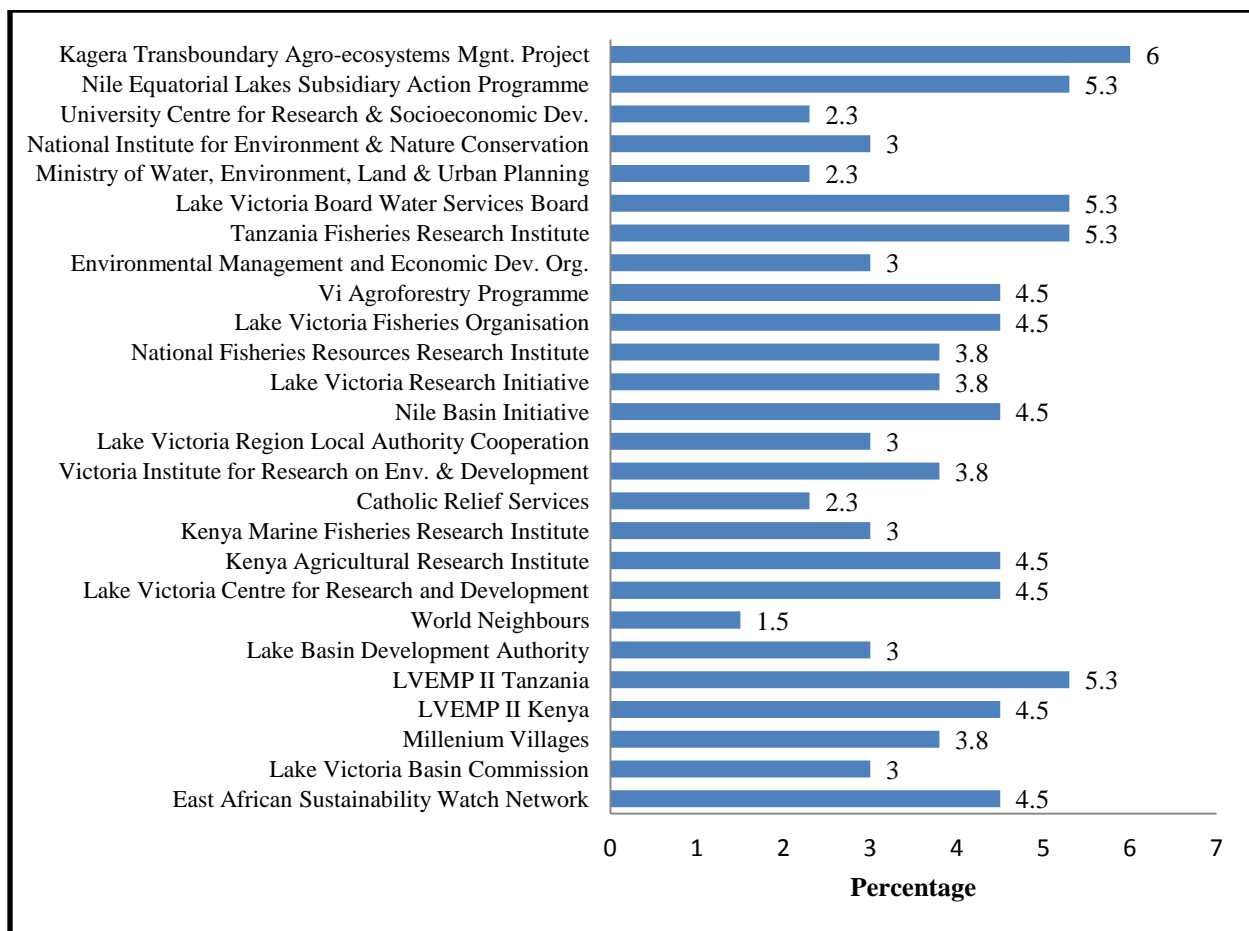


Figure 4.1 Institutions of respondents

4.2.1.3 Number of years served in the current job

Respondents were asked to state the number of years of experience that they had acquired in their career. The highest percentage (29%) of the respondents reported having work experience of between 10-15 years (Table 4.2).

Table 4.2 Years of work experience

| Years of experience | Percentage |
|---------------------|------------|
| Less than 5 years | 9 |
| 5-10 | 23 |
| 10-15 | 29 |
| 15-20 | 24 |
| Over 20 years | 15 |

4.2.1.4 Areas of specialisation of the respondents

As regards the areas of specialisation of the respondents, the findings showed that most respondents were either librarians or ICT officers, with both at 25.51%. (Figure 4.2).

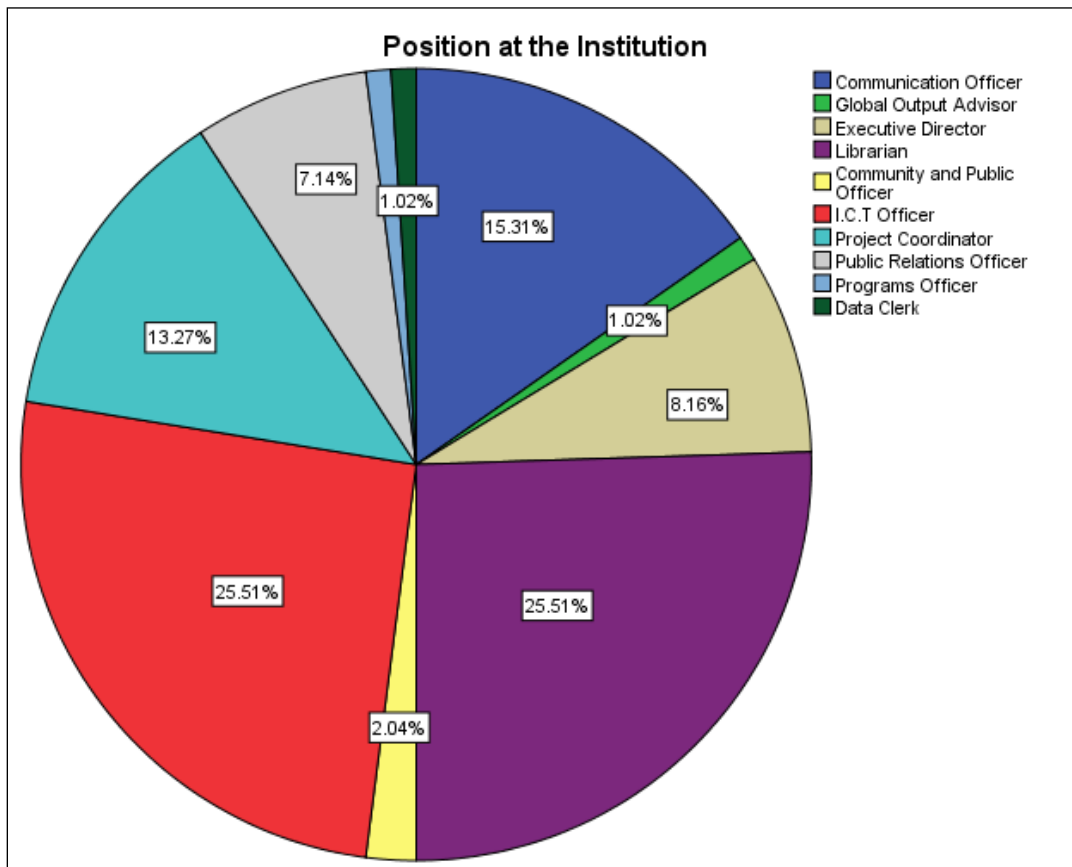


Figure 4.2 Respondents' position at the institution

4.2.2 Knowledge management

Dalkir (2010:3) defines knowledge management as “the deliberate and systematic coordination of an organisation’s people, technology, processes and organisational structure in order to add value through reuse and innovation”. This section sought to establish the extent to which respondents understood knowledge management, benefits of knowledge management to an organisation and the role of knowledge management towards attainment of sustainable development. The respondents were required to agree, or disagree, with several statements provided.

4.2.2.1. Benefits of knowledge management

On the benefits of knowledge management, 63 respondents (64.3%) strongly agreed, while 35 (35.7%) agreed with the statement that knowledge management is beneficial to their institution (Table 4.3).

Table 4.3 Knowledge management is beneficial (N=98)

| Attribute | Frequency | Percentage |
|----------------|-----------|--------------|
| Strongly Agree | 63 | 64.3 |
| Agree | 35 | 35.7 |
| Total | 98 | 100.0 |

4.2.2.2 Role of knowledge management in sustainable development

In a bid to establish the role of knowledge management in sustainable development of the Lake Victoria Basin, respondents were asked to state how strongly they agreed or disagreed with the statement that knowledge management plays a role in sustainable development. Majority of the respondents (65.3%) strongly agreed, 32.7% agreed, while 2% disagreed with the statement (Table 4.4). These findings are in harmony with Hamel (2005) who stated that knowledge may be the most powerful weapon against unsustainable development in Africa. Further, Okurut (2012:5) noted that sustainable development within Lake Victoria Basin requires a wholesome approach including use of technology, efficient utilisation of current available knowledge and continuously seeking new knowledge.

Table 4.4 Knowledge management plays a role in sustainable development

| Attributes | Frequency | Percent |
|----------------|-----------|--------------|
| Strongly Agree | 64 | 65.3 |
| Agree | 32 | 32.7 |
| Disagree | 2 | 2.0 |
| Total | 98 | 100.0 |

4.2.2.3 Knowledge as a systematic discipline to empower organisations

The researcher, sought to establish the respondents' level of agreement, or disagreement, with the statement that knowledge management is a systematic discipline of policies, processes, activities and tools which empower organisations to apply knowledge to improve effectiveness, innovation and quality. Fifty three percent strongly agreed, 34.7% agreed, 10.2% disagreed, while 1% strongly disagreed with the statement (Figure 4.3).

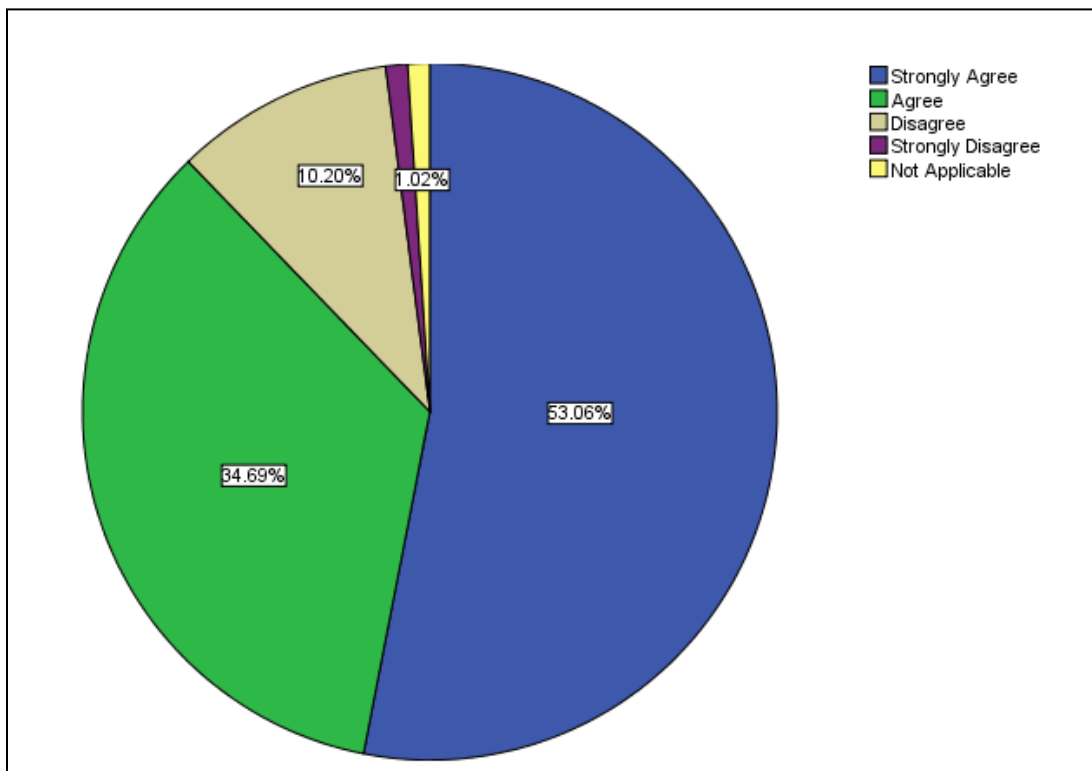


Figure 4.3 Knowledge management as a systematic discipline to empower organisations (N=98)

4.2.2.4 Organisation's role in facilitating the discovery and capture of information and knowledge

Discovery of information and knowledge entails mapping out the knowledge resources within an organisation, which is then captured and stored in a knowledge repository (Tripathy, Patra and Pani 2007:3). The researcher sought to establish the respondents' level of agreement with the statement that their organisation facilitates the discovery and capture of information and knowledge. Up to 39.8% of respondents strongly agreed, 54.1% agreed, while 5.1% disagreed with this statement (Figure 4.3).

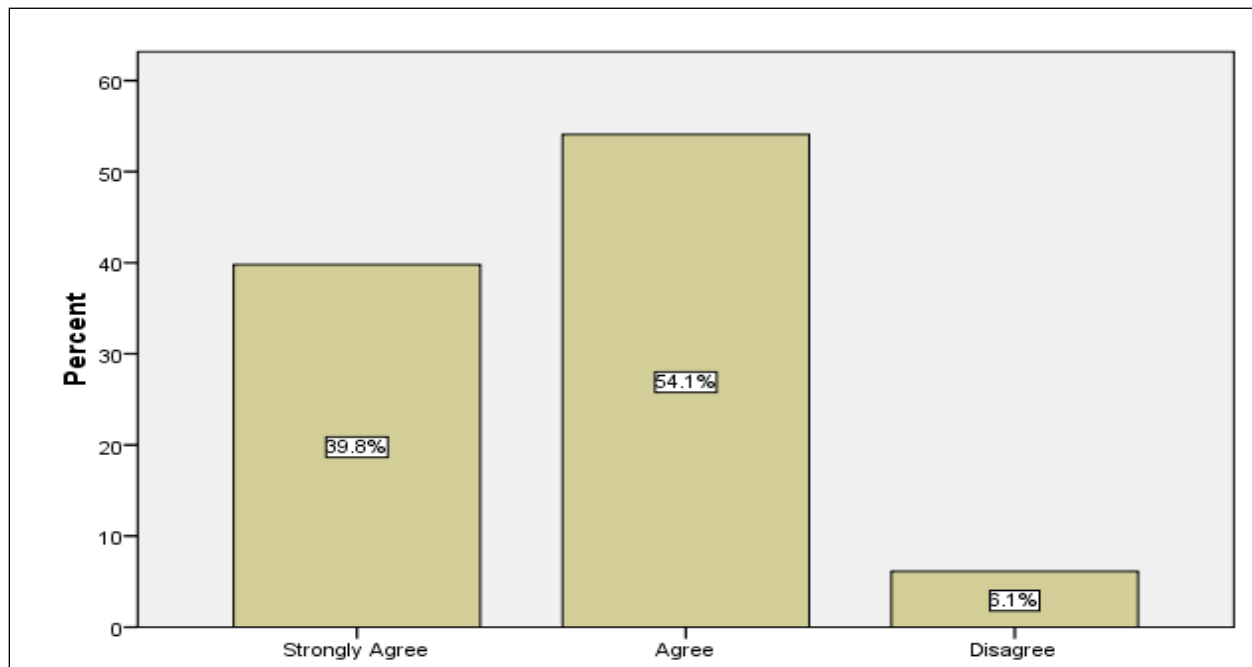


Figure 4.4 Organisation's facilitation of discovery and capture of knowledge

4.2.2.5 Organisation's facilitation of storage/retrieval of knowledge

As discussed in Chapter Two, storage and retrieval of knowledge involves an important aspect of effective knowledge management. To establish how the different organisations facilitate storage and retrieval of knowledge, the researcher sought to establish the respondents' view on the statement that their organisation facilitates storage and retrieval of knowledge. Up to 40.8% strongly agreed, 52% agreed, while 7.1% disagreed with the statement (Table 4.5).

Table 4.5 Whether organisations facilitate storage/retrieval of knowledge

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Strongly Agree | 40 | 40.8 |
| Agree | 51 | 52.0 |
| Disagree | 7 | 7.1 |
| Total | 98 | 100.0 |

According to literature reviewed in chapter two, transfer of knowledge allows organisations to exploit and capitalise on knowledge-based resources (Cabrera and Cabrera 2005:725; Davenport and Prusak 1998). The researcher sought to establish whether LVB organisations facilitate knowledge transfer across their various departments/functional units. The majority of respondents (52%) agreed, 35.7% strongly agreed, while 12.2 disagreed with the statement (Table 4.6).

Table 4.6 Facilitating the transfer of knowledge across departments

| Attributes | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 35 | 35.7 |
| Agree | 51 | 52.0 |
| Disagree | 12 | 12.2 |
| Total | 98 | 100.0 |

4.2.2.6 Specific knowledge needed for effective management of knowledge resides with experts/colleagues

Knowledge management has three key components, that is people, processes and technology (Alavi and Leidner 2001:76; Pee and Kankanhalli 2009; Dalkir 2010; NHS National Library for Health 2005). The people component encompasses to create, share and use knowledge. The

researcher sought to establish the whether or not, the specific knowledge needed for effective knowledge management, within the LVB organisations resides with experts/colleagues. The findings showed that the majority of the respondents (34.7%) agreed, 15.3% strongly agreed, while 32.7% disagreed and 14.3% strongly disagreed (Table 4.7).

Table 4.7 Specific knowledge needed for effectiveness is found with experts/colleagues

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 15 | 15.3 |
| Agree | 34 | 34.7 |
| Disagree | 32 | 32.7 |
| Strongly Disagree | 14 | 14.3 |
| Not Applicable | 3 | 3.1 |
| Total | 98 | 100.0 |

4.2.2.7 Respondent sought knowledge not directly available in their organisations

As to whether or not, the respondents sought knowledge that was not directly available in their organisations, the majority of respondents (49%) strongly agreed with the statement, 37.8% agreed, while 11.2% and 2% disagreed and strongly disagreed respectively (Table 4.8). The findings revealed that the majority of respondents strongly agree that they always have to seek knowledge not directly available in their organisations.

Table 4.8 Seeking knowledge not directly available in LVB organisations

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 48 | 49.0 |
| Agree | 37 | 37.8 |
| Disagree | 11 | 11.2 |
| Strongly Disagree | 2 | 2.0 |

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 48 | 49.0 |
| Agree | 37 | 37.8 |
| Disagree | 11 | 11.2 |
| Strongly Disagree | 2 | 2.0 |
| Total | 98 | 100.0 |

4.2.2.8 Organisations encouragement of documentation of lessons learnt

According to the documents reviewed in Chapter Two, organisations should continuously document lessons learnt and best practices to allow possible replication (Maitima, Olson, Mugatha, Mugisha and Mutie 2010:202). Okurut (2012) further notes that organisations must efficiently utilise the available knowledge and continuously seek new knowledge. Maitima, Olson, Mugatha, Mugisha and Mutie (2010), further suggest that in order to achieve sustainable resource management, it is necessary to include the component of knowledge and information systems that will document and share successes. The researcher sought to know whether the organisations encourage documentation of lessons learnt, majority of respondents (51.88%) strongly agreed, 42.11% agreed, while 6.02% disagreed (Figure 4.5).

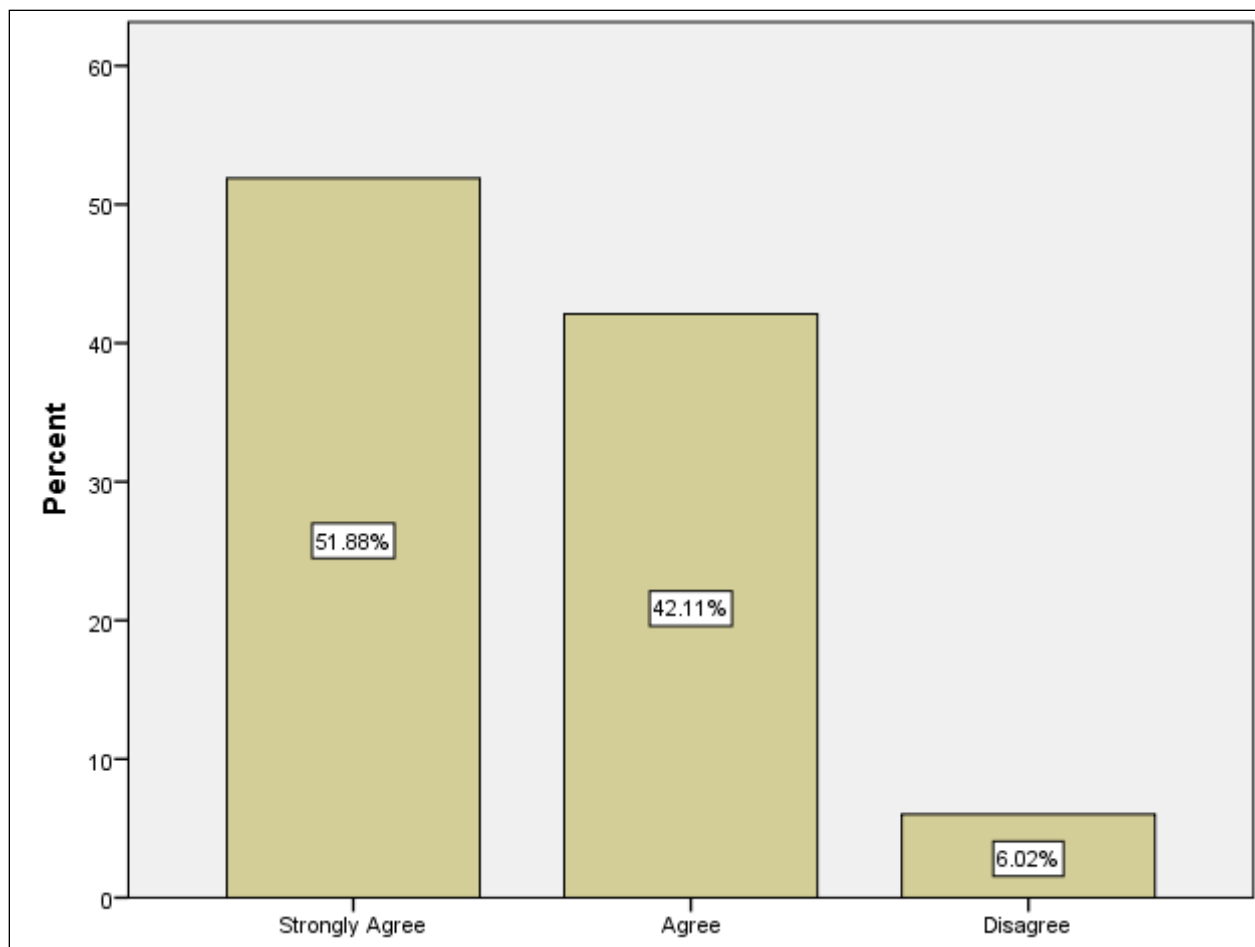


Figure 4.5 Organisation’s encouragement of documentation of lessons learnt

4.2.2.9 Mandatory deposition of key documents in the library for wide access

The researcher sought to establish from the respondents whether their respective organisations have made it mandatory to deposit key documents in the library or documentation centres, for proper storage and wide access. Based on the findings, it was clear that most respondents (39.8%) strongly agreed, while 41.8% agreed and 8.2% disagreed. However, 9.2% of the respondents reported that the statement was not applicable to them (Table 4.9).

Table 4.9 Mandatory to deposit key documents in the library for universal access

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Strongly Agree | 39 | 39.8 |
| Agree | 41 | 41.8 |
| Disagree | 8 | 8.2 |
| Not Applicable | 9 | 9.2 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

4.2.3 Knowledge management and sustainable development

To establish the influence of knowledge management on sustainable development of the Lake Victoria Basin, the researcher sought to establish the respondents' level of agreement or disagreement with the following statements:

4.2.3.1 Knowledge management process and their ability to make a difference in achieving sustainable development

According to Nonaka and Takeuchi (1995:77), knowledge management processes are the social and technological steps that enhance the contribution of knowledge in the organisation. The researcher sought to establish the level to which respondents agreed, or disagreed, with the statement that Knowledge Management processes used make a difference in achieving sustainability. Majority of the respondents (46.9%) agreed, 41.8% strongly agreed while 8.2% disagreed with the statement that knowledge management processes used make a difference in achieving sustainability.

Table 4.10 Knowledge management processes used make a difference in achieving sustainability

| Attribute | Frequency | Percent |
|----------------|-----------|--------------|
| Strongly Agree | 41 | 41.8 |
| Agree | 46 | 46.9 |
| Disagree | 8 | 8.2 |
| Missing | 3 | 3.1 |
| Total | 98 | 100.0 |

4.2.3.2 Knowledge management is a pre-requisite for furthering sustainable development process

According to Wong (2010:1444) and Igberaese and Onyeaghalaji (2009:5), knowledge is a critical resource for sustainable development. The researcher sought to establish the respondents' opinion as to whether knowledge management is a pre-requisite for furthering the sustainable development process. The findings showed that a majority of respondents (45.83%) agreed, 32.29% strongly agreed while 19.79% disagreed and 2.08% strongly disagreed with the statement (Figure 4.6).

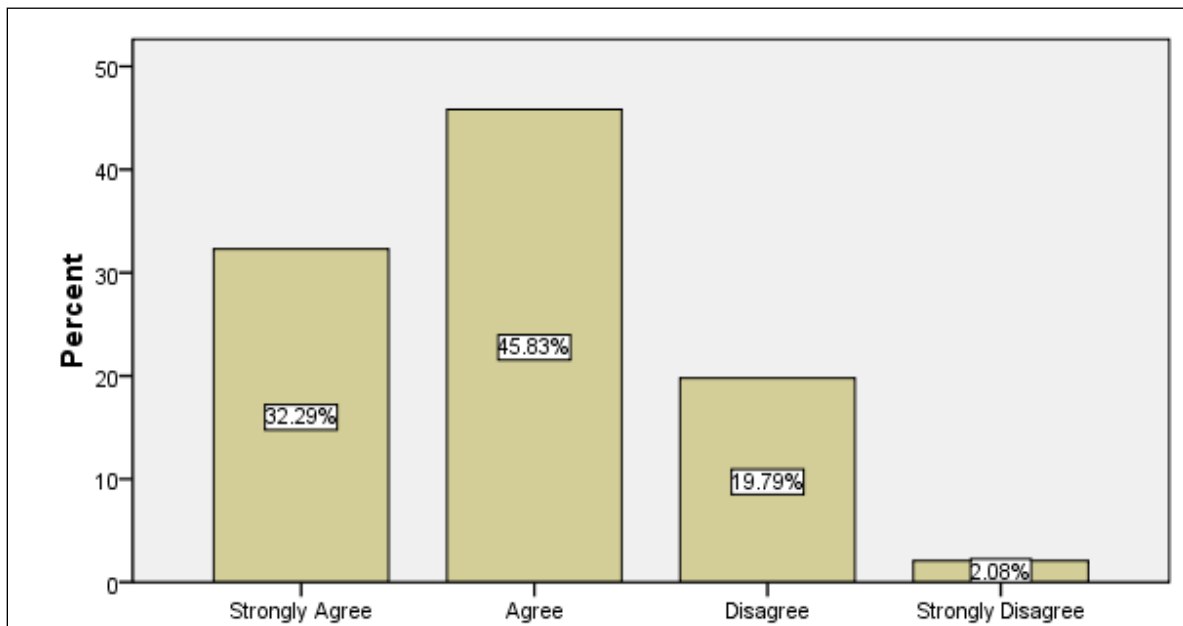


Figure 4.6 Knowledge management is a prerequisite for furthering the sustainable development process

4.2.3.3 Pivotal role of knowledge management to development in modern society

Respondents were asked to state their level of agreement with the statement that knowledge management is pivotal to development in modern society. Almost half the respondents (49.0%) strongly agreed, 33.7% agreed, while 14.3% disagreed while another 2.0% strongly disagreed with the statement (Table 4.11).

Table 4.11 Knowledge management is pivotal to development in modern society.

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 48 | 49.0 |
| Agree | 33 | 33.7 |
| Disagree | 14 | 14.3 |
| Strongly Disagree | 2 | 2.0 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

4.2.3.4 Knowledge management as an organic part and potent instrument for furthering sustainable development

The researcher sought to establish if knowledge management is an organic part and potent instrument for furthering sustainable development. The findings showed that the majority of respondents (43.9%) agreed, 36.7 strongly agreed, while 17.3% disagreed while 1% strongly disagreed (Table 4.12).

Table 4.12 Knowledge management is both organic part and potent instrument for furthering sustainable development

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 36 | 36.7 |
| Agree | 43 | 43.9 |
| Disagree | 17 | 17.3 |
| Strongly Disagree | 1 | 1.0 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

4.2.3.5 Sustainable development requires wholesome approach to knowledge management

Okurut (2012) noted that for the Lake Victoria Basin to achieve sustainable development wholesome approach, including use of technology, efficient utilisation of current available knowledge and continuously seeking new knowledge is required. The researcher sought to establish from the respondents whether sustainable development requires a wholesome approach to knowledge management. The findings showed that most of the respondents (47.96%) strongly agreed, while 38.78% agreed with the statement that the attainment of sustainable development requires a wholesome approach including the use of technology, efficient utilisation of current available knowledge and continuously seeking new knowledge. Only 12.24% disagreed with the statement (Figure 4.7).

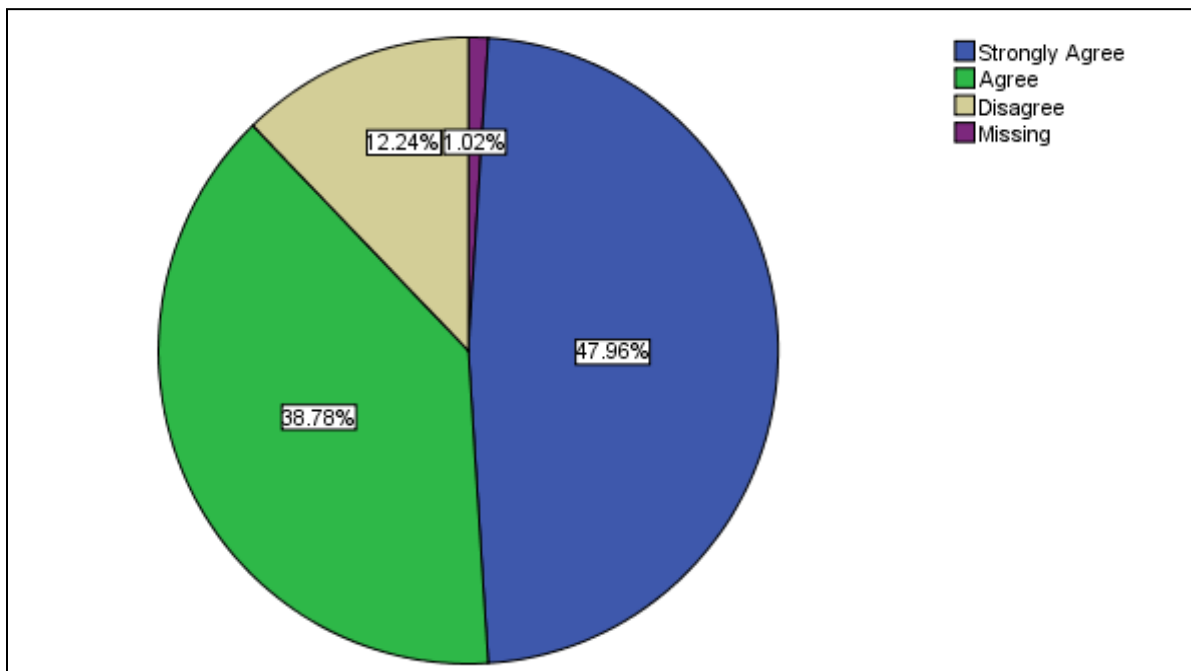


Figure 4.7 Sustainable development requires wholesome approach to knowledge management

4.2.4 Significance of knowledge management in achieving best results with regards to several aspects in an organisations

In an attempt to establish how significant the role of knowledge management is in achieving the best results with regard to improving competitive advantage, improving customer focus, innovations creation, inventory reduction, employee development and sustainable development

and better decision making. A Pearson correlation¹ was performed and the findings showed that there was a very strong positive significant relationships among the variables (R=0.983, p=0.01), (Table 4.13). In addition, as the significance of knowledge management in sustainable development increased the significance of knowledge management in employee development increased as well. This applies to the remaining relations because they are positive (Table 4.13). The Pearson product-moment correlation coefficient is a measure of the strength of the linear relationship between two variables (Gayen 1951).

Table 4.13 Correlation between knowledge management and various aspects in organisations

| Pearson correlation attributes | | Significance of knowledge management in Sustainable development | Significance of knowledge management in Improving competitive advantage | Significance of knowledge management in employee development |
|---|---------------------|---|---|--|
| Significance of knowledge management in Sustainable development | Pearson Correlation | 1 | .988 | .991 |
| | Sig. (2-tailed) | | .000 | .000 |
| | N | 98 | 98 | 98 |
| Significance of knowledge management in Improving competitive advantage | Pearson Correlation | .988 | 1 | .983** |
| | Sig. (2-tailed) | .000 | | .000 |
| | N | 98 | 98 | 98 |
| Significance of knowledge management in Employee development | Pearson Correlation | .991 | .983 | 1 |
| | Sig. (2-tailed) | .000 | .000 | |
| | N | 98 | 98 | 98 |

** Correlation is significant at the 0.01 level (2-tailed).

As regards the significance of knowledge management in improving customer focus, the findings showed that 47.42% of the respondents felt that knowledge management was significantly important in improving customer focus, 32.99% felt that it is very important, 12.37% felt they were fairly important, 3.09% neither important, while 4.12% felt they were fairly not important (Figure 4.8).

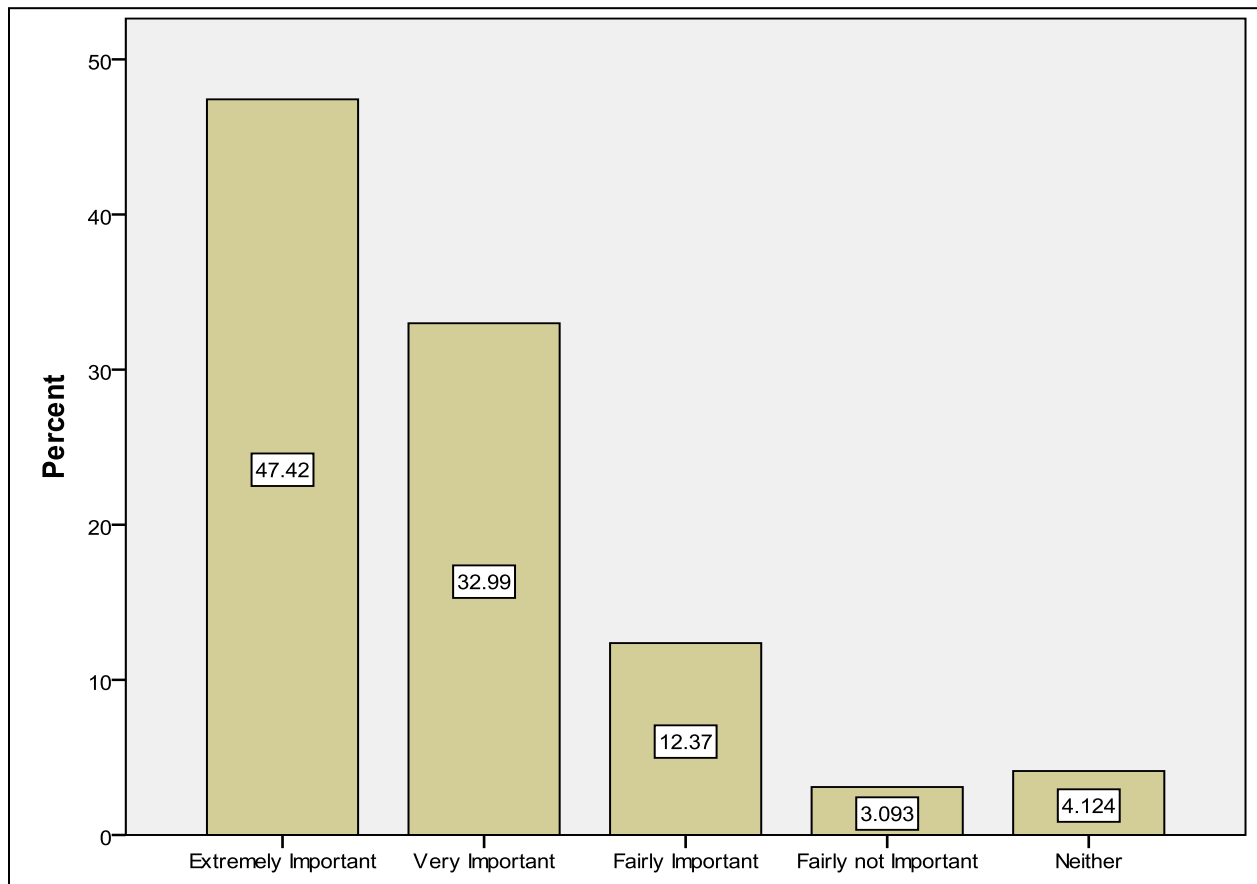


Figure 4.8 Significance of knowledge management in improving customer focus

In regard to the significance of knowledge management in innovations creation, most of the respondents (49.84%) felt that it was extremely important, 16.49% thought it was very important, 16.49% fairly important, 13.4% fairly not important while 4.12% felt it was neither (Figure 4.9).

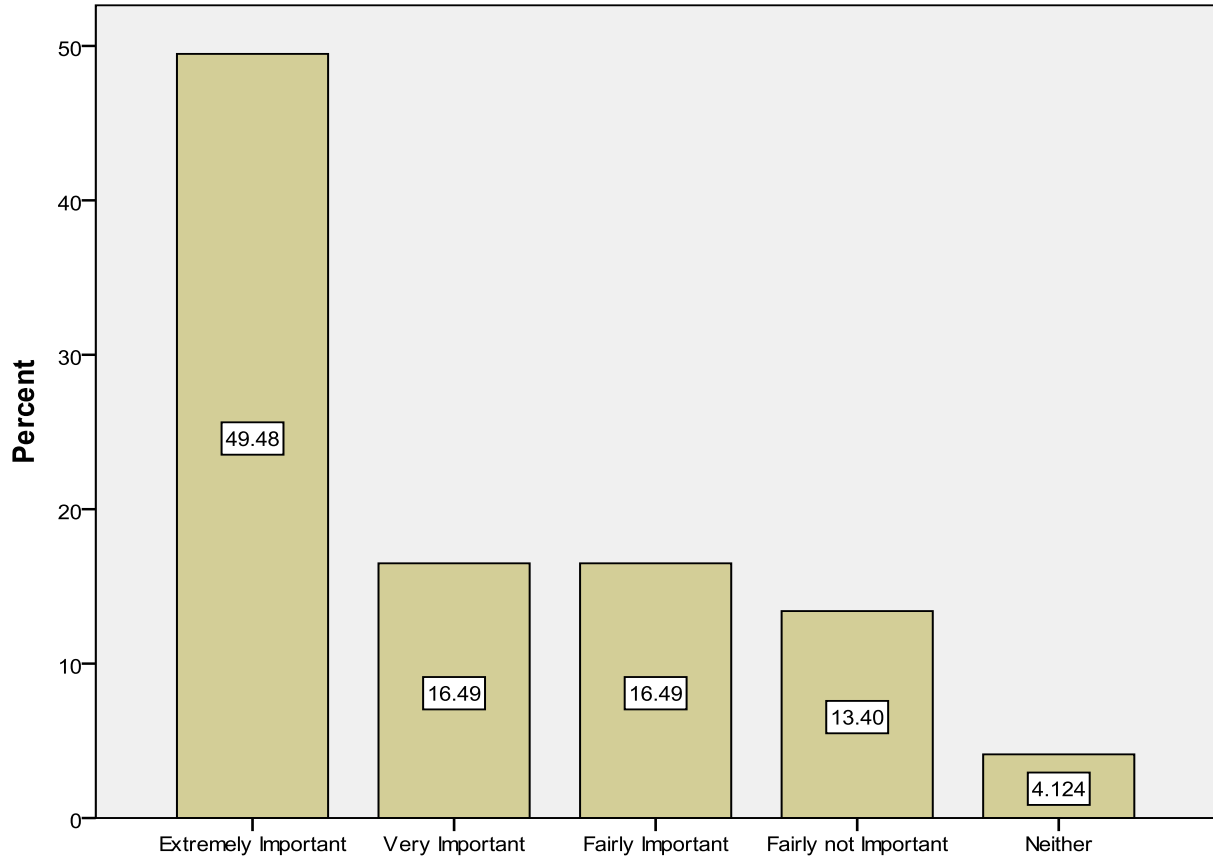


Figure 4.9 Significance of knowledge management in innovations creation

As regards the significance of knowledge management in reducing the list of items or contents (i.e. inventory reduction), most respondents (25.5%) felt that it was very important, 23.5% felt it was extremely important, while 22.4% felt it was fairly important. However, 7.1% of the respondents felt it was neither, 6.1% fairly not important, 9.2% not very important and 5.1% extremely not important (Table 4.14).

Table 4.14 Significance of knowledge management in inventory reduction

| Attribute | Frequency | Percent |
|---------------------|-----------|---------|
| Extremely Important | 23 | 23.5 |
| Very Important | 25 | 25.5 |
| Fairly Important | 22 | 22.4 |

| | | |
|-------------------------|-----------|--------------|
| Neither | 7 | 7.1 |
| Fairly Not Important | 6 | 6.1 |
| Not Very Important | 9 | 9.2 |
| Extremely Not Important | 5 | 5.1 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

On the significance of knowledge management in better decision making, a large proportion of respondents (78.6%) felt it was extremely important, 12.2% felt it was very important and 3.1% felt it was fairly important. However, 2% felt it was neither, 2% felt it was not very important and 1% felt that it was extremely not important (Table 4.15).

Table 4.15 Significance of knowledge management in better decision-making

| Attribute | Frequency | Percent |
|-------------------------|-----------|---------|
| Extremely Important | 77 | 78.6 |
| Very Important | 12 | 12.2 |
| Fairly Important | 3 | 3.1 |
| Neither | 2 | 2.0 |
| Not Very Important | 2 | 2.0 |
| Extremely Not Important | 1 | 1.0 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

4.2.5 Format of storage and tracing of internal and external knowledge within the organisations

The researcher sought to establish the format in which knowledge, or information is stored within their organisations. Almost all respondents (99%) reported that the information they used in performing their duties was mainly stored in paper-based media (Table 4.16).

Table 4.16 Location of knowledge/information – paper-based medium

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Yes | 97 | 99.0 |
| No | 1 | 1.0 |
| Total | 98 | 100.0 |

The researcher sought to establish how organisations trace internal and/or external knowledge. Up to 79.6% of the respondents reported that their organisations mainly traced internal and/or external knowledge by having a directory of expertise, while 20.4% reported that their organisations did not have such directories (Table 4.17).

Table 4.17 Tracing internal/external knowledge by establishing a directory of expertise

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Yes | 78 | 79.6 |
| No | 20 | 20.4 |
| Total | 98 | 100.0 |

4.2.6 Role of managers in promoting knowledge transfer and sharing in the organisations

The researcher sought to establish the role that managers play in promoting knowledge transfer and sharing within the organisations. Majority of the respondents (93.96%) cited the promotion of professional networks as the major role of managers in promoting knowledge transfer and sharing within their organisations (Figure 4.10).

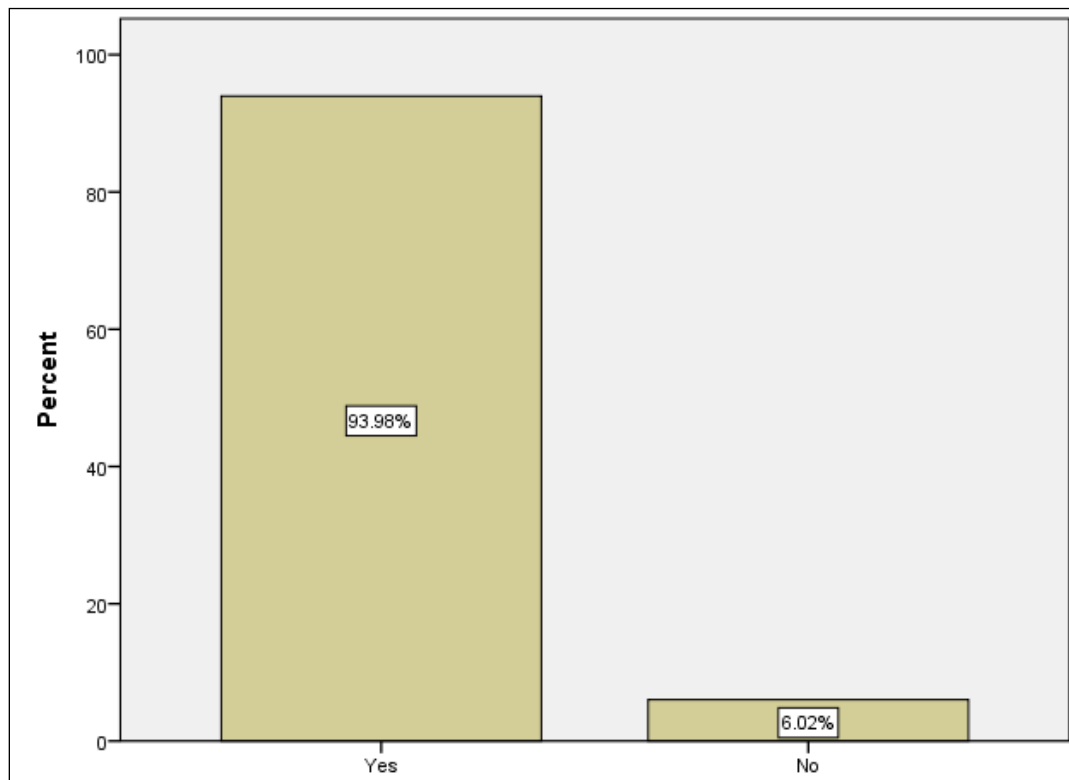


Figure 4.10 Promoting professional networks as the main role of managers in promoting knowledge transfer and sharing

4.3 Challenges and barriers to knowledge management

From the literature review in Chapter Two, Pirkkalainen and Pawlowski (2013:11) defined a barrier to knowledge management as “any challenge, risk, difficulty, obstacle, restriction or hindrance that might prevent a single person, or a group or an organisation to reach an objective and success in a specific context when the challenge is related to acting or working in a collaborative cross border setting.” The study by Brandt and Hartmann (1999), as cited by Lotti (2014:1056), identified technology, organisation and people as the main barriers and challenges to knowledge management. In order to establish some of the barriers to knowledge management, respondents were asked what they perceived to be the challenges that hinder effective knowledge sharing within their organisations.

Multiple responses were given. For instance, the majority of respondents (51.55%) strongly agreed with the statement that lack of an open-minded sharing environment was a challenge that

hindered effective knowledge sharing. However, 34.02% agreed, 12.37% disagreed while 2.06% strongly disagreed (Figure 4.11).

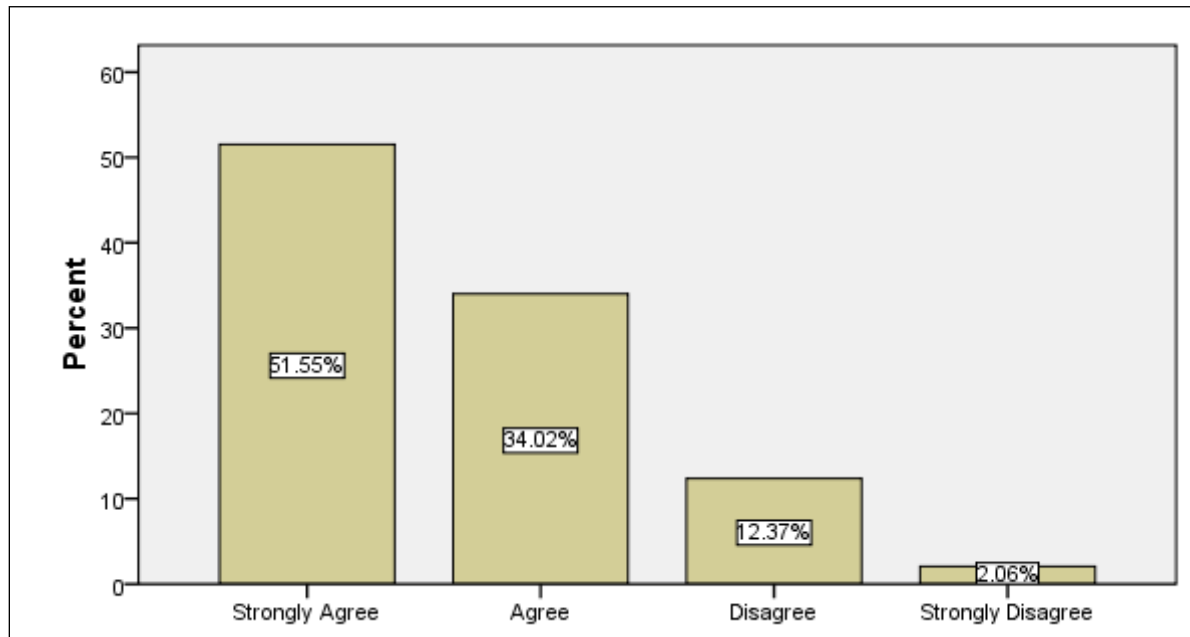


Figure 4.11 Lack of open-minded sharing environment as a challenge to knowledge sharing

Up to 38.78% of respondents strongly agreed, while 32.85% agreed with the statement that bureaucratic procedures, involved in sharing knowledge/information was among the challenges and barriers to knowledge sharing in their organisations. However, 24.49% of the respondents disagreed and 2.04% strongly disagreed with the statement (Figure 4.9).

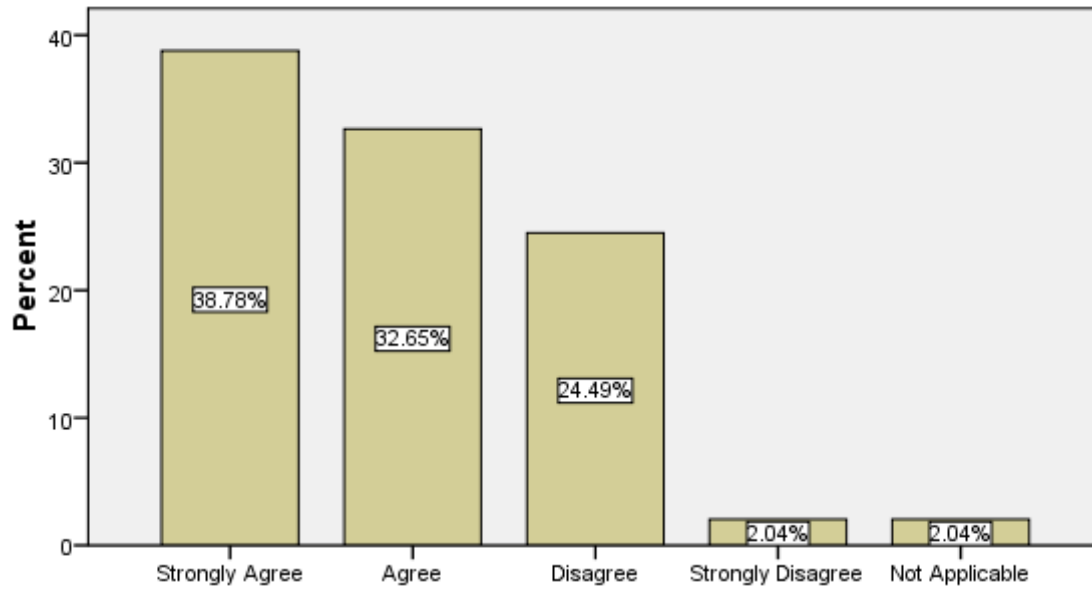


Figure 4.12 Bureaucratic procedures as a challenge to knowledge management

Technology as a knowledge management enabler provides a platform for knowledge management and enhances its impact in an organisation by helping and leveraging its knowledge systematically and actively (Singh and Kant 2008). The majority of respondents (37.8%) strongly agreed, while 31.6% agreed with the statement that a poor information system was a challenge that hinders effective knowledge sharing in their organisation. However, 25.5% disagreed while 5.1% strongly disagreed with the statement (Table 4.18).

Table 4.18 Poor information system as a challenge to knowledge sharing

| Attribute | Frequency | Percent |
|-------------------|-----------|--------------|
| Strongly Agree | 37 | 37.8 |
| Agree | 31 | 31.6 |
| Disagree | 25 | 25.5 |
| Strongly Disagree | 5 | 5.1 |
| Total | 98 | 100.0 |

Most respondents (53.68%) rated information sharing within their organisation as good, 15.79% as very good, 29.47% as average while 1.05% reported that information sharing within their organisation was poor (Figure 4.13).

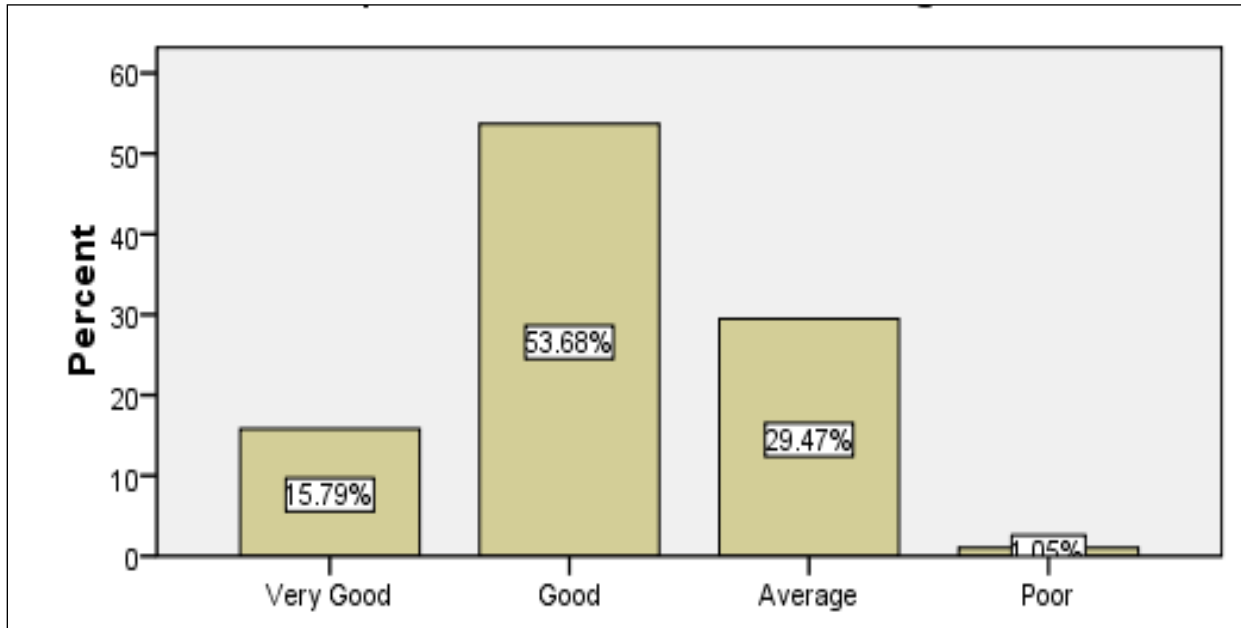


Figure 4.13 Information sharing within the organisations

4.3.1 Obstacles to efficient documentation of knowledge acquired

The researcher sought to establish the obstacles to proper documentation in the organisations. Lack of time was cited by 75.19% of the respondents as one of the obstacles to proper documentation. However, 24.81% thought it was not an obstacle to proper documentation (Figure 4.14).

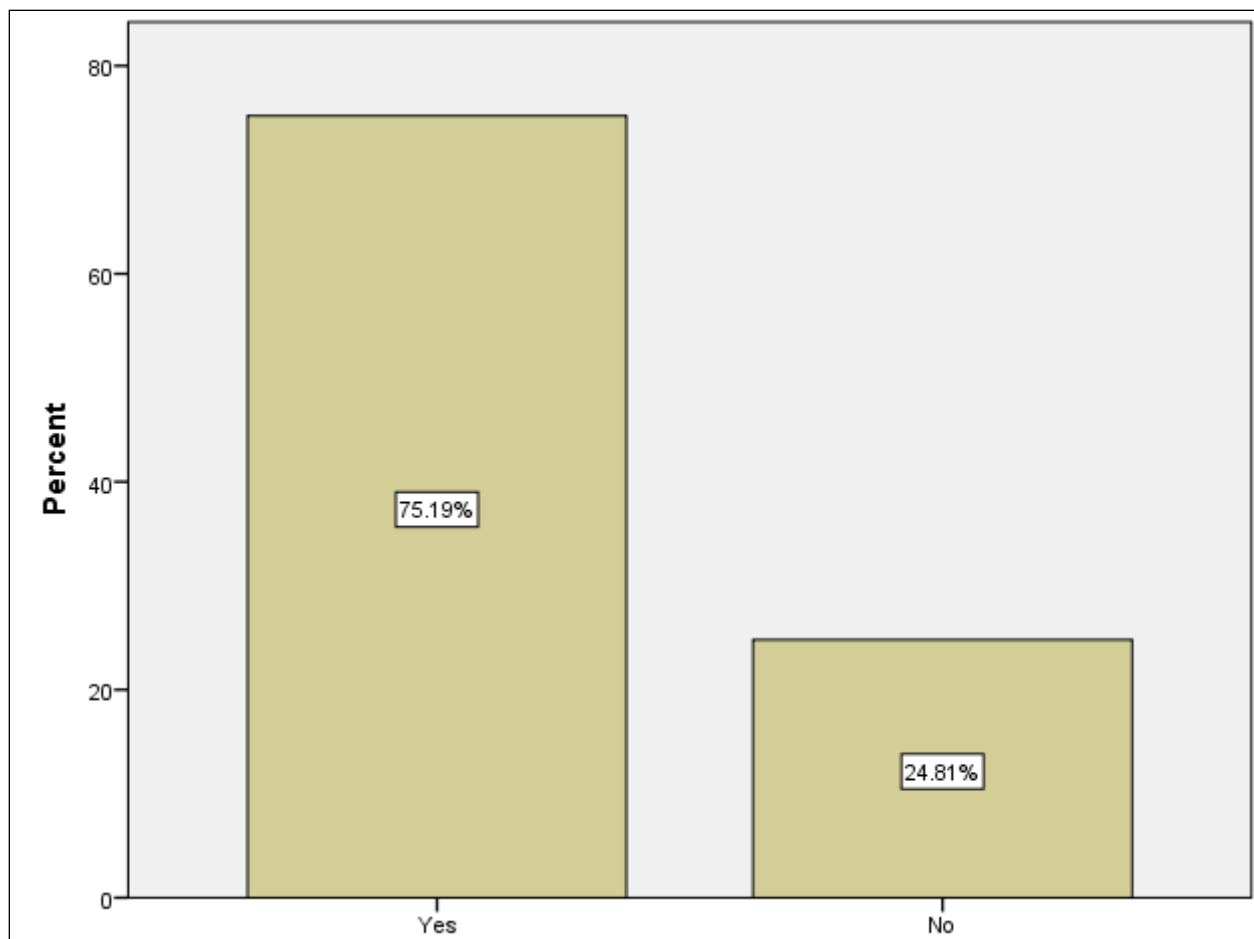


Figure 4.14 Lack of time as an obstacle to proper documentation

Most of the respondents (68.4%) viewed knowledge creation as being considered important by their organisations (Table 4.19).

Table 4.19 Is knowledge creation considered as an important process in documentation

| Attribute | Frequency | Percent |
|--------------|-----------|--------------|
| Yes | 67 | 68.4 |
| No | 31 | 31.6 |
| Total | 98 | 100.0 |

4.4 Knowledge management tools and technologies

Technology is a fundamental building block that supports and coordinates knowledge management (Yeh, Lai and Ho 2006:794). From the literature review, technology facilitates the linking of the right information and knowledge to the right people at the right time (Kazemi and Allahyari 2010). The researcher wanted to find out which knowledge management tools and technologies are used by the organisations. Several options were cited. The internet was mentioned by all the respondents (100%) as one of the knowledge management tools and technologies. Majority of the respondents (87.97%) agreed that databases were available in their organisations while only 12.03% stated they are not available (Figure 4.15).

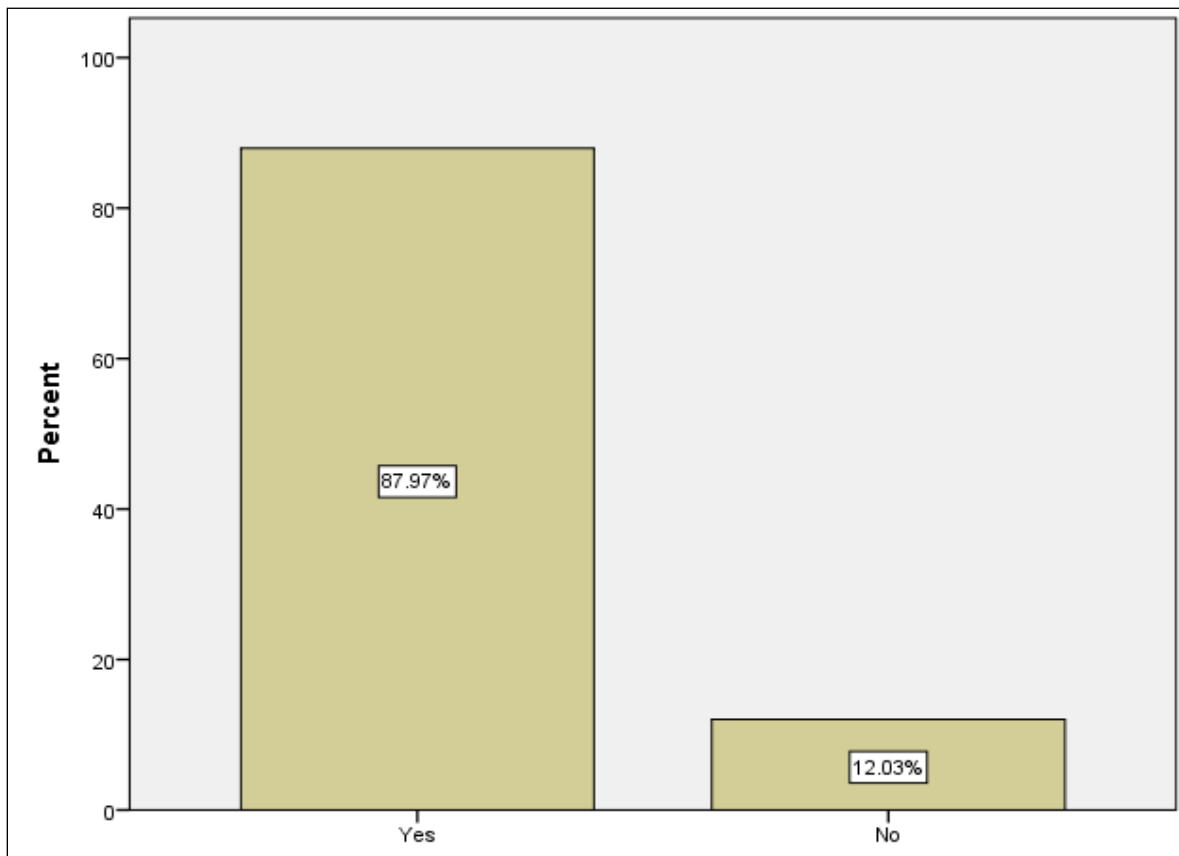


Figure 4.15 Availability of a database as a knowledge management tool / technology

Only 11.2% of respondents reported having a data warehousing tool in their organisations for knowledge management. The majority of the respondents (88.8%) reported that they do not have a data warehousing tool in their organisations (Table 4.20).

Table 4.20 Data warehousing as a knowledge management tool and technology

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Yes | 11 | 11.2 |
| No | 87 | 88.8 |
| Total | 98 | 100.0 |

4.4.1 Utilisation of information and communication technology within the organisations

The researcher sought to establish how organisations utilise information and communication technology. Several responses were given by the respondents. Most of the respondents (94.9%) reported that their organisations utilise information and communication technology as a data storage device (Table 4.21).

Table 4.21 Data storage device as a way of utilising ICT within the organisations

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Yes | 93 | 94.9 |
| No | 5 | 5.1 |
| Total | 98 | 100.0 |

Majority of respondents (95.92%) also reported that their organisations utilise information and communication technology for communication (Figure 4.16).

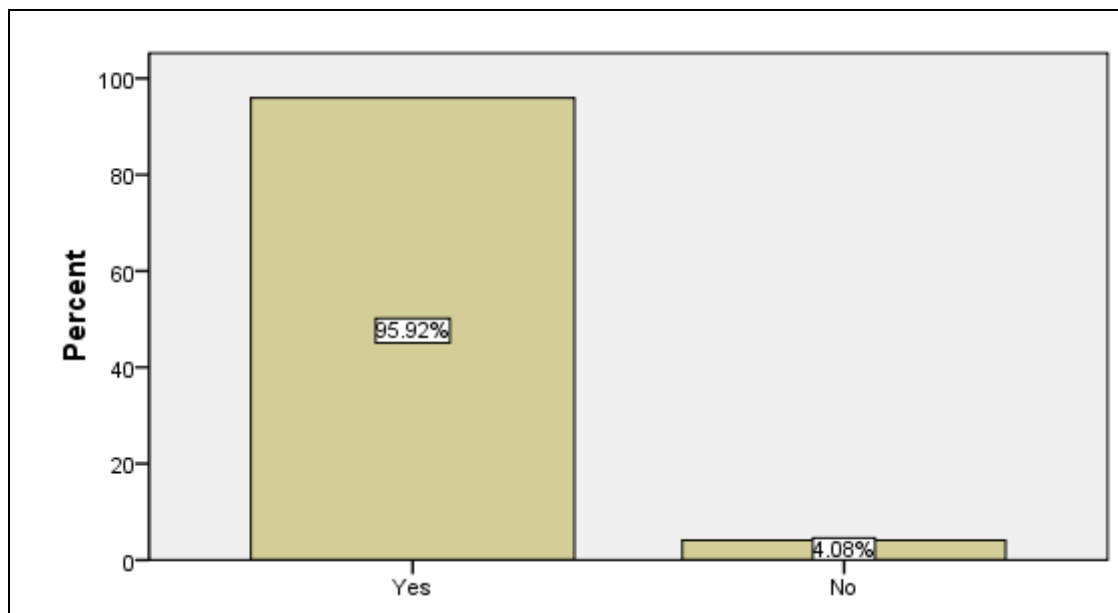


Figure 4.16 Communication within the organisation as a way of utilising ICT

4.4.1.1 Problems faced in using information communication technology within the organisation

The researcher sought to establish the problems faced in using ICT within the organisations, by asking respondents to rank their responses on a numerical scale ranging from most critical problem to the least problematic issue. The findings showed that technical problems were cited by 71.4% of the respondents as being the most critical problem facing the use of ICT in their organisations (Table 4.22).

Table 4.22 Technical problems as challenges faced using ICT for knowledge management

| Attributes | Frequency | Percent |
|-------------------------------|-----------|---------|
| Most critical problem | 70 | 71.4 |
| Very critical problem | 11 | 11.2 |
| Fairly critical problem | 4 | 4.1 |
| Neither | 2 | 2.0 |
| Not a fairly critical problem | 1 | 1.0 |

| | | |
|-----------------------------|-----------|--------------|
| Not a very critical problem | 2 | 2.0 |
| Least problematic | 4 | 4.1 |
| Missing | 4 | 4.1 |
| Total | 98 | 100.0 |

A complex information and communication system was also cited by 29.6% of the respondents as being the most critical problem facing use of ICT for knowledge management, while 28.6% thought that it was a very critical problem (Table 4.23).

Table 4.23 System complications as a challenge faced in using ICT for knowledge management

| Attribute | Frequency | Percent |
|-------------------------------|------------------|----------------|
| Most critical problem | 29 | 29.6 |
| Very Critical problem | 28 | 28.6 |
| Fairly critical problem | 14 | 14.3 |
| Neither | 11 | 11.2 |
| Not a fairly critical problem | 5 | 5.1 |
| Not a very critical problem | 5 | 5.1 |
| Least Problematic | 4 | 4.1 |
| Missing | 2 | 2.0 |
| Total | 98 | 100.0 |

4.5 Institutionalisation of knowledge management

Liebowitz (1999) stated that key driving force behind successful implementation of knowledge management in an organisation is to have a clear and well-planned strategy. In attempts to establish how knowledge management has been institutionalised, the researcher asked respondents to indicate the extent to which they agreed or disagreed with several statements in relation to their projects during the set-up stage. Most of the respondents (42.9%) agreed that

their organisations applied the best practices such as professional procedures borrowed from past projects in informing future projects especially during project set-up stage; while 35.7% strongly agreed. However, 12.2% disagreed with the statement (Table 4.24).

Table 4.24 Best practices applied during project setup

| Attribute | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 35 | 35.7 |
| Agree | 42 | 42.9 |
| Disagree | 12 | 12.2 |
| Strongly Disagree | 1 | 1.0 |
| Not Applicable | 7 | 7.1 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

A majority of the respondents (45.9%) also agreed that feasibility studies were conducted during project setup, while 29.6% strongly agreed. However, 15.3% of the respondents disagreed with the statement that feasibility studies were conducted before project setup (Table 4.25).

Table 4.25 Feasibility studies conducted during project setup

| Attribute | Frequency | Percent |
|------------------|------------------|----------------|
| Strongly Agree | 29 | 29.6 |
| Agree | 45 | 45.9 |
| Disagree | 15 | 15.3 |
| Not Applicable | 8 | 8.2 |
| Missing | 1 | 1.0 |
| Total | 98 | 100.0 |

A correlation analysis was performed on responses obtained on project setup against a set of activities considered during this phase. The set of activities included knowledge management consideration, previous project reports reviewed, time estimation done, information management plans formulated and staff experience and qualifications considered. The findings showed that all the relationships were statistically significant. The strongest positive relationship was between project setup and information management plans formulated and project setup against time estimation. Meanwhile, the weakest positive relationships were between project setup, previous project reports reviewed, project setup and knowledge management consideration (Table 4.26).

Table 4.26 Correlations between project setup and several variables

| Pearson Correlation Attributes | Project setup Vs | | | | |
|--|---------------------------------|-----------------------------------|----------------------|---|--|
| | Knowledge Management considered | Previous project reports reviewed | Time estimation done | Information management plans formulated | Staff experience & qualifications considered |
| Project Setup - Pearson Correlation Knowledge Management considered Sig. (2-tailed) N | 1 .122 98 | .122 .232 98 | .320** .001 97 | .200* .049 97 | .220* .030 97 |
| Project Setup - Pearson Correlation Previous project reports reviewed Sig. (2-tailed) N | .122 .232 98 | 1 .232 98 | .726** .000 97 | .719** .000 97 | .790** .000 97 |
| Project Setup - Time estimation done Pearson Correlation Sig. (2-tailed) | .320** .001 | .726** .000 | 1 | .832** .000 | .759** .000 |

| | | | | | |
|---|-------|--------|--------|--------|--------|
| N | 97 | 97 | 97 | 96 | 96 |
| Project Setup - Pearson Information Correlation | .200* | .719** | .832** | 1 | .797** |
| management plans Sig. (2- formulated tailed) | .049 | .000 | .000 | | .000 |
| N | 97 | 97 | 96 | 97 | 96 |
| Project Setup - Staff Pearson experience & Correlation | .220* | .790** | .759** | .797** | 1 |
| qualifications Sig. (2- considered tailed) | .030 | .000 | .000 | .000 | |
| N | 97 | 97 | 96 | 96 | 97 |

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

4.5.1 Factors contributing to effective knowledge sharing at the preparation / development stage

In a bid to establish the factors contributing to effective knowledge sharing at the preparation and development stages, the researcher provided a list of factors which respondents indicated their level of agreement, or disagreement. Most of the respondents (53.1%) agreed that team work among employees in the organisations contributed to effective knowledge sharing (Table 4.27).

Table 4.27 A lot of teamwork as a factor contributing to effective knowledge sharing

| Attribute | Frequency | Percent |
|-------------------|-----------|--------------|
| Strongly Agree | 35 | 35.7 |
| Agree | 52 | 53.1 |
| Disagree | 6 | 6.1 |
| Strongly Disagree | 2 | 2.0 |
| Not Applicable | 3 | 3.1 |
| Total | 98 | 100.0 |

Up to 41.84% of the respondents agreed with the statement that holding regular progress meetings contributes to effective knowledge sharing (Figure 4.17).

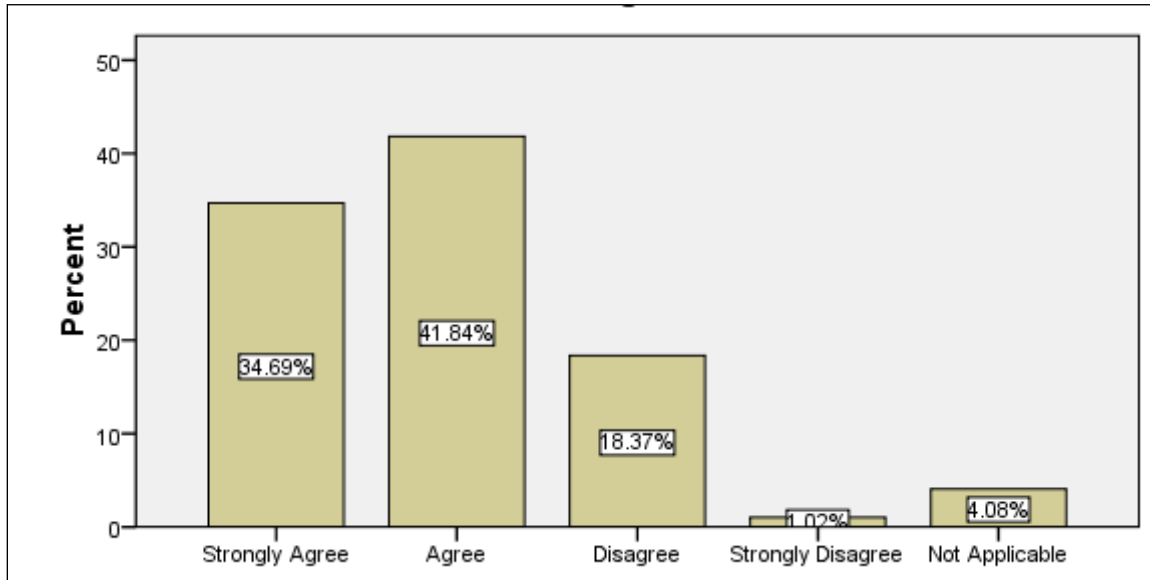


Figure 4.17 Holding regular meetings as a factor contributing to effective knowledge sharing

Most of the respondents (49%) agreed that project team members are encouraged to share what they know including the technologies that encourage them to document and share information (Table 4.28).

Table 4.28 Collaboration using technology among team members as a factor contributing to effective knowledge sharing

| Attributes | Frequency | Percent |
|-------------------|-----------|--------------|
| Strongly Agree | 31 | 31.6 |
| Agree | 48 | 49.0 |
| Disagree | 10 | 10.2 |
| Strongly Disagree | 5 | 5.1 |
| Not Applicable | 4 | 4.1 |
| Total | 98 | 100.0 |

Most of the respondents (54.1%) agreed, while 35.7% strongly agreed that reuse of knowledge gained in previous projects was one of the perceived causes of success in knowledge sharing. However, 6.1% disagreed and 1% strongly disagreed with the statement (Table 4.29).

Table 4.29 Reuse of knowledge gained in previous projects as a perceived cause of success in knowledge sharing

| Attributes | Frequency | Percent |
|-------------------|------------------|----------------|
| Strongly Agree | 35 | 35.7 |
| Agree | 53 | 54.1 |
| Disagree | 6 | 6.1 |
| Strongly Disagree | 1 | 1.0 |
| Not Applicable | 3 | 3.1 |
| Total | 98 | 100.0 |

According to Riege (2005), one of the barriers to knowledge management is lack of leadership and managerial direction. Singh and Kant (2008:148) singled out poor leadership and lack of commitment from the top as the most important barrier to knowledge management within organisations. The researcher sought to know from the respondents if leadership was perceived as a barrier to knowledge sharing. An equal proportion of respondents (44.9%) strongly agreed while the same percentage also agreed that project leadership was very critical and was perceived as a cause of success in knowledge sharing. However, 6.12% of the respondent disagreed (Figure 4.18).

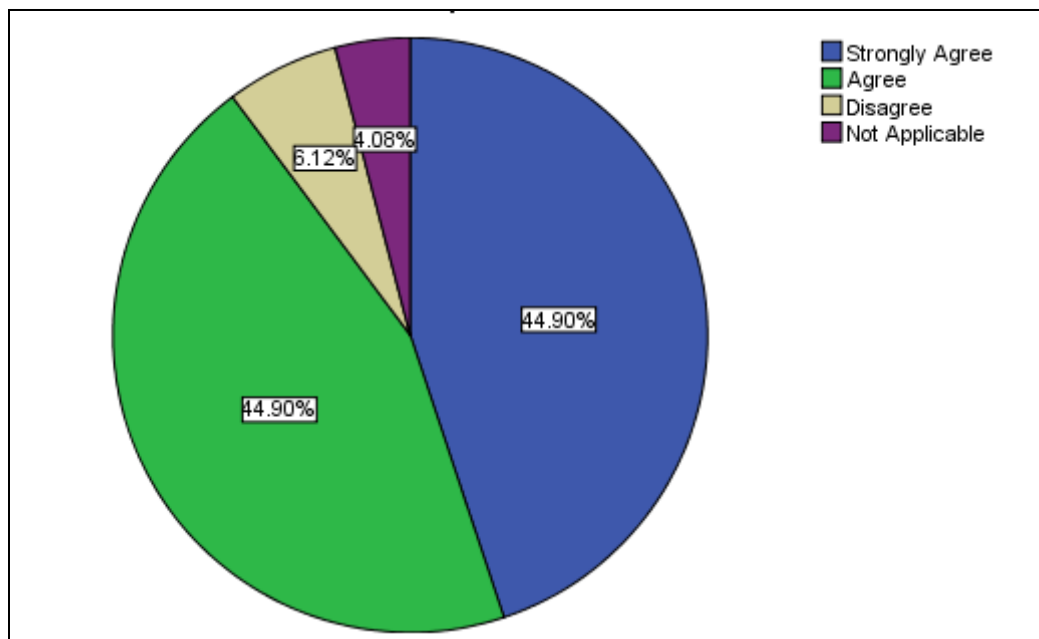


Figure 4.18 Project leadership as a perceived cause of success in knowledge sharing

4.5.2 Ensuring continuity of proper knowledge management

The researcher sought to establish how organisations ensure continuity/maintenance of proper knowledge management, in relation to their projects at the evaluation stage. Multiple responses were given as highlighted below. Up to 48% of the respondents agreed, while 33.67% strongly agreed with the statement that their organisations maintained a repository/documentation/report database entailing the activities that went on from the identification to the evaluation stage of the project (Table 4.30).

Table 4.30 Project reports available on demand as a way of maintaining knowledge management continuity

| Attribute | Frequency | Percent |
|-------------------|-----------|---------|
| Strongly Agree | 33 | 33.67 |
| Agree | 47 | 47.96 |
| Disagree | 13 | 13.27 |
| Strongly Disagree | 1 | 1.02 |

| | | |
|----------------|-----------|--------------|
| Not Applicable | 3 | 3.06 |
| Missing | 1 | 1.02 |
| Total | 98 | 100.0 |

4.5.3 Accumulation of knowledge/information from projects

The researcher sought to establish how organisations accumulate knowledge and information from projects. Most of the respondents (89.8%) reported that they accumulated knowledge from projects through holding project meetings (Figure 4.19).

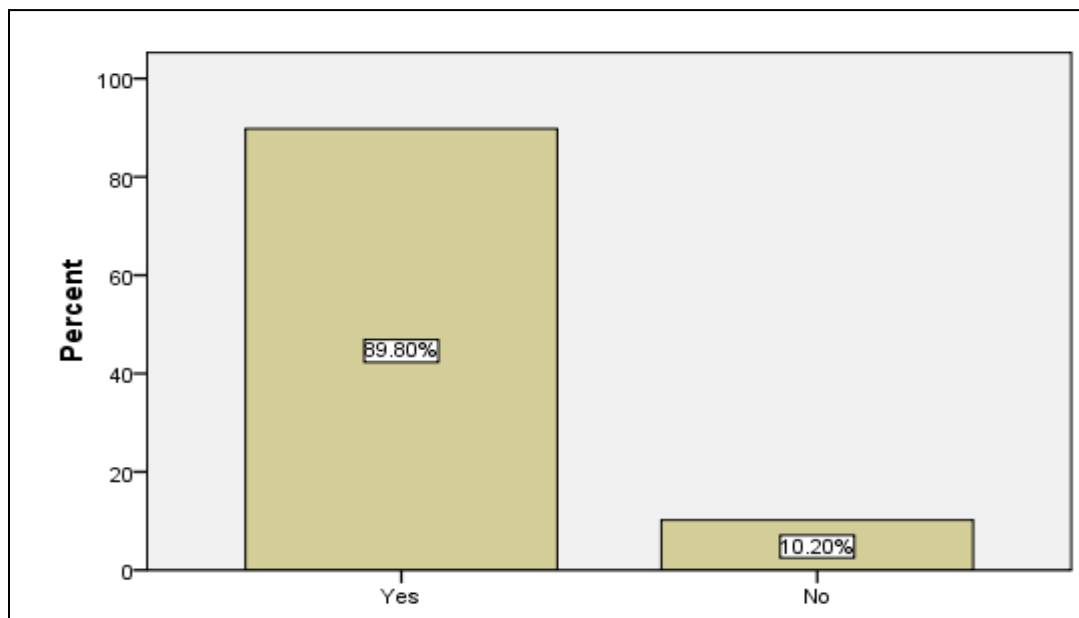


Figure 4.19 Knowledge accumulation from previous projects – project meetings

4.6 Summary

Chapter Four has presented the results of the data collected from the survey and also from that obtained from the documents reviewed. The data was analysed using descriptive statistics from the Statistical Package for Social Science (SPSS) software version 2.0. The data were presented using tables and charts which provide the background for the discussions in Chapter Five. The next chapter interprets and discusses the study findings as presented in Chapter Four. The interpretation and discussion is based on the study objectives.

CHAPTER FIVE

INTERPRETATION AND DISCUSSION OF RESEARCH FINDINGS

5.1 Introduction

The main objective of this chapter is to provide interpretation of the results as presented in Chapter Four and support the conclusions made. In this chapter, evidence from the study findings and the reviewed literature on knowledge management in sustainable development is provided. The meaning and importance of the findings is also explained. In some instances, alternative explanations of the findings are provided. This chapter also describes the mechanisms that may explain some of the observations made. The main aim of this study was to establish the role of knowledge management in the sustainable development of Lake Victoria Basin. To achieve this aim, four key objectives were formulated on which this discussion is hinged. The four specific objectives include:

- i. to establish the role of knowledge management in the sustainable development of Lake Victoria Basin;
- ii. to determine the challenges and barriers that hinder effective knowledge management on the Lake Victoria Basin and how to overcome them;
- iii. to establish the tools and technologies that can be used in enhancing knowledge management in the development of Lake Victoria Basin; and
- iv. to establish the strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development.

5.2 Role of knowledge management in the sustainable development of Lake Victoria Basin

The first objective of the study was to establish the role of knowledge management in sustainable development of Lake Victoria Basin. The following section gives a brief analysis of the Lake Victoria Basin and thereafter discusses the role of knowledge management in sustainable development of the Basin.

5.2.1 Background information on Lake Victoria Basin

Lake Victoria Basin was described by the East African Community as a “geographical area extending within the territories of the Partner states determined by the watershed limits of the system of waters, including surface and underground waters” (LVBC 2003:4). According to Okurut and Wegorro (2011), the Lake Victoria Basin covers an area of 180,950 square kilometres with Tanzania occupying 44%, Kenya 21.5%, Uganda 15.9%, Rwanda 11.4% and Burundi 7.5%. Lake Victoria, which is the second largest fresh water lake in the world, is considered the epicentre of the East African Community and the most important shared natural resource by all the five countries that share the Lake Victoria Basin. The management and development of the natural resources in LVB, requires collaborative efforts from the five countries.

The LVB is home to over 38 million people (EAC 2012). According to Okurut (2012), human beings are central components of the environment and their activities heavily influence the utilisation and sustainability of natural resources. According to Okurut and Weggoro (2011:3), the LVB inhabitants rely heavily on the lake’s resources. As such, all the development activities within the basin need to be guided by accurate knowledge, concerning their sustainability. It is however highly likely that the knowledge on sustainable development emanating from various research institutions and organisations, such as Lake Victoria Environmental Management Programme (LVEMP), Lake Victoria Basin Commission (LVBC), Nile Basin Initiative (NBI) among others, on the Lake Victoria Basin is not reaching the target audience. It is the contention of the researcher that this is due to poor knowledge management. This assertion is evidenced by the continued unsustainable utilisation of the LVB resources despite numerous studies on sustainability having been carried out on the LVB. According to UN-Habitat (2008), rapid urbanisation with complete disregard of sustainability is placing enormous pressure on the natural resources in the Lake Victoria Basin. For instance, awareness of the importance of curbing pollutant sources into the lake coupled with adhering to fish quotas by the communities in the LVB can lead to sustainable fish harvests. Therefore, while urbanisation drives the economic growth of the LVB, it has also brought serious environmental challenges, most of which result from poor knowledge management. The picture of Lake Victoria Basin was summed up by the retired President of Kenya, Mwai Kibaki, during the inauguration of the Lake Victoria Basin Commission in Kisumu (Drakenberg 2007). The President noted:

Regrettably, Lake Victoria is today seriously threatened due to receding water levels, soil and waste pollution, over-fishing, and a growing decline in the health of its ecosystems. As a result, the livelihoods and well-being of over 30 million people who live around its Basin are at risk. It is imperative that we act urgently and decisively to halt further decline of the lake and the surrounding environment.

Below are some pictures that show the effects of unsustainable development of Lake Victoria Basin. In order to achieve sustainable development in Lake Victoria Basin, there is need to embrace a holistic and coordinated approach to address the challenges for the benefit of the current and future generations. According to Fink (2008:1), adequate knowledge should be seen as a pre-condition for effective governance structures focusing on sustainable development. Applying this contention to the LVB means that all the organisations involved in various developments and management of natural resources in the LVB need to share information if sustainable development of the basin is to be achieved.



Low lake levels at the wagon ferry terminal at Mwanza South which inhibit lake transport
Source: LVBC 2012



Environmental stress arising out of land degradation and deforestation
Source: LVBC 2012



Users compete for the fresh water resources
Source: LVBC 2012



Encroachment of littoral Wetlands for agriculture
Source: LVBC 2012

Given the importance of the LVB to the East Africa region, increased attention has been given to the Basin as evidenced by the various studies being undertaken and projects implemented by institutions/projects such as LVEMP I and II, LVFO, LVBC, Lake Victoria Development Authority (LVDA). Studies such as those conducted by the LVFO on fisheries resources of Lake Victoria are aimed at ensuring sustainable fish harvests in the lake. One of the major initiatives, undertaken by the partner states to reverse the LVB deterioration, was the establishment and implementation of the Lake Victoria Environmental Management Programme, Phase 1 (LVEMP I) between 1997 and 2004 (Kayombo and Jorgensen 2006:432). This programme was aimed at re-habilitating the Lake Victoria Basin's environment and alleviating poverty. As noted by Bertilsson (2005:21), and further supported by Kayombo and Jorgensen (2006), LVEMP I collected, compiled and documented substantial information and knowledge which was however

never shared with the key stakeholders. This wealth of information cannot therefore contribute to an increased awareness about environment or used by decision makers.

A different study by Bachou, Nyantahe and Ichang'i (2005:43) that sought to compile "Lessons learnt on the institutional framework of the Project" noted that LVEMP I did not have an effective information management system. They further noted that LVEMP I also lacked a clear communication strategy and as a result, the cumulative knowledge acquired was largely unavailable to key stakeholders including independent researchers, research organisations, institutions of higher learning, government institutions, investors/developers as well as the local communities. These instances demonstrated a complete disregard of the importance of knowledge management in the sustainable development of the LVB. It is thus clear that key knowledge management processes were lacking at the project set-up and implementation stage. This meant that subsequent projects could not build, or learn from the information and knowledge generated by LVEMP I (Bachou, Nyantahe and Ichang'i 2005). Poor knowledge management strategy is not however restricted to LVEMP I project but, to virtually all other projects, organisations and individuals conducting studies within the LVB. Lack of knowledge management strategy among the various players in the LVB presents a challenge in the sustainable development of the basin. This is reflected in the current state of environmental degradation and unsustainable development being witnessed within the Lake Victoria Basin. A good example is the successful control of water hyacinth weed during the LVEMP I project life and its resurgence few years after the end of the project. Other organisations such as Lake Victoria Centre for Research and Development and Lake Victoria Region Local Authority Cooperation, have each undertaken activities aimed at removing the water hyacinth from the Lake without much success. Controlling this menace requires collaborative knowledge and joint efforts from all relevant stakeholders.

A study by Chua and Lam (2005:7) sought to find out why projects fail to make any significant impact. In their findings, the authors established that many project-based organisations lack the expertise to handle their knowledge assets as well as build on previous findings and experiences. Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udeaja (2006), Carrillo (2005) and Garon (2006) also observe that most projects lack the ability to capture, codify and carry over

knowledge into future projects due to their design. Zedtwitz (2003) points out that most projects often do not use the lessons learnt from previous projects. It can therefore be argued that the effects of unsustainable development being witnessed in the Basin such as increased pollutant load, land degradation, reduced water levels, resurgence of water hyacinth, dwindling fisheries' resources among others, are all as a result of poor management of knowledge by various organisations in the LVB.

Tyler, Bibri and Tyler (2007:27), while investigating strategic sustainable development and knowledge management, concluded that the practice of managing knowledge within research organisations has the potential of adding value and solving considerable challenges with regard to sustainable development. According to their framework, knowledge management is about harnessing the internal knowledge among employees working within an organisation and turning it into usable knowledge (explicit), which can then be utilised to empower and solve problems within the same organisation. This therefore means that knowledge, whether originating from within the institution, or from outside is of importance and can greatly inform the sustainable development of the LVB (UNDP 2007:60). According to Alavi and Leidner (2001:113), the need to manage knowledge is largely triggered by problems faced by institutions in locating, preserving, disseminating/sharing and using knowledge, both within and outside their organisations.

According to the findings of this study on LVB, proper knowledge management rarely occurs in most organisations working within the Lake Victoria Basin. A good example is the project Trans-boundary Water for Biodiversity and Human Health in the Mara River Basin (TWBHH-MRB) project. During the implementation of TWBHH-MRB project, a number of studies were conducted and findings well documented. However, after the end of the project, the reports have not been packaged into user-friendly formats and disseminated to stakeholders. This study therefore advocates for the internalisation and integration of knowledge management by all organisations working within the Lake Victoria Basin (LVB) in their activities. This would enable the achievement of their common goal, which is the sustainable development of the LVB. Without proper management of the knowledge generated by the various organisations, sustainable development of the LVB region will not be achieved.

5.2.2 Knowledge management and sustainable development

In Chapter One, this study adopted the definition of knowledge as provided by Davenport and Prusak (1998:4). According to these scholars, knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information (Davenport and Prusak 1998). In organisations, knowledge is embedded in documents, repositories, organisational work routines, processes, practices and norms. While emphasising the importance of knowledge, Drucker (1993) points out that the most important resource in building the economy is no longer labour, capital or land but knowledge. Hawthorne (2004), further points out that knowledge is of utmost importance in virtually all sectors of today's economy. Sustainable development on the other hand is concerned with the management of natural resource systems to balance present and future consumptions (OECD 2001).

From the literature review in Chapter Two, it is evident that knowledge management that supports sustainable development is crucial in addressing the global crisis of natural resources depletion (Wong 2010:1444). Wong (2010) further posits that knowledge is a critical resource for sustainable development especially in the current knowledge driven society. In support of Wong's argument, Igberaese and Onyeaghalaji (2009:5) concur that knowledge management is a necessity for sustainable development. Igberaese and Onyeaghalaji (2009) further reiterate that sustainable development is significantly enhanced by knowledge management. According to Becerra-Fernandez and Sabherwal (2001), knowledge is among the key determinants of building capacity to sustain development. The dynamic process that drives sustainable development relies not only on knowledge but, also on the learning experience. This is actualised by investing in knowledge creation, management and sharing within an organisation (Wong 2010). With regard to the literature review, it is apparent that knowledge management within organisations can play a significant role in the sustainable development of a region, as complex as the Lake Victoria Basin.

A study by Carillo (2015), reviewed in Chapter Two, shows that the challenges facing modern societies call for knowledge-based development strategies. In addition, Baporikar (2014) concurs that knowledge management is an ultimate power that propels unprecedented growth in any

knowledge-based economy, be it the growth of an organisation, industry, or even country. This can only be achieved in highly empowered institutions where knowledge management is implemented in a systematic manner. Consistent with the literature review, the researcher established that most of the respondents (over 90%) in the current study were positive that knowledge management processes used by their respective organisations could make a difference in achieving sustainable development of the Lake Victoria Basin. However, while the current study findings give an impression of a high level of awareness concerning the role of knowledge management in sustainable management of the Lake Victoria Basin, there is a disconnect between the knowledge generated and how the same knowledge is managed and more specifically how it is shared among different players.

Based on the above understanding, the first objective of this study was to establish the role of knowledge management in the sustainable development of the Lake Victoria Basin by the 26 selected organisations. The findings showed that most of the respondents (64.3%) from the 26 organisations were in agreement that knowledge management is beneficial to their institutions. An equally large proportion of respondents (65.3%) also indicated that knowledge management plays a significant role in sustainable development. These findings are consistent with those of Igberaese and Onyeaghalaji (2009) that also considered knowledge management to be an important input for sustainable development as well as a major factor in environmental conservation and wealth creation amidst global competition. This resonates further with Terra and Angeloni (2008) observation that knowledge-based society and knowledge-sharing environment can therefore make the development process sustainable and goals of the development process achievable.

While 79% of the respondents acknowledge that knowledge management is a prerequisite for furthering the sustainable development process, the actions by the various players seem to tell a different story. For instance, the LVEMP I project components were highly relevant and critical to the sustainable development of the LVB Basin. However, some of the key lessons learnt with regards to the need for a lake-wide all-inclusive perspective in tackling environmental degradation of the Lake Victoria, were never disseminated to relevant stakeholders (Kayombo and Jorgensen 2006). Had the LVEMP I project shared their findings on management of

industrial and municipal effluents with the local population and other stakeholders, then probably there would have been an improvement in the management of water and fisheries resources. It is thus clear that improper management of this information curtails its utilisation and results in environmental degradation. The Lake Victoria Fisheries Organisation (LVFO) has recorded success in using knowledge acquired from conducting frame surveys on Lake Victoria biannually since 2000. The frame survey is aimed at providing information on the facilities and services at landing sites and the composition, magnitude and distribution of fishing activities to guide development and management of the fish resources of Lake Victoria (LVFO 2012). The results of the frame survey have always been used to introduce fisheries quota system and closures to curtail overfishing. Further, the LVFO developed the Lake Victoria fisheries management plan (FMP), which builds on previous efforts to manage the fisheries resources of the lake by fisheries departments and research institutes within the partner states (Bwathondi, Ogutu-Ohwayo and Ogari 2013). This signifies a case of well managed information, which has subsequently been used to successfully promote the sustainable utilisation of the fisheries resources in the Lake Victoria. Understanding the use and application of knowledge would therefore enable more leverage to be gained from the knowledge already at hand. The use of available knowledge is likely to increase returns on the massive investment that most organisations use in developing knowledge assets.

Sustainability goals within the Lake Victoria Basin can only be achieved if development activities are informed by new and existing resources of knowledge and expertise. This has not always been the case for most organisations as most of them almost always shelved their research findings, study reports and projects' documents in repositories within the same institution. Knowledge-based sustainable development, according to Ovalle, Marquez and Salomon (2004), connotes the process of using knowledge to inform sustainable development processes. Organisations operating within the LVB can therefore employ some specific knowledge management processes which can then help in the organisation, acquisition, storage, and utilisation of knowledge (Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udejaja 2006).

Based on the findings from this study, it is apparent that a majority of respondents, across the 26 organisations, acknowledge that knowledge management is an organic part and important

instrument for furthering sustainable development, within the Basin. Besides, over 85% of the respondents were in agreement that attainment of sustainable development requires a wholesome approach including use of technology, efficient utilisation of currently available knowledge and continuously seeking new knowledge. The respondents in the current study demonstrated high levels of awareness concerning the vital role of knowledge management in the sustainable development of the Lake Victoria Basin. In addition, over 80% of the respondents felt that knowledge management is important in innovations' creation, while over 90% felt that knowledge management is of significance in better decision making. According to Tobias (2000:59), proper knowledge management enables an organisation to adopt a culture based on collaboration, sharing and open communication capable of making it flourish. Indeed, Lotti (2014) approached knowledge management from a holistic perspective basing it on the comprehensive approach, pegged on three components; namely people, technology and processes.

According to Jackson, Chuang, Harden, Jiang and Joseph (2006), knowledge management and sharing is the fundamental means through which employees can contribute to knowledge application, innovation, and ultimately the competitive advantage of their organisations. In addition, knowledge sharing between employees and within and across teams allows organisations to exploit and capitalise on knowledge-based resources (Cabrera and Cabrera, 2005). A review of the Lake Victoria Basin by Kayombo and Jorgensen (2006) revealed weaknesses in knowledge sharing and dissemination of useful information, such as that on water hyacinth infestation, fisheries management, water quality management, waste water management, soil and water conservation, among others. Sharing of such information would inform subsequent and future management priorities for the Lake Victoria Basin.

Availability of the most current and accurate information on the status of the LVB resources is a pre-requisite for its sustainable development. This information should always be availed in a timely manner to the users since they are the key drivers of development in the LVB. Previous studies by Alawi, Marzoogi and Mohamed (2007) showed that facilitating a more proactive and open knowledge sharing culture within and among organisations is positively related to improved team performance, efficient execution of new projects, among others, all of which are

likely to contribute to sustainable development. Many organisations in the Lake Victoria Basin can potentially benefit and be empowered by findings from previous studies undertaken in related fields.

As noted in Chapter One the famous statement “if only we knew what we know now” prompted the idea of capturing, sharing and applying knowledge all over the organisation (Metaxiotis, Ergazakis and Psarras 2005:6). This statement concurs with the utterance of former Premier of Mpumalanga Province in South Africa, Thabang Makwetla, who stressed the need for government and public organisations to become learning organisations which manage knowledge as a valuable resource that it is (Makwetla 2004). The Premier further noted that:

... if we cannot learn from our own experiences, how can we learn from anyone else? If we do not know what we already know, how do we identify new areas of learning and adapt the knowledge of others to our realities (Makwetla 2004).

Gottschalk (2004:2) summarises all this by stating that “today, intellectual capital, rather than physical capital, is the driving competitive force for companies, in the modern world”.

5.2.3 Knowledge management process

This study adopted the knowledge management processes, as highlighted in the six sequential steps identified by Bouthillier and Shearer (2002). These are: knowledge discovery, acquisition, creation, storage and organisation, sharing and use or application.

5.2.3.1 Discovery and capture of information and knowledge

Knowledge is among the most important determinants for building capacity in an organisation to sustain development. According to Thompson (2003:13), knowledge management is viewed as an important strategy for accelerating organisations towards cost-cutting environments and therefore contributes to sustainability. Gottschalk (2004:2) concurs that knowledge management could result in improvements in individual performance, organisational performance and inter-organisational performance. It is therefore, the role of any organisation to ensure that they play a leading role in the discovery and capture of information and knowledge. Studies show that the systematic process of finding, selecting, organising, distilling and presenting information,

improves an employee's comprehension in a specific area of interest (Kumar and Anwarul 2014).

The current study established that most organisations took the role of discovery and capture of information and knowledge seriously. This is ascertained by the fact that the majority of respondents (over 90%) were in agreement that their organisations facilitated the discovery and capture of knowledge. Consistent with the findings of this study, other studies, such as Dalkir (2005) and Olukupe (2007), show that most organisations have been forced to address the challenge of knowledge management in order to achieve their goals in today's knowledge driven development. Like other organisations, those within the Lake Victoria Basin acknowledge that one widespread guiding principle is to document lessons learnt from each project or programme. The proper use of the knowledge generated by organisations will determine the level of success in attaining sustainability in development.

Based on the responses received in this study, the researcher can reliably conclude that most of the 26 research institutions studied appreciate and acknowledge the role of knowledge management in the sustainable development of the region. The current study findings clearly show that research organisations, such as Kenya Agricultural and Livestock Research Institute (KALRO), have always and continue to discover and capture knowledge from their various research activities. However, while organisations seem to have the right knowledge and information in their repositories, it is not clear if this knowledge is utilised to inform subsequent researches or development activities within the Basin.

Dalkir (2005) concurred that once an organisation identifies the knowledge that needs to be collected, it must take desperate approaches to capture and retain that knowledge so that the same knowledge can be used to inform decision-making. In their article titled "An experiential approach to teaching knowledge management," on a study conducted by Davenport, DeLong and Beers (1998) reported various ways of capturing knowledge. These included lessons learnt, subject matter experts, documentation from other projects, the institution's intranet, knowledge transfer workshops, mentorship and World Wide Web, among others. It is thus contended that organisations typically use multiple approaches in their effort to discover and capture relevant information and knowledge. These imply that only utilising one or two approaches is not enough.

It is therefore important for institutional heads to remember that the entire knowledge management effort will be fruitless unless institutions recognise, nourish and appropriately handle the discovery and capture of relevant knowledge and information.

5.2.3.2 Documentation of lessons learnt

While emphasising the reasons why organisations in Africa should seriously embrace knowledge management, Musana (2006) proposed that measures need to be undertaken to minimise situations where conducted studies would be repeated because of lack of information resulting from inappropriate documentation of lessons learnt. Musana (2006) further advises that lack of proper documentation of lessons learnt can result in wastage of resources, which would otherwise be used in building on the findings of past studies. In that regard, proper documentation of lessons learnt from past studies by different organisations has the capacity to facilitate transfer of best practices from previous studies, or elsewhere (Musana 2006).

Most respondents in the current study reported that documentation of lessons learnt was encouraged in their organisations. This is important since the documented knowledge can inform subsequent projects. However, such knowledge can only be useful in an organisation if it is shared in a timely manner to interested users. Lack of coordination among individuals, organisations and other stakeholders operating within the LVB basin has resulted in the duplication of efforts and wastage of resources.

Anumba and Khan (2003) in their presentation on knowledge management in development projects at the 29th Water, Engineering and Development Centre (WEDC) International Conference in Abuja, Nigeria, noted that an effective knowledge management strategy can have a number of positive outcomes. These include the ability to:

- i. easily retrieve knowledge since it is properly captured and stored;
- ii. effortlessly transfer knowledge to relevant users and in a timely manner thus enabling effective decision making;
- iii. create new knowledge aimed at solving problems from existing knowledge; and
- iv. archive lessons learnt for future use.

5.2.3.3 Storage and retrieval of knowledge

Storage and retrieval of knowledge involves an important aspect of effective knowledge management within an organisation (Tyler, Bibri and Tyler 2007:63). According to Desouza (2011), knowledge management success pertains to proper creation, harnessing, sharing and managing of information within an organisation. All knowledge databases should be well organised, accurate, current and easy to retrieve. Unfortunately as noted by Benbay, Passiante, and Aissa (2004), only a few organisations handle explicit and tacit knowledge effectively except some higher learning institutions that have personnel who are skilled at creating, acquiring and transferring knowledge. According to Ragsdell (2009), knowledge databases add value only when target users have direct and easy access to them and actually use them.

In the current study, the researcher sought to establish how knowledge storage and retrieval is conducted within the 26 institutions under study. A majority of the respondents (over 90%) across the 26 organisations agreed that their organisations facilitate storage and retrieval of knowledge. This means that organisations in the LVB appreciate the importance of proper knowledge storage and retrieval. The current study also established that print publications were the most common types of communication media used. The preference for paper-based publications could be due to the perceived high level of formality and credibility, compared to other formats. However, paper-based publications are only useful to the elite stakeholders leaving out the local community members who are more often the key pillars in the society in effecting the change.

Consistent with the reviewed literature, the current study established that information used within the 26 organisations in accomplishing duties was mainly stored on paper-based medium according to a majority of the respondents (99%). In attempts to establish how organisations trace internal and/or external knowledge in the current study, up to 79.6% of the respondents reported that their organisations mainly traced internal and/or external knowledge by keeping a directory of expertise. The main problem cited with regards to knowledge retrieval is the complexity of finding the right knowledge once it has been stored. It is obvious that when a knowledge repository gets very large, finding a particular piece of knowledge can prove very difficult. Such challenges can however be circumvented by keeping and maintaining an efficient

storage and retrieval mechanism within the organisation.

5.2.3.4 Knowledge sharing

One of the most important aspects of knowledge management is how knowledge is acquired, organised and shared among different users. According to the literature review, organisations can acquire knowledge through imitation, benchmarking, replication, substitution, purchasing, outsourcing and discovering (Bhatt 2000:19, Abou-Zeid 2002:488). However, acquisition of knowledge alone cannot be of any good to an organisation if this knowledge is not shared out. The use of information and communication technology thus comes in handy in providing appropriate knowledge sharing infrastructure and platforms. In this study, less than half the respondents reported that encouragement of team work within their respective organisations contributed to effective knowledge sharing, with 41.8% agreeing that holding regular progress meetings contributed to effective knowledge sharing. Another 49% agreed that that project team members were encouraged to share what they knew and that there were technologies that encouraged them to document and share information.

Tripathy, Patra and Pani (2007) expounded on the need to provide incentives to motivate employees to share their knowledge. The literature review in Chapter Two revealed that most individuals refrain from sharing knowledge for fear of losing power but it is also true that individuals can increase their experience by sharing the knowledge they have with others (Bollinger and Smith, 2001). While there was considerable level of knowledge sharing among different players within the same organisation, the same could not be said about knowledge sharing across organisations.

In this study, most respondents were in agreement that reuse of knowledge gained in previous projects was one of the perceived cause of success in knowledge sharing, while an equally large proportion of respondents were in agreement that project leadership was very critical and was perceived as a motivation for knowledge sharing. Nonetheless, a major shift in attitude may be required in many organisations, if knowledge is to be shared willingly and consistently. According to Jackson, Chuang, Harden, Jiang and Joseph (2006:31), knowledge sharing is a fundamental means through which staff members can contribute to knowledge application,

innovation, and ultimately the competitive advantage of the organisation. To build on this, Cabrera and Cabrera (2005:725) note that knowledge sharing among staff members and across teams, allows organisations to exploit and capitalise on knowledge-based resources.

5.2.3.4.1 Role of managers in promoting knowledge transfer and sharing

Knowledge sharing and transfer refers to the activities associated with the timely flow of knowledge from one party to another (Riege 2007). Studies show that a knowledge management initiative within an organisation should be supported at the highest level if it is to have any significant impact. In attempts to establish the role that organisational managers play in promoting knowledge transfer and sharing within organisations in the current study, the researcher established that a majority of respondents were in agreement with the statement that managers played a major role in promoting knowledge management within their organisations, with 92.7% of the respondents singling out the promotion of professional networks as the major role that managers play in promoting knowledge transfer and sharing within their organisations.

Consistent with the current study findings, Lee and Steen (2006) reported that top managers' support normally has a bearing on both the level and quality of knowledge sharing by influencing employee commitment to knowledge management in one way or the other. Further, Riege (2005) reported that management support for knowledge sharing within an institution is positively associated with employees' perceptions of a knowledge sharing culture of trust and willingness to share knowledge. Based on the current findings, it is apparent that if the organisational top managers support knowledge management within their organisations, there is a higher likelihood that employees will also support and embrace it. This implies that corporate cultural shift cannot occur without the commitment and support from the top management in the organisations.

The implementation of knowledge management requires that the top management becomes the champions and gives priority to capacity building of the people, invest in technology and create conducive organisational culture. Studies on barriers to knowledge management by Singh and Kant (2008:148) identified lack of top management's commitment, as the single most important barrier. For the successful implementation of knowledge management initiatives, the top

management must develop a strategy and structure for capturing and sharing knowledge. Top management can use recognition and rewards as some of the easiest interventions that can be used to facilitate knowledge sharing and help build a supportive culture (Ajmal, Helo and Kekale 2010). In addition, de-emphasising employee's ranks, seniority and position in an organisation were cited as some of the ways that organisations can create conducive environment for knowledge sharing (Riege 2005).

Sing and Kant (2008) however argue that knowledge sharing may be facilitated by having a less centralised organisational structure, creating a work environment that encourages interaction among employees and encouraging free flow of information and knowledge across departments and informal meetings. Overall, the results of the current study suggest that organisational managers have a critical role to play in promoting the transfer and sharing of knowledge within their organisations.

5.2.4 Location or sources of knowledge

Several authors as established in Chapter One have categorised knowledge into two types: tacit and explicit (Dalkir 2005; Awad and Ghaziri 2007; Nonaka and Takeuchi 1995). Tacit knowledge is embedded in the individual's mind through work experiences. It includes lessons learnt, know-how, judgement, rules of thumb and intuition, which are characteristics of learning organisation (Wen 2005). Tacit knowledge represents internalised knowledge that an individual may not be consciously aware of, like how he or she accomplishes particular tasks and has not been documented. Explicit knowledge is the knowledge that is codified and transmittable in databases, documents and manuals (Botha 2008). It is therefore fairly easy to identify, store and retrieve (Wellman 2009).

5.2.4.1 Internal sources of knowledge

Knowledge is a human, highly personal asset and represents the pooled expertise and efforts of networks and alliances (Cranfield and Taylor 2008). According to Gottschalk (2004) 99 percent of the work that people do is knowledge based. In the current study, opinion was divided with almost an equal proportion (50%) of those respondents who felt that the specific knowledge needed for effective knowledge management within an organisation resides with

experts/colleagues and those (47%) who felt otherwise. Contrary to the current study findings, Sveiby (2006) reported that most of the knowledge in any organisation is embedded and synthesised in peoples' heads. The fact that personal knowledge cannot be seen, nor shared directly with others could have probably led to the divided opinion among respondents in the current study.

Previous studies have shown that people are often afraid to share their knowledge as they believe that they will lose the advantage that their expertise gives them among their peers and within the institutions (Tripathy, Patra and Pani 2007). With this kind of notion, it is definite that valuable knowledge resources will continue to be wasted unless the top management openly supports knowledge management processes. According to Smith (2001) employees who leave organisations take their valuable knowledge, resources, skills and experiences with them, while those who remain may be assigned new duties and may therefore never use their wealth of accumulated knowledge. The above discussion strongly supports the notion that knowledge resides within experts, or colleagues within an organisation. It is therefore clear that unless managers recognise the importance of knowledge management, loss of critical knowledge will always happen. Tacit knowledge, in particular, is likely to get lost through outsourcing, downsizing, mergers and terminations within institutions (Smith 2001).

Based on reviewed literature, it is apparent that most knowledge resides in people's heads and that it is difficult to capture or codify this tacit knowledge in manuals, books, databases, among others. This in essence means that it is best to create a conducive environment and culture that facilitates knowledge sharing through networking and interactions among individuals and relevant groups. Nevertheless, even under the best of circumstances, only a small fraction of an individual's applicable expertise can be elicited and shared.

5.2.4.2 External sources of knowledge

In the current study, the researcher established that the majority of respondents (86%) sought knowledge that was not directly available in their organisations from elsewhere. This corroborates the fact that knowledge is about sharing ideas and skills, not only within organisations but, also between organisations, as no single organisation, or individual can claim

to possess all the knowledge required for sustainable development. The way organisations share and access relevant knowledge is a factor in their level of knowledge transfer effectiveness, which likely translates, or determines project success rates (UNDP 2007). This is because not all methods of sharing knowledge will achieve the objectives of knowledge transfer. Organisations that are effective at knowledge sharing create more interactive processes where employees are highly likely to share knowledge more openly (Aidemark 2009).

5.2.4.3. Role of library and documentation centres

Reviewed literature in Chapter Two shows that for organisations to be productive and competitive there is need to have a single consolidated deposition of their information – regardless of its type or form. This is the reason why libraries are of great importance as they not only ensure that critical information is stored centrally but, is also easily accessible to target users. In the current study, most (over 80%) respondents were in agreement that their respective organisations made it mandatory to deposit key documents in the library for wide access. Regular documentation guards against loss of critical knowledge and information. According to Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udejaja (2006:19), organisations create knowledge, learn and also forget, which therefore informs the need for proper documentation of lessons learnt. However, while information may be readily available in libraries, it is important to ensure that this information is put to good use by the targeted users. This calls for continued encouragement of employees and other potential users to ensure continuous utilisation of this information.

Based on the reviewed literature, it was established that a knowledge repository as the storage medium for the knowledge collected is essential for storing organisational memory and the retention of knowledge assets (Tripathy, Patra and Pani 2007: 3). According to Taft (2000: 15) a knowledge repository must have sufficient storage media to accommodate the knowledge. Taft (2000: 15) further observes that for the repository to remain relevant, updating the knowledge residing in the repository remains a key and continuous task.

5.3 Challenges and barriers to knowledge management

Barriers to knowledge management in organisations can be anything that hinders the successful implementation of knowledge management initiatives in an organisation and can occur as a result of technology, organisation or people as categorised by Lotti (2014). Consistent with Lotti's (2014) classification, Akhavan, Reza and Hosein (2014:98) categorised barriers to knowledge management into five sub-sections, namely: individual, organisational, technological, contextual, and inter-project, while Bollinger and Smith (2001:14) singled out organisational, team/group and individuals as major impediments to knowledge management. Becerra-Fernandez and Gudi (2008) stated that the major challenge of managing knowledge is less knowledge creation and more knowledge capture and integration. Abrahamson and Goodman-Delahunty (2014:1) in their research on knowledge management identified: processes/ technology; individual unwillingness; organisational unwillingness; workload/ overload; location/ structure; leadership; and risk management as barriers to knowledge management.

As regards organisational barriers to knowledge management, Ajmal, Helo and Kekale (2010: 156) established that lack of incentives and the absence of appropriate information systems were key barriers to knowledge management. In a bid to establish some of the barriers to knowledge management in the current study, respondents were asked what they perceived to be the challenges that hinder effective knowledge sharing within their organisations. Most respondents cited lack of open-minded sharing environment and bureaucratic procedures involved in knowledge sharing among workers as some of the key barriers to knowledge management. From the survey findings, it was established by the researcher that organisational and people barriers are more prevalent in Lake Victoria Basin, as opposed to technological barriers at least according to the classification of Lotti (2014). In the current study, lack of time was also cited by 76.5% of the respondents as one of the major obstacle to documentation of experiences and lessons learnt. Despite the numerous challenges to knowledge management in the current study, more than half (53.7%) the respondents rated information sharing within their organisations as good and 15.8% as very good, implying that more than 68% of the respondents were comfortable with the way in which information was being shared within their organisations.

Kayombo and Jorgensen (2006:444) carried out a review of the barriers to knowledge

management situation of organisations in the Lake Victoria Basin. They established that the technical and scientific capacity available in most organisations for knowledge management was relatively poor. They further reported that despite the new knowledge that had been generated on functioning of the lake, the information was only available to a select group of people such as the researchers. They further observed that while there is sufficient knowledge base for informed lake management, particularly in the fisheries sector, the mass of information from these projects is yet to be assembled into management-friendly and community friendly packages. Kayombo and Jorgensen (2006) concluded that the benefits from these major investment programmes will not be realised until the knowledge produced is effectively managed and shared to users.

5.4 Knowledge management tools and technologies

The use of knowledge management tools and technologies is gaining popularity, as the demand for information and knowledge grows. With the advent of internet coupled with the rapid growth of ICT, organisations are experiencing information overload. According to Eunson (2012:539), an organisation may possess a lot of data, but unless that data can be organised into information, and unless human minds can synthesise and learn from information to create knowledge, then very little advantage is made of it. One of the objectives of implementing knowledge management is to ensure that the right knowledge is accessed at the right time by the right people (Spender 2008). There is therefore need to choose tools and technology that will simultaneously facilitate storage and quick retrieval of knowledge. According to Gillingham and Roberts (2006), suitable ICT for knowledge management must include powerful search engines that facilitate the discovery of what has been stored. Reviewed literature in Chapter Two showed that technology plays an important role in knowledge management. Rubanju (2007) concluded that an organisation cannot exploit its capabilities and incentives without the help of technology. According to Rubanju (2007), technology aids in the process of knowledge capture, creation, sharing, dissemination, acquisition and application. This view concurs with Wong (2005) knowledge management tools and technologies are key enablers of knowledge management.

In the current study, the internet was mentioned by all (100%) respondents as one of the knowledge management tools and technologies used within their organisations, while 86.7% and 88.8% of the respondents reported that databases and data warehousing tools, respectively, were

available in their organisations. This is important since knowledge management tools typically provide a secure central space where parties can exchange information and share knowledge for better decision making. Effective technologies and tools automate the input, storage, transfer and retrieval of knowledge. This includes tools for capturing various types of knowledge from useful lessons learnt, classifying knowledge documents, locating the relevant experts and expertise (Uday, Sury and Ronald 2007). However, to achieve the intended goal, organisations must choose the right technology option that meets its knowledge management objectives. Ray (2008) agrees that information technology provides knowledge management processes but, only with the appropriate tools that can facilitate knowledge capture, retention and management within an organisation.

Besides acquisition of the tools and technologies for knowledge management, investment in people empowers the ability of society to sustain knowledge management initiatives through the creation and management of new knowledge. Arora, Fosfuri and Gambardella (2002:6) concluded the debate on importance of knowledge management tools and technologies by stating that information technology infrastructure is a necessity for the success of knowledge management within an organisation. Based on the current study findings, it is clear that the internet is the most widely preferred knowledge capture, creation, sharing and dissemination tool that has been universally adopted by all 26 organisations studied. This is in agreement with Hamel (2005) who argues that on-line or e-knowledge is the best thing ever to happen to African nations. Hamel (2005) added that internet provides a bonanza of knowledge and it is the new revolutionary instrument for accessing knowledge. Knowledge portals and on-line knowledge searching and knowledge sharing have grown fast.

5.4.1 Utilisation of information and communication technology

Information and communication technology plays a vital role in the capture and codification of knowledge for distribution. It is therefore, important to have a strong information and communication technology framework to implement the systematic storage and dissemination of information within an organisation. The major variables to consider in the selection of technology are functional fit, technical fit, cost and cultural fit (Wiig 2004). Wiig (2004) further noted that cultural fit, which influences communication flow and openness for sharing

knowledge, may be the most important factor in all personal information exchanges.

In the current study, most (94.9%) respondents reported that their organisations utilise information and communication technology (ICT) as data transfer and storage devices; a clear indication that these organisations acknowledge the importance of ICT in the process of knowledge management. However, having an intranet, an e-mail system, or computerised databases does not automatically translate into good knowledge management. From the literature reviewed in Chapter Two, Albers (2009) cautioned against organisations placing too much emphasis on ICT, while implementing knowledge management at the expense of people and processes. This is because ICT will only be of importance in an organisation, if the target users are well conversant with it. Therefore, in order to leverage ICT tools for positive impact, organisations need to have clear ICT strategies in place.

In the current study, majority (95.9%) of respondents reported that their organisations utilise information and communication technology for communication. Albers (2009) concurs with the current study findings by stating that the internet is becoming an increasingly popular communications media, given its growth and access within the academic, business, organisational and social sectors around the world. Communication on its part can be effectively achieved by ensuring the effective use of information technology. This means that investment in information and communication technology becomes a necessity for sustainable development, which requires the building of the right ICT infrastructure to facilitate knowledge networking exchange and sharing within and among organisations. From the survey findings, it was established by the researcher that while organisations in Lake Victoria Basin have invested in latest information and communication technology, an equal investment has not been made in building the capacity of the employees to utilise ICT effectively for the intended purposes.

5.4.2 Problems faced in using information communication technology

Building infrastructural capacity for information and communication technology is critical in any organisation keen on promoting sustainable development. However, due to the complexities in the set-up and use of ICT, several problems and challenges are bound to occur with regard to the ICT use within organisations. In the current study, 71.8% of the respondents across the different

organisations cited technical problems as being the most critical challenges facing the use of ICT in their organisations, while 29.6% cited a complicated information and communication technology (ICT) system. The fact that some respondents cited complicated systems as among the problems facing the use of ICT in their organisations could have been due to their personal inability to use the technologies, probably out of ignorance or just out of fear of failure. Lack of skills to handle knowledge management technologies may result in employee reluctance to implement knowledge management in an organisation (Harvey 2003). Petermode (2008:21) noted that conducting an ICT audit within organisations can help the leadership in choosing the right set of processes and tools for their organisations.

5.5 Knowledge management strategies within Lake Victoria Basin

According to the literature reviewed in Chapter Two, a proper knowledge management strategy is an enabler of knowledge management activities and processes in an organisation (Oluikpe, Sohail and Odhiambo 2010:28). A good knowledge management strategy according to Aidermark (2009:4) is closely aligned with the organisation's overall strategy and objectives. Dalkir (2005) however suggests that decisions on knowledge management ought to be based on who (people), what (knowledge), and why (business objectives), and save the how (technology), for last. According to UNDP (2007:60), an effective strategy should be centred on the following areas:

- i. knowledge mapping;
- ii. appropriate technology;
- iii. effective and relevant information management system;
- iv. make the project cycle knowledge-driven;
- v. contextualise knowledge; and
- vi. Community building.

Effective knowledge management contributes to the success of development-oriented projects, and therefore the need to include a knowledge management component in project formulation (UNDP 2007:70). Carrillo (2005:238) recommended that projects should have a strategy for capturing and formalising knowledge. This is in agreement with Soward's (2005:36) view that

projects need to capture knowledge during the project implementation and not just at the end of the whole process. The above findings are applicable to both project and non-project based organisations and can be used to justify the development of a knowledge management strategy. Anumba and Khan (2003) noted that an effective knowledge management strategy should ensure that:

- i. Project knowledge is captured, organised or stored properly so that it can be retrieved easily, since the speed at which knowledge is available can affect project decision making.
- ii. Project knowledge is shared and transferred to the relevant project team members at the right time, right place using the right medium so that project decisions can be effectively made.
- iii. Project knowledge is combined to create new knowledge that can assist in solving problems, and
- iv. Key project knowledge and lessons learnt are archived properly for future use.

The above benefits are particularly important for regions like the Lake Victoria Basin, where most researches and development initiatives are undertaken by project based organisations. It is estimated that there are over 40 non-governmental organisations concerned with sustainable development and environmental issues within the Lake Victoria Basin (LVBC 2012). However, despite the large number of organisations, institutions and stakeholders involved in different studies on the LVB, the management of knowledge generated and its dissemination is still poor (EAC 2007). According to a report by the EAC (2007), poor cooperation and coordination among different actors has been singled out as an impediment. This is partly because most outputs emanating from the various projects are rarely shared out to target audiences or put into use to inform future studies. This can be attributed to lack of knowledge management strategies in most organisations operating within the Lake Victoria basin. Different authors, Tan, Carrillo, Anumba, Kamara, Bouchlaghem and Udeaja (2006), Carrillo (2005) and Garon (2006) all concurred that most projects have the inability to capture, codify and carry over knowledge into future projects due to their design. This study has established that information and knowledge is available in the originating organisations but this same information is never shared with others.

The current study sought to establish how knowledge management was handled during the

feasibility, implementation and evaluation stages. Most of the respondents (over 75%) were in agreement that their organisations applied the best practices acquired from previous projects during project set-up. An equally larger proportion of respondents were also in agreement that feasibility studies were conducted within their organisations before project setup. This shows that most organisations applied the knowledge acquired including best practices in previous projects to inform current projects. The basic goal of knowledge management practice is not just about generating new knowledge, but also ensuring that the new and existing knowledge is actually applied in all processes where the knowledge can be useful. The researcher sought to establish how organisations ensure continuity and maintenance of proper knowledge management in relation to their projects at the evaluation stage. Multiple responses were given but majority of respondents cited maintenance of a repository database entailing the activities from the identification to the evaluation stage of the project, which are normally availed on demand.

The researcher also sought to establish how organisations accumulate knowledge and information from projects. Most of the respondents (89.8%) reported that they accumulated knowledge from projects through holding project meetings. According to the literature reviewed in Chapter Two, Maitima, Olson, Mugatha, Mugisha and Mutie (2010:77), CARE (Cooperative for Assistance and Relief Everywhere) International (2010:26) and UNDP (2010:6) agreed that the project cycle should start with identifying, evaluating and applying best options for development by synthesising already existing information. The scholars concur that significant emphasis must be placed on information and knowledge management throughout the project cycle in order to build knowledge that can be disseminated widely to build capacity for a wide range of stakeholders.

5.5.1 Personification and codification strategy

Literature reviewed in Chapter Two revealed that there are two types of knowledge management strategies. These are codification and personification strategies (Gammelgaard and Ritter 2005). Personification strategy focuses mainly on tacit knowledge, its storage in the human mind and its transformation between persons. On the other hand, codification strategy focuses on explicit knowledge. In the codification strategy, knowledge is codified and stored in databases for access and retrieval. This study sought to establish the strategy used by organisations in Lake Victoria

Basin and established that most organisations surveyed did not have a written down knowledge management strategy. Based on the respondents' view, most organisations have invested in information tools and technology which facilitates capture, storage, sharing and dissemination of explicit knowledge. The current study established that the platforms available include repositories, databases and internet connectivity. This implies that the organisations are unconsciously implementing codification strategy. Based on these findings, there is need for the development of efficient knowledge management strategies with the capacity to facilitate knowledge acquisition and sharing among organisations operating within the Lake Victoria Basin if sustainable development of the basin is to be achieved.

5.6 Summary

Chapter Five has discussed the findings of the study presented in Chapter Four. Based on the responses from the study, the researcher can reliably report that a majority of the 26 research institutions operating in the LVB under study acknowledge the beneficial role of knowledge management in empowering organisations and promoting sustainable development of the region. However, several challenges and barriers to knowledge management were cited by respondents with a majority singling out lack of an open minded sharing environment as a major challenge that hinders effective knowledge sharing in their organisations. Nevertheless, all organisations reportedly invested in the internet as a knowledge management tool and technology, though some technical problems were cited as the most critical problem facing the use of ICT in their organisations.

Chapter Six presents the summary, conclusion and recommendations of the study based on the study findings.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

Chapter Five presented the interpretation and discussion of the findings outlined in Chapter Four. This chapter gives a summary of the study and provides conclusions and recommendations based on the objectives of the study. It also provides recommendations for further studies.

6.2 Summary of the findings

In Chapter One, the researcher observed that Lake Victoria and its Basin is one the most treasured trans-boundary natural resources in East Africa. The East African Community Partner States having recognised the potentials and threats to the Lake and the Basin, in general, designated it as an “economic growth zone” to be exploited in a coordinated manner (EAC 2007). With that Declaration, the Lake Victoria Basin Commission was established to spearhead the sustainable development agenda within the Lake Victoria Basin. The literature reviewed confirmed that several projects and initiatives such as LVEMP, LVFO, LVWATSAN, TransVic project among others aimed at protecting the environment have been undertaken in the Lake Victoria Basin. However, despite their combined efforts, the basin remains poorly developed and largely polluted.

The largest trans-boundary project undertaken within the Lake Victoria basin so far is the Lake Victoria Environmental Programme (LVEMP) currently in phase two. Other key projects include but, are not limited to Lake Victoria Water and Sanitation project, The TransVic Project among others. Some of the major development partners with keen interest on sustainable development of the Lake Victoria Basin include the African Development Bank, World Bank, Government of Sweden and United States Agency for International Development and Government of Norway among others. This study sought to link unsustainable development within the Lake Victoria Basin as reported by Awange and Obiero (2006), UN-Habitat (2008), and Maitima, Olson, Mugatha, Mugisha, and Mutie (2010) to poor knowledge management strategies by organisations working in the region. While acknowledging the lake’s vital contribution to the locals’ wellbeing, Maitima et al. (2010) noted that the usefulness of the lake has been severely

strained by anthropogenic activities. These authors recommended the adoption of sustainable resource management that includes knowledge and information systems. This according to the authors would ensure documentation and sharing of successes. These successes will inform subsequent efforts against the widespread land degradation, declining soil fertility and low crop yields in the Lake Victoria Basin.

The main objective of the study was to determine the role of knowledge management in promoting sustainable development of the Lake Victoria Basin. Four specific objectives were formulated in line with the aim of this study. The objectives were:

- i. to establish the role of knowledge management in the sustainable development of the Lake Victoria Basin;
- ii. to determine the challenges and barriers that hinder effective knowledge management in the Lake Victoria Basin and how to overcome them;
- iii. to establish the tools and technology that can be used in enhancing knowledge management in the Lake Victoria Basin; and
- iv. to establish strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development.

This study was conducted within 26 selected organisations across the five East African partner states (Republics of Burundi Kenya, Rwanda, Uganda and Tanzania). The respondents included, Chief Executive Officers/Managing Directors, Librarians, Communications Officers and Information and Technology Officers who were deemed to possess relevant information and were in a better position to understand aspects of knowledge management within their organisations.

6.2.1 The role of knowledge management in the sustainable development of Lake Victoria Basin

This study established that knowledge management had a role in the sustainable development of the Lake Victoria Basin as majority of the respondents were in agreement with the statement. The documents reviewed also strongly advocated that sustainable development can be achieved

if organisations implement knowledge management. Most respondents were also in agreement that knowledge management is a systematic discipline of policies, processes, activities and tools which empower organisations to apply knowledge to improve effectiveness, innovation and quality. A large proportion of respondents reported that their organisations facilitate the discovery and capture of information and knowledge as well as facilitating the storage and retrieval of knowledge. The study established that most organisations facilitate knowledge transfer across various departments, while response was divided among respondents by almost half for those who felt that specific knowledge needed for effective management resides within experts against those who felt otherwise.

The study established that organisations such as LVBC, NELSAP, LVEMP and LVFO encouraged documentation of lessons learnt. A high percentage of respondents also reported that their organisations made it mandatory to deposit key documents in the library for wide access. Paper-based medium was the most preferred knowledge storage format according to most respondents.

6.2.2 Challenges and barriers to knowledge management in the sustainable development of Lake Victoria Basin

To establish some of the barriers to knowledge management, respondents were asked what they perceived to be the key challenges that hinder effective knowledge sharing within their organisations. Over half the respondents strongly agreed with the statement that lack of an open-minded sharing environment was a challenge that hindered effective knowledge sharing.

Needlessly, time consuming procedures involved in sharing of knowledge was also cited by a large proportion of respondents as a challenge and barrier to knowledge sharing between organisations. Other barriers to knowledge sharing cited included technical problems in ICT tools. Lack of time was singled out by 76.5% of the respondents as one of the obstacles to proper documentation.

6.2.3 Tools and technology that can be used in enhancing knowledge management in Lake Victoria Basin

The researcher sought to establish which management tools and technologies are used by

organisations. The internet was mentioned by all (100%) respondents as one of the knowledge management tools and technologies, while most (87%) respondents reported that databases were available in their organisations.

Only 12% of respondents reported having a data warehousing tool, in their organisations for knowledge management. Most respondents reported that their organisations utilise information and communication technology, as a data storage device as well as a communication tool.

The researcher sought to find out the problems faced in using ICT within the organisations. This was done by asking respondents to rank their responses on a numerical scale ranging from most critical problem to the least problematic issue. Technical problems were reported by 71.4% of the respondents as being the most critical problem facing the use of ICT in their organisations, with 29.6% of the respondents citing a complicated system.

6.2.4 Strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development

In attempts to establish how knowledge management has been institutionalised, the researcher asked respondents to indicate the extent to which they agreed, or disagreed with several statements in relation to their projects during the set-up stage. A good example is the Lake Victoria Region Water and Sanitation Initiative (LWATSAN) which supports the East Africa Community governments to achieve the Millennium Development Goals for water supply and sanitation, with emphasis on innovative solutions and speedy delivery. The phase one of the project conducted studies that informed the set up and implementation of the phase two. From the research, 42% of the respondents agreed that their organisations applied the best practices during project set-up. Up to 46.4% of the respondents also agreed that feasibility studies were conducted during project setup.

As regards the factors that contribute to effective knowledge sharing at the preparation and development stage, 53.1% of the respondents cited team work among employees, while 41.8% of respondents reported that holding regular progress meetings contributed to effective knowledge sharing.

Most respondents were in agreement with the statement that reuse of knowledge gained in future projects was one of the perceived causes of success in knowledge sharing. A high proportion of respondents also agreed that project leadership was very critical and was perceived as a cause of success in knowledge sharing.

Most respondents reported that documentation of activities that went on throughout the project life was done within their organisations. They further reported that the reports were uploaded in repository or database for ease of access.

The researcher sought to establish how organisations accumulate knowledge and information from projects. Most of the respondents (89.8%) reported that they accumulated knowledge from projects through holding project meetings.

6.3 Conclusions

The conclusions made are guided by the study objectives, research questions and the findings that were obtained in the study.

6.3.1 The role of knowledge management in the sustainable development of Lake Victoria Basin

As noted in Chapter One, Lake Victoria Basin is a trans-boundary region which is endowed with rich natural resources that include freshwater, fish, minerals, wildlife, biodiversity, land, wildlife, forests, wetlands, mountainous ecosystems, energy resources and other natural resources which provide unique opportunities for socio-economic development (Okurut and Weggoro 2011:3). However, sustainable development within the Lake Victoria Basin, faces challenges such as deteriorating water quality; declining lake levels; over exploitation of natural resources; and resurgence of the water hyacinth menace which hinders transport and fishing activities. These environmental problems coupled with the growing population pressure in the Lake Victoria Basin, has resulted to increased competition and conflicts over the use of the limited but shared trans-boundary natural resources (World Bank 2008). The EAC (2012:3) further identified weak institutional, legal and regulatory frameworks for environmental and natural resources management and governance as a hindrance to sustainable development. In order to achieve sustainable development, there is need therefore, to embrace a holistic and coordinated approach to address the challenges for the benefit of the current and future generations.

The current study addressed the need for institutions in the Lake Victoria Basin to embrace, internalise and integrate knowledge management in the conduct of their business. This would in turn facilitate the sustainable development of the Lake Victoria Basin. It is imperative that organisations in the Lake Victoria Basin, such as the LVBC, NBI, LVEMP and LVFO, seek to consolidate their knowledge bases. This would then allow for timely dissemination of findings to stakeholders. These stakeholders include independent researchers, research organisations and institutions of higher learning and relevant arms of government, investors, developers and communities that rely directly on Lake Victoria Basin resources (EAC 2014). This can be done by continuously documenting lessons learnt and best practices to allow possible replication (Okurut 2012:7).

As regards to the role of knowledge management in the sustainable development of the Lake Victoria Basin, many respondents agreed with the statement that knowledge management has a role to play in the sustainable development of the Lake Victoria Basin. The fact that a majority of respondents were able to link knowledge management and sustainable development is a reflection of the relatively high level of awareness among the Lake Victoria Basin inhabitants. Proper knowledge management is one of the preconditions for effective governance structures focusing on sustainable development (UNCED 1992:6). To achieve the delicate balance between development and protection of natural resources, organisations within the Lake Victoria Basin must therefore embrace knowledge management to enhance the capacity of people to utilise the natural resources sustainably.

The findings obtained in this study are consistent with those of Wong (2010) that knowledge is a critical resource for sustainable development. The current study thus concludes that knowledge management is of absolute importance to any organisation operating within the Lake Victoria Basin. This study also agrees with Hamel (2005), who noted that knowledge may be the most powerful weapon against unsustainable development in Africa; a continent characterised by interrelated high levels of poverty, hunger, illiteracy, illness, insecurity, superstitions, joblessness, cultural rigidities, eco-degradation and international dependence. This study has further established that there is need for development organisations in the Basin to embrace knowledge management thereby enabling knowledge generation, codification, transfer and sharing. It is

indeed clear that the future of the natural resources in the Basin is closely linked to how well the various stakeholders are able to generate, access and use the information and knowledge available.

Based on the reviewed literature, it was established that the East African Community partner states, share a common interest and heritage in the Lake Victoria Basin. The EAC recognises that the Lake Victoria and its Basin is experiencing environmental degradation and in danger of irreparable damage. This was consistent with the reviewed literature which also showed that the Lake Victoria Basin is facing a myriad of threats resulting from anthropogenic activities such as increased watershed degradation, including soil erosion and loss of vegetation cover; reduced water inflows into the lake, over abstraction of lake water, recurrence of water hyacinth, and increased water pollution from industries, livestock, agriculture, mining and urban runoff (EAC 2012). As a result, the EAC partner states have committed to ensure proper management and sustainability of the Basin's resources for the benefit of present and future generations, through the development of the Protocol for Sustainable Development of the Lake Victoria Basin. The Protocol established the Lake Victoria Basin Commission (LVBC) which is responsible for promoting, facilitating and coordinating the sustainable development agenda of the Basin (LVBC 2011). The Protocol further provides policy guidance to support the management and development of Lake Victoria Basin in a sustainable manner.

6.3.2 Challenges and barriers to knowledge management in the sustainable development of Lake Victoria Basin

From the literature reviewed in Chapter Two, barriers to knowledge management have been described as whatever hinders the successful implementation of knowledge management initiatives in an organisation. Knowledge management being a relatively new concept to many organisations based in the Sub - Saharan Africa (Ondari-Okemwa 2006) has not been fully implemented. The current study established that most respondents appreciated knowledge management as a concept but, in practice had not been keen on its implementation. Various barriers and challenges were identified by respondents in the current study. These included: lack of an open minded sharing environment, bureaucratic procedures involved in knowledge sharing and poor information sharing within and among organisations.

Based on Brandt and Hartmann's (1999) categorisation of the barriers and challenges to knowledge management, for the purposes of this study, the barriers were grouped into technology, organisation and people-based. On the basis of these categories, this study established that people barriers were the most critical, while technological barriers were the least critical barriers to knowledge management in organisations operating within the Lake Victoria Basin. These findings concur with Singh and Kant (2008:148), who cited people barrier as most critical. For the successful implementation of knowledge management initiatives, the top management in organisations must develop a strategy and structure for capturing and sharing knowledge. The need to encourage a change of culture among employees aimed at improving the sharing of information with others can thus not be overemphasised.

6.3.3 Tools and technology that can be used in enhancing knowledge management in Lake Victoria Basin

From the literature review, knowledge management technologies and tools are those that enhance and enable knowledge generation, codification and transfer (Ruggles 1997, as cited by Dalkir 2005:218). There are three key components of knowledge management as revealed in this study through the literature review. These are people, processes and technology.

The ICT technologies enable the right knowledge to be accessed by the right people at the right time using the right medium (O'Dell and Grayson 1997:4). Thus, the objective of knowledge management is to ensure knowledge is shared with the relevant users at the right time, place and using the right medium so that development decisions can be made effectively (Anumba and Khan 2003).

This study established that information and communication technologies are enablers of knowledge management. These ICT tools provide a platform to increase access and dissemination of generated knowledge. From the findings of this study, the technology widely embraced in Lake Victoria Basin is the use of the Internet, World Wide Web and databases. This is in agreement with Al-Roubaie (2012) who noted that in recent years, the Internet has become an important means for knowledge acquisition and information diffusion. During the study, 87% of the respondents reported that they always sought knowledge not directly available in their

organisations from elsewhere. To effectively access the knowledge resources within or without organisations, there is need to encourage the use of ICT by the target users to source for the knowledge.

This study established that majority of organisations such as Lake Victoria Basin Commission, The East African Sustainability (SusWatch) Network, Nile Equatorial Subsidiary Programme, Nile Basin Initiative and Lake Victoria Fisheries organisations have all invested in information tools and technology which facilitates capture, storage, sharing and dissemination of explicit knowledge. Such tools include knowledge repositories and databases. However, the study found that the tools are not being effectively utilised due to technical problems and lack of time to codify knowledge. It is important therefore, that organisations acquire appropriate tools and technology that will support the creation and dissemination of knowledge.

6.3.4 Strategies used by organisations to manage knowledge generated for sustainable development in the Lake Victoria Basin

From the literature reviewed in Chapter Two, O'Dell and Grayson (1997:4) viewed knowledge management as a conscious strategy of getting the right knowledge to the right people at the right time, and helping people to share and use the information. In this definition, O'Dell and Grayson (1997:4) emphasised that knowledge management is a conscious strategy developed through planning. They further observed that knowledge management involves people, who generate, transfer and share knowledge. Based on this definition, it is clear that knowledge management is a conscious strategy developed through planning.

From the literature reviewed in Chapter Two, it is imperative that organisations in Lake Victoria Basin develop a conscious strategy to systematically develop and implement knowledge management processes, knowledge generated cannot be effectively managed, captured and shared. UNESCO (2006:5) noted that while most organisations develop and distribute knowledge, a knowledge management strategy attempts to be more intentional and coordinated in that approach, and therefore likely to be successful. Based on the works of Alavi and Leidner (2001:76), Pee and Kankanhalli (2009), Dalkir (2010) and NHS National Library for Health (2005), knowledge management can be broadly categorised into three components: (i) people

who create, share and use knowledge, (ii) processes which offer methods to acquire, create, organise and transfer knowledge, and (iii) technology which provides mechanisms to store and provide access to data, information and knowledge created by people. Therefore, for any organisation wishing to implement knowledge management, the three components must be balanced as they play complementary roles.

From the current study findings, the organisations do not seem to have developed clear strategies to guide their knowledge management initiatives. The study's findings did however suggest that organisations are beginning to appreciate knowledge management and the potential benefits that may be realised. A good example is the Lake Victoria Basin Commission (LVBC), which has developed a unit called "Communication and knowledge management unit". This unit, which has been charged with the responsibility of spearheading implementation of knowledge management processes within the Commission, brings together the Library, Information technology and communication departments.

In the absence of knowledge management strategies, most organisations focus more on knowledge collection and storage and often forget to disseminate this knowledge to the right users. This has resulted in duplication of efforts and resources, which makes it difficult to make informed policy and management decisions on the Lake Victoria Basin. A good example is the overlapping mandates of the Nile Equatorial Lakes Subsidiary Action Programme (NELSAP) and the Lake Victoria Basin Commission (LVBC). The Nile Equatorial Lakes Subsidiary Action Programme seeks to eradicate poverty, promote economic growth and reverse environmental degradation in the Kagera, Mara and Sio-Malaba-Malakisi river basins. The LVBC on the other hand, is responsible for coordinating management of environment and natural resources in the entire Lake Victoria Basin including the three river basins namely the Kagera, Mara and Sio-Malaba-Malakisi. The two organisations are currently engaged in development of a memorandum of understanding which among other things will allow for free flow of information and knowledge between these two organisations. This will lead to a coordinated approach of interventions within the Lake Victoria Basin.

UNDP (2007) noted that by implementing knowledge management, an organisation can collectively:

- i. Avoid repeating past mistakes;
- ii. Highlight good practices to be replicated elsewhere;
- iii. Make work more relevant, effective and accessible;
- iv. Compare experiences and draw out common issues and challenges;
- v. Influence policy and strategic thinking by rooting them in experience;
- vi. Make lesson-learning, and thereafter capacity-building, a conscious and habitual process within a team and/or an organisation; and
- vii. Help develop strong networks among people.

To realise the above benefits, it is imperative for organisations within the Lake Victoria Basin to formulate knowledge management strategies that will promote the harnessing of knowledge resources and building a knowledge base to support sustainable development within the region. Bachou, Nyantah and Ichang'i (2005:43) as reviewed in chapter two, recommended the development of knowledge management strategies which will facilitate information and knowledge sharing, dissemination and awareness in the Lake Victoria Basin. This will in turn facilitate access, sharing, use, and replication of knowledge by all stakeholders.

6.4 Recommendations

The recommendations made are guided by the study objectives, research questions and the findings that were obtained in the study.

6.4.1 The role of knowledge management in the sustainable development of Lake Victoria Basin

The role of knowledge management in the sustainable development of the Lake Victoria Basin cannot be over-emphasised. Managing knowledge for sustainable development within Lake Victoria Basin should therefore become a strategic priority for organisations involved in development in the region. This study concurs with Tripathy, Patra and Pani (2007) that for sustainable development to be achieved in Lake Victoria Basin, there is need to establish:

- i. What the people in society know;
- ii. Where the knowledge resides in organisations or the society;
- iii. How to locate people with specific knowledge, expertise and experience; and
- iv. How to share and utilise the accumulated knowledge.

This calls for the development and enactment of knowledge management processes within organisations. The expected benefits of having knowledge processes as established from the literature reviewed in Chapter Two (Martin, Lopez and Navas 2008) are:

- v. Connecting people for knowledge sharing;
- vi. Connecting people with knowledge repositories;
- vii. Encouraging knowledge creation;
- viii. Allowing knowledge encoding for easier transfer; and
- ix. Disseminating knowledge in and outside the organisation.

6.4.2 Challenges and barriers to knowledge management in the sustainable development of Lake Victoria Basin

This study established that people barriers were the most critical barriers to knowledge management more so with regard to knowledge sharing. To mitigate the challenges and barriers identified in Lake Victoria Basin, it is imperative for organisations in the Basin to develop a corporate culture (King 2008:26) that will:

- i. Shape the assumption that knowledge is important;
- ii. Mediate the relationship between organisational and individual knowledge;
- iii. Create a context for social interaction; and
- iv. Shape processes for creation and adoption of new knowledge.

This study further established that corporate cultural shift cannot occur without the commitment and support from the top management in the organisations. This is based on the understanding that knowledge management is first and foremost a people issue. There is need for institutions and organisations working within the Lake Victoria Basin to develop a culture that will support

ongoing learning and knowledge sharing within and across their organisations. Organisations therefore need to support a culture of openness, mutual respect and sharing among all the stakeholders which will lead to effective management and dissemination of knowledge. The top management in organisations need to motivate and reward employees for creating, sharing and using the knowledge they generate. This study therefore, recommends that the top managers take the lead as the knowledge management champions within their organisations.

6.4.3 Tools and technology that can be used in enhancing knowledge management in Lake Victoria Basin

Technology plays a critical role as an enabler of knowledge management. This study agrees with Abdelrahman (2013) that information and communication tools and technologies play a major role in enhancing the management of knowledge within organisations. Building an ICT infrastructure therefore becomes vital. Wong (2005:9) identified knowledge capture/creation technologies; and knowledge sharing/dissemination technologies as vital for integration into any organisation's technological platform.

This study recommends that all organisations within Lake Victoria Basin develop technological infrastructure appropriate to the specific needs of the organisation. Some of the recommended tools are knowledge repositories and databases which will not only facilitate knowledge access but also act as a preservation tool. Knowledge sharing and dissemination tools recommended by the study include collaboration tools. These are the tools that can be used to enhance collaboration and knowledge networking within and among organisations. A good example of a collaboration tool is the corporate portals, which are web-based applications that provide a single point of access to online information (both in-house and external sources). Corporate portals present the potential of providing organisations with a rich and complex shared information workspace for the creation, exchange, retention and reuse of knowledge (Benbay, Passiante and Aissa 2004).

6.4.4 Strategies used by organisations in the Lake Victoria Basin to manage knowledge generated for sustainable development

According to Zedtwitz (2003), there is a frequent observation in literature that projects do not often reuse the lessons learnt from previous projects. This has led to increased demand for the adoption of a knowledge management strategy that can then be used to consolidate this knowledge and make it available to all stakeholders. The current study established that most organisations in the Lake Victoria Basin did not have clear knowledge management strategies. This study established that while there exists large volumes of information generated by various institutions within the basin, this information is never shared with other stakeholders (EAC 2014:5).

This study therefore recommends the formulation of a knowledge management strategy that will address the three key components namely: people, processes and technology. Constructing an effective knowledge management strategy will promote the harnessing of knowledge resources and build the right Lake Victoria Basin knowledge base with the ability to support sustainable development in the Lake Victoria Basin region. A proper knowledge management strategy will lead to a coordinated approach to sustainable development in the Lake Victoria Basin. Having an effective knowledge management strategy would enable organisations easily retrieve, transfer and share knowledge since it is properly captured and stored. Further, organisations in Lake Victoria Basin would be able to create new knowledge aimed at solving problems from the existing knowledge as well as archive lessons learnt for future use. The shared information will also inform subsequent studies and thus eliminate instances of repeated studies and replication of efforts.

6.6 Suggestions for future research

This study was conducted through a survey, in which the questionnaire was the main data collection tool. The survey aspect of the study is limited by the structured nature of the questionnaire which only allowed respondents to give information as guided. The survey method was chosen due to the large geographical location of the study area, which covered the Lake Victoria Basin within the five East African Community Partner States.

Given the importance of the subject matter, there is a need for further research on the same subject to be conducted using mixed methods. In addition, the following topics are recommended for further research:

- i. How to implement knowledge management in organisations involved in development. This is necessitated by the fact that most organisations involved with the Lake Victoria Basin do not seem to have clearly spelt out strategies on knowledge management implementation. Further, a knowledge management framework should be developed to guide organisations wishing to embrace knowledge management.
- ii. In-depth research on knowledge management initiatives at LVBC. LVBC has been singled out due to its unique position in the region and the mandate of spearheading sustainable development agenda in Lake Victoria Basin. It is in view of this that the LVBC should strive to achieve its mandate of promoting, facilitating and coordinating the sustainable development agenda of the Lake Victoria Basin.

6.7 Summary

This chapter provided a summary of findings, conclusions and recommendations based on the objectives of the study. Suggestions for further studies are also provided based on the study outcomes. The study established that knowledge management has a role to play in the sustainable development of the Lake Victoria Basin. This study recommends that institutions and organisation in LVB should embrace and integrate knowledge management in the conduct of their business to be able to achieve their common goal, which is the sustainable development of LVB. This study concurs with Okurut (2012) who noted that for sustainable development to be achieved in LVB, there is need to use a wholesome approach which includes efficient utilisation of current available knowledge and continuously seeking new knowledge.

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APPENDIX I: COVERING LETTER FOR THE QUESTIONNAIRE

Dear Respondent,

My name is Mary Mwangi; I am carrying out a research for my Master's thesis at the University of South Africa. The title of my thesis is "**The role of knowledge management in the sustainable development of Lake Victoria Basin**". The research objectives for my study are as follows:

- v. to establish the role of knowledge management in the sustainable development of Lake Victoria Basin;
- vi. to determine the challenges and barriers that hinder effective knowledge management on Lake Victoria Basin and how to overcome them;
- vii. to establish the tools and technology that can be employed in enhancing knowledge management on Lake Victoria Basin; and
- viii. to establish strategies employed by organisations to manage knowledge generated for sustainable development of the Lake Victoria Basin.

The findings from literature review and the survey which the researcher will conduct amongst selected institutions with projects on the Basin will inform the recommendations of the study.

Your organisation/institution has been identified as a key player in promoting sustainable development in Lake Victoria Basin. I request your participation to enable me establish the role of knowledge management in ensuring sustainable development.

For the purposes of this study the following has been identified as the working definition:

- **Knowledge management** is the deliberate and systematic coordination of the organisation's people, technology, processes and organisational culture in order to add value through reuse and innovation.
- **Sustainable development** is the "ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.

Given the background above, I am hereby requesting you to kindly take time to fill in the questionnaire hereby attached. All the information and views expressed in this questionnaire will be treated with confidentiality and used only for the purposes of this research and no opinion will be attributed to any individual.

Thank you for your time and participation in the survey.

Sincerely,

Mary Mwangi
Department of Information Science
University of South Africa
Email: 37055267@mylife.unisa.ac.za
Mobile +254 725 840 330

Note: After completing the questionnaire, please return it via email to 37055267@mylife.unisa.ac.za or print it out, fill and return to Mary Mwangi by 31st July, 2014

APPENDIX II: QUESTIONNAIRE

RESPONDENT TO FILL

Serial number: _____

PART I: PERSONAL INFORMATION

- i. Gender: Female Male
- ii. Organisation/Institution-----
- iii. Position at the institution-----
- iv. Experience:
- a. How many years of experience do you have? -----
- b. Briefly state your duties and responsibilities? -----

PART II:

SECTION I: THE ROLE OF KNOWLEDGE MANAGEMENT

1. Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it. **Key:** 1 stands for **Strongly Agree (SA)**, 2 for **Agree (AG)**, 3 for **Disagree (DA)**, 4 for **Strongly Disagree (SD)**, and 5 for **Not Applicable (NA)**.

| | Statement | SA | AG | DA | SD | NA |
|---|---|----|----|----|----|----|
| a | Knowledge management is something that could be beneficial for the organisation | 1 | 2 | 3 | 4 | 5 |
| b | Knowledge management has a role to play towards attainment of sustainable development | 1 | 2 | 3 | 4 | 5 |
| c | Knowledge management is a systematic discipline of policies, processes, activities and tools which empower organisations to apply knowledge to improve effectiveness, innovation, and quality | 1 | 2 | 3 | 4 | 5 |
| d | The organisation facilitates the discovery and capture of information and knowledge | 1 | 2 | 3 | 4 | 5 |
| e | The organisation facilitates knowledge storage/retrieval both internally and externally | 1 | 2 | 3 | 4 | 5 |
| f | The organisation facilitates knowledge transfer across its various departments/functional units | 1 | 2 | 3 | 4 | 5 |
| g | The specific knowledge that I need to be effective in discharging my duties resides with the experts/colleagues | 1 | 2 | 3 | 4 | 5 |
| h | I always have to seek new knowledge that is not directly available in the organisation | 1 | 2 | 3 | 4 | 5 |
| i | The organisation encourages documentation of lessons | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | learnt | | | | | |
| j | It is mandatory to deposit key documents in the library for wide access | 1 | 2 | 3 | 4 | 5 |

2. Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it. **Key:** 1 stands for **Strongly Agree (SA)**, 2 for **Agree (AG)**, 3 for **Disagree (DA)**, 4 for **Strongly Disagree (SD)**, and 5 for **Not Applicable (NA)**.

| | Statement | SA | AG | DA | SD | NA |
|---|--|-----------|-----------|-----------|-----------|-----------|
| a | Knowledge management has a role to play towards attainment of sustainable development | 1 | 2 | 3 | 4 | 5 |
| b | Knowledge management is a systematic discipline of policies, processes, activities and tools which empower organisations to apply knowledge to improve effectiveness, innovation and quality | 1 | 2 | 3 | 4 | 5 |
| c | Knowledge management has a role to play towards attainment of sustainable development | 1 | 2 | 3 | 4 | 5 |
| d | The types of knowledge management processes employed by the organisation are able to make a difference in achieving sustainability | 1 | 2 | 3 | 4 | 5 |
| e | Knowledge management within an organisation is a pre-requisite for furthering the process of sustainable development | 1 | 2 | 3 | 4 | 5 |
| f | Knowledge management is unequivocally the pivot around which all forms of development in modern society revolves | 1 | 2 | 3 | 4 | 5 |
| g | Knowledge management is both an organic part of sustainable development and a potent instrument for furthering the process of sustainable development | 1 | 2 | 3 | 4 | 5 |
| h | The attainment of sustainable development requires a wholesome approach including use of technology, efficient utilisation of current available knowledge and continuously seeking new knowledge | 1 | 2 | 3 | 4 | 5 |

3. How significant is the role of knowledge management in achieving the best result with regard to the following in your organisation? **Key:** Rank your responses on a numerical scale of **1 – 7**, with **1 representing extremely important and 7 for not important**

| | | | | | | |
|----------------------------|----------|----------|----------|----------|----------|----------------------|
| Extremely important | | | | | | Not important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | |
|---|---------------------------------|--|
| a | Improving competitive advantage | |
| b | Improving customer focus | |
| c | Innovations creation | |
| d | Inventory reduction | |
| e | Employee development | |
| f | Sustainable development | |
| g | Better decision-making | |

4. The knowledge/information I need to accomplish my duties is located in the following places: [**Kindly tick against as many choices as is appropriate**].

| | | |
|---|--|--|
| a | In paper-based documents/books/library | |
| b | In colleagues memory (internal collaboration) | |
| c | On my personal workstation/computer | |
| d | On the internet | |
| e | On the intranet | |
| f | From professional bodies | |
| g | From other third level institutions (external collaboration) | |

Kindly provide any other sources that you make use of that may not have been listed above

5. How does your organisation trace internal and external knowledge? [**Kindly tick against as many choices as is appropriate**].

| | | |
|---|---|--|
| a | By finding out what the people in the organisation know | |
| b | By establishing where the knowledge resides in the various departments or persons in the organisation | |
| c | By locating the people with specific knowledge, expertise and experience | |
| d | By establishing a directory of expertise | |
| e | Others, please specify | |

6. What role do managers in your organisation play in promoting knowledge transfer and sharing? [**Kindly tick against as many choices as it is appropriate**].

| | | |
|----------|--|--|
| a | Promoting professional networks | |
| b | Encouraging staff to share knowledge with co-workers | |
| c | Encouraging informal gatherings where knowledge is shared | |
| d | Appointing mentors | |
| e | Holding regular meetings with other staff | |
| f | Encouraging communication through various media (intranet, internet, etc.) | |
| g | Inviting experts to give lectures | |
| h | Establishing work teams/project teams | |
| i | Use of information repositories | |
| j | Use of databases | |
| k | Any other (Please specify) | |

SECTION II: CHALLENGES AND BARRIERS TO KNOWLEDGE MANAGEMENT

1. What do you perceive to be the challenges that hinder effective knowledge sharing? Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it. **Key:** 1 stands for **Strongly Agree (SA)**, 2 for **Agree (AG)**, 3 for **Disagree (DA)**, 4 for **Strongly Disagree (SD)**, and 5 for **Not Applicable (NA)**.

| | Statement | SA | AG | DA | SD | NA |
|----------|---|----|----|----|----|----|
| a | Lack of open-minded sharing environment | 1 | 2 | 3 | 4 | 5 |
| b | Lack of trust in other people's knowledge | 1 | 2 | 3 | 4 | 5 |
| c | Lack of proper organisational guidelines on sharing | 1 | 2 | 3 | 4 | 5 |
| d | Bureaucratic procedures involved in sharing information/knowledge | 1 | 2 | 3 | 4 | 5 |
| e | Lack of proper information technology platform to share knowledge | 1 | 2 | 3 | 4 | 5 |
| f | Inhibitive organisation policies/directives | 1 | 2 | 3 | 4 | 5 |
| g | Poor information systems/processes | 1 | 2 | 3 | 4 | 5 |
| h | People do not think there is any need to share what they know | 1 | 2 | 3 | 4 | 5 |
| i | Knowledge management is not embedded in the work processes | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|----------|--|----------|----------|----------|----------|----------|
| j | Exclusion of knowledge management during project designs | 1 | 2 | 3 | 4 | 5 |
| k | Lack of training on knowledge management | 1 | 2 | 3 | 4 | 5 |

Kindly state any other challenges and barriers to knowledge management that you may think of that are not captured in the items above _____

2. Please rate information sharing within your organisation (*Tick as appropriate*)

| | | | | |
|-----------|------|---------|------|-----------|
| Very good | Good | Average | Poor | Very poor |
|-----------|------|---------|------|-----------|

3. What in your opinion are the obstacles to creating proper documentation? (Please tick as many as appropriate)

| | | |
|---|--|--|
| a | Not important to my role | |
| b | Lack of time | |
| c | Knowledge creation is not considered important by the organisation | |
| d | I keep all the knowledge in my memory | |
| e | Others (please specify) | |

SECTION III: TOOLS AND TECHNOLOGIES FOR KNOWLEDGE MANAGEMENT IN ORGANISATIONS/ INSTITUTIONS UNDER INVESTIGATION

1. Which knowledge management tools and technologies are available in your organisation? [**Kindly tick against as many choices as is appropriate**].

| | | |
|----------|-------------------------------|--|
| a | Internet | |
| b | Data warehousing | |
| c | Intranet | |
| d | Knowledge management software | |
| e | Extranet | |
| f | Email group | |
| g | Decision support system | |
| h | Database management system | |
| i | Virtual conference rooms | |
| j | Electronic bulletin boards | |

| | | |
|----------|-----------------------|--|
| k | Discussion forums | |
| l | Knowledge directories | |
| m | Web portal | |
| n | Library | |
| o | Databases | |

Others, [if others please specify]: _____

2. How does your organisation utilise information and communication technology? [**Kindly tick against as many choices as it is appropriate**].

| | | |
|-----------|--|--|
| i. | As data storage devices | |
| i. | As data processing tools | |
| i. | As communication devices | |
| i. | As knowledge gathering and dissemination tools | |
| i. | As analysis and decision support tools | |

Others,[please specify] _____

3. What problems do you face in using information technology for knowledge management?
Key: Rank your responses on a numerical scale of **1 – 7**, with **1 being the MOST critical problem and 7 for least problematic issue.**

| Most critical problem | | | | | | least problematic issue |
|------------------------------|----------|----------|----------|----------|----------|--------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | |
|----------|--|--|
| a | Lack of training | |
| b | IT system too complicated | |
| c | Failure to identify proper information technology tool | |
| d | Inadequate time to learn | |

| | | |
|----------|---|--|
| e | Lack of user uptake due to insufficient knowledge | |
| f | Every day use not integrated into normal working practice | |
| g | Technical problems | |

Kindly list any other problems faced in using IT in knowledge management that may have been omitted in the list above _____

SECTION IV: INSTITUTIONALISATION OF KNOWLEDGE MANAGEMENT

1. Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it in relation to your project during the set-up stage. **Key:** 1 stands for **Strongly Agree** (SA), 2 for **Agree** (AG), 3 for **Disagree** (DA), 4 for **Strongly Disagree** (SD), and 5 for **Not Applicable** (NA).

| | Statement | SA | AG | DA | SD | NA |
|----------|---|-----------|-----------|-----------|-----------|-----------|
| a | A knowledge management process was considered at the initial stage of the project | 1 | 2 | 3 | 4 | 5 |
| b | Similar project reports/lessons learnt in the past were reviewed before planning this project | 1 | 2 | 3 | 4 | 5 |
| c | Best practices are a very important aspect of our project considerations | 1 | 2 | 3 | 4 | 5 |
| d | Feasibility studies were conducted at the commencement of the project | 1 | 2 | 3 | 4 | 5 |
| e | The time necessary for completing various aspects of the project was estimated | 1 | 2 | 3 | 4 | 5 |
| f | Information management plans were put in place at the beginning of the project | 1 | 2 | 3 | 4 | 5 |
| g | Experiences and qualifications of staff is taken seriously before assigning them to any project | 1 | 2 | 3 | 4 | 5 |

2. What do you perceive to be the factors contributing to effective knowledge sharing? Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it in relation to your project at the preparation/development stage. **Key:** 1 stands for **Strongly Agree** (SA), 2 for **Agree** (AG), 3 for **Disagree** (DA), 4 for **Strongly Disagree** (SD), and 5 for **Not Applicable** (NA)

| | Statement | SA | AG | DA | SD | NA |
|----------|--|-----------|-----------|-----------|-----------|-----------|
| a | There was/is a lot of team work during the project | 1 | 2 | 3 | 4 | 5 |
| b | Team members helped each other learn on the project and newcomers especially were able to learn from others on the job | 1 | 2 | 3 | 4 | 5 |
| c | We held/hold regular progress meetings to review | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|----------|--|---|---|---|---|---|
| | work done, brainstorm and to correct mistakes and also plan ahead for the project | | | | | |
| d | There was the presence of informal groups within the project | 1 | 2 | 3 | 4 | 5 |
| e | Team members are also allowed and encouraged to communicate with others engaged in similar projects externally to gain knowledge | 1 | 2 | 3 | 4 | 5 |
| f | Project team members are encouraged to share what they know and there are technologies that encourage them to document and share | 1 | 2 | 3 | 4 | 5 |

3. What do you perceive to be the cause of success in effective knowledge sharing? Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it in relation to your project at the implementation stage. **Key:** 1 stands for **Strongly Agree (SA)**, 2 for **Agree (AG)**, 3 for **Disagree (DA)**, 4 for **Strongly Disagree (SD)**, and 5 for **Not Applicable (NA)**.

| | Statement | SA | AG | DA | SD | NA |
|----------|--|-----------|-----------|-----------|-----------|-----------|
| a | Knowledge gained from group collaboration, discussions and sharing was critical to executing future projects | 1 | 2 | 3 | 4 | 5 |
| b | There were attempts to translate innovative ideas into practical equivalents during the execution | 1 | 2 | 3 | 4 | 5 |
| c | In my estimation, our project created new knowledge during its life cycle | 1 | 2 | 3 | 4 | 5 |
| d | The project leadership was very critical to its success | 1 | 2 | 3 | 4 | 5 |
| e | The team work on this particular project was adequate in helping project success | 1 | 2 | 3 | 4 | 5 |
| f | There was a management process which enabled project staff to identify concerns and raise them appropriately to leadership for necessary action | 1 | 2 | 3 | 4 | 5 |
| g | We had a quality management procedure in place to ensure the project adhered to accepted standards | 1 | 2 | 3 | 4 | 5 |
| h | There was also a Work Breakdown Structure (WBS) in place to ensure that various aspects of the project were successfully assigned to competent staff | 1 | 2 | 3 | 4 | 5 |
| i | I would consider our project a success from the point of view of the stated objectives at the commencement of the project | 1 | 2 | 3 | 4 | 5 |
| j | The project also met the cost, schedule and time requirements of the stakeholders | 1 | 2 | 3 | 4 | 5 |

4. How do you ensure continuity/maintenance of proper knowledge management in your organisation? Please **TICK ONE BOX** for each statement to show how much you agree or disagree with it in relation to your project at the evaluation stage. **Key:** 1 stands for **Strongly Agree** (SA), 2 for **Agree** (AG), 3 for **Disagree** (DA), 4 for **Strongly Disagree** (SD), and 5 for **Not Applicable** (NA)

| | Statement | SA | AG | DA | SD | NA |
|----------|---|-----------|-----------|-----------|-----------|-----------|
| a | The project was analysed at the end against stated objectives and stakeholders views | 1 | 2 | 3 | 4 | 5 |
| b | We have a system/process put into place to review our projects | 1 | 2 | 3 | 4 | 5 |
| c | We maintain a repository/documentation/report database entailing the activities that went on from the identification to the evaluation stage of the project | 1 | 2 | 3 | 4 | 5 |
| d | This report is available for project members and other interested parties | 1 | 2 | 3 | 4 | 5 |
| e | Staff who have been reassigned to other projects could also be reached when questions regarding the project came up | 1 | 2 | 3 | 4 | 5 |

5. How do you accumulate knowledge/information from projects? (**Please tick as appropriate**)

| | | |
|---|------------------------|--|
| a | Brainstorming sessions | |
| b | Lessons learnt | |
| b | Project workshops | |
| b | Post project reviews | |
| b | Project meetings | |
| f | Others | |

If you selected “others” please specify

APPENDIX III: RESPONDENTS AS IDENTIFIED FROM THE 26 ORGANISATIONS

| Country | Name of organisation | CEO/MD | Librarian | Communication officer | IT officer |
|----------------|--|---------------|------------------|------------------------------|-------------------|
| Kenya | Lake Victoria Basin Commission | X | X | X | X |
| | Lake Basin Development Authority | X | X | X | X |
| | Lake Victoria Centre for Research and Development | X | X | X | X |
| | Millennium Villages | X | X | X | X |
| | Kenya Agricultural Research Institute | X | X | X | X |
| | Kenya Marine Fisheries Research Institute | X | X | X | X |
| | Lake Victoria Environmental management program | X | X | X | X |
| | Catholic Relief Services | O | X | O | X |
| | Victoria Institute for Research on Environment and Development | X | X | X | X |
| | World Neighbors | O | O | X | X |
| Uganda | Lake Victoria Region Local Authority Cooperation | X | X | X | X |
| | Nile Basin Initiative | X | X | X | X |
| | Lake Victoria Research Initiative | X | X | X | X |
| | Uganda Coalition for Sustainable Development | X | X | X | X |
| | National Fisheries Resources Research Institute | X | X | X | X |
| | Lake Victoria Fisheries Organisation | X | X | X | X |
| Tanzania | Vi Agroforestry Programme | X | X | X | X |
| | Environmental Management and Economic Development Organisation | X | X | X | X |
| | Lake Victoria Environmental management program | X | X | X | X |
| | Tanzania Fisheries Research Institute | X | X | X | X |

| | | | | | |
|---------|--|---|---|---|---|
| | Lake Victoria Board Water Services Board | X | X | X | X |
| Burundi | Ministry of Water, Environment, Land and Urban Planning | O | X | O | X |
| | National Institute for Environment and Nature Conservation | X | X | X | X |
| | University Centre for Research and Socioeconomic Development | O | X | X | X |
| Rwanda | Nile Equatorial Lakes Subsidiary Action Programme | X | X | X | X |
| | Kagera Transboundary Agro-ecosystems Management Project | X | X | X | X |

Legend:

X = offices of interest to the researcher and with occupants in the sampled organisations at the time of the survey.

O = the positions within the organisations of interest that had no office holder at the time of survey