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THE DESIGN AND IMPLEMENTATION OF KNOWLEDGE MANAGEMENT SYSTEMS IN ACADEMIC LIBRARIES TO ENABLE KNOWLEDGE MANAGEMENT PROCESSES: A CASE STUDY OF MAKERERE UNIVERSITY LIBRARY

MINI-DISSERTATION

BY

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SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF INFORMATION TECHNOLOGY

IN THE SCHOOL OF INFORMATION TECHNOLOGY

OF THE

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION

TECHNOLOGY, UNIVERSITY OF PRETORIA

SUPERVISOR: MS MARIETJIE SCHUTTE   **NOVEMBER 2016**

DECLARATION

I, **Sylvia Martha Munafu,** declare that this mini-dissertation is my own work and I have referenced all sources that I have used in this work. I am confident that this work has never been submitted for any academic award to any institution.

Signed:

Sylvia Martha Munafu

Date: 23rd November 2016

ACKNOWLEDGEMENTS

First and foremost, I would like to thank God who has given me strength and wisdom to successfully complete this research project. It has been his guidance and faithfulness that has carried me through it all.

I would like to thank my dear supervisor Ms Marietjie Schutte who has taken the time to read my work and give me feedback that has enabled me to improve in so many areas and be able to complete this research successfully. I am forever grateful for all her efforts and guidance.

Special thanks go to all lecturers in the Department of Information Science at the University of Pretoria for their time, efforts and contributions made towards my academic life and growth as a student at the University of Pretoria, I have not remained the same! The MIT journey has been exciting and full of a lot of lessons learned from being exposed to different countries that are part of the MIT Carnegie Programme. Special thanks to Prof Theo Bothma, Dr Marlene Holmner and Mrs Rachel Fischer who have made the whole MIT experience possible and worthwhile.

Furthermore, I would like to extend my heartfelt thanks and gratefulness to the Carnegie Corporation of New York for the scholarship which has given me a chance to study at the University of Pretoria. It is because of this scholarship that I have been able to grow in my career as a librarian.

Lastly, I would like to thank the entire MIT fifth intake class. For their love, encouragement and support that has made the MIT experience and journey more bearable. I also thank my friends and family that have stood with me throughout the MIT programme specifically to my friend Irene Mbawaki and my sister Brenda Mugala who have been a source of strength, may the Almighty God bless you and reward you abundantly.

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LIST OF ABBREVIATIONS

DICTS	Directorate for ICT support
ICT	Information and Communications Technology
ILS	Integrated Library System
IT	Information Technology
KM	Knowledge Management
KMS	Knowledge management Systems
LAN	Local Area Network
Makir	Makerere University Institutional repository
Maklib	Makerere University Library
OPAC	Online Public Access Catalogue
UWAN	University Wide Area Network

ABSTRACT

Knowledge management (KM) is increasingly becoming important for organisations to enhance their competitive advantage, performance and to become more effective. Academic institutions and academic libraries, in particular, have come to the realisation that they too can benefit from knowledge management and are increasingly looking to adopt appropriate means to effectively manage their knowledge resources so as to improve the services rendered to their patrons. Knowledge management systems (KMS) are suitable means for academic libraries to manage knowledge and enable the processes of creation, storage, sharing and application of knowledge.

While issues related to the design and implementation of knowledge management systems have been widely discussed within various sectors such as the business sector, there is a paucity of research pertaining to KMS implementation in academic libraries yet libraries have started to use several technologies for KM without putting certain issues that are critical to the successful implementation into consideration. Therefore, this study, puts forwards the idea of a KMS in Makerere University Library, exploring several aspects with the aim of discovering how the library can successfully implement a knowledge management system and in so doing explore the readiness of Makerere University Library to implement a KMS. An exploratory study was done adopting the qualitative research approach with Makerere University Library as the case study. The study involved interviews with eight library staff members in the librarian and IT staff categories that were purposively selected to provide information to the study.

The major findings from the study revealed that, the majority of library staff at Makerere University Library understand the meaning of knowledge and knowledge management concepts though more training is still needed to clarify these concepts to some staff that do not have a clear understanding of the two concepts. The study also revealed that, the technological infrastructure of the library needs to be updated to support the KMS implementation. Other factors discovered that are key for the successful KMS design and implementation include: library management support, KMS budget, library culture, KM strategy, policies and guidelines, rewards and incentives. The study also identified benefits of a KMS for the library as well as challenges that the library may face in implementing a KMS. Finally, the study puts forward recommendations in the form of strategies for the library to successfully implement a KMS.

Keywords: Knowledge management, Knowledge management systems, Knowledge management processes, Academic libraries

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter introduces the study by first of all presenting the background to the study and the research question as well as the research sub-questions. Also covered in this chapter is the aim of the study, objectives of the study and a brief summary of the methodology adopted for the study. Furthermore, the research limitations, scope of the study, research gap and value of the study are discussed. Finally, key concepts are clarified and the division of chapters for the mini-dissertation is presented.

1.2 Background to the study

Organisations today are recognising knowledge as an important strategic resource (Nassuora & Hasan, 2010:164; Roy, 2015:20; Wang & Wang, 2016:829) and with the emergence of the knowledge society, information and knowledge are seen as crucial elements of development (Hoq & Akter, 2012:92) and innovation. According to Ni et al. (2010:63), organisations are looking at managing their knowledge by adopting various techniques in order to discover and maximise the potential of the resource. Mavodza and Ngulube (2012:1) also point out that, society is increasingly becoming more and more knowledge-based and the rise of the knowledge-based organisation has prompted organisations to adopt means to manage their knowledge. With the emergence of information technology (IT) as a strategic asset for enabling organisational processes and operations, organisations are now looking to integrate IT into their processes to create opportunities and gain competitive advantage (Hoq & Akter, 2012:93). Since it has been observed that knowledge is a crucial factor that contributes towards the survival of an organisation, there is a need to capture, manage and utilise organisational knowledge to enable growth of the organisation (Hoq & Akter, 2012:93). Information technology has been identified as crucial in helping organisations to facilitate creation, acquisition, sharing and use of knowledge. Swartbooi (2010:59) observes that, the use of IT in any organisation enables the connection of many people across various locations and distances, keeping of large volumes of data and also allows the movement of this data at great speed from one point to another, which is good for KM.

It is believed that, with the increasing interest in organisational knowledge and knowledge management, coupled with the growing recognition of information technology as an enabler of

KM activities and processes (Swartbooi, 2010:59), researchers have started to highlight and promote the use of information systems called Knowledge Management Systems (KMS) to help in facilitating knowledge management processes that include creation, storage, sharing and application of knowledge in organisations (Alavi & Leidner, 2001:107; Wang & Wang, 2016:829). However, despite the interest of KM researchers in KMS implementation, Dato'Ahmad and Abdullah (2007:1) observe that, emphasis is mainly being put on the implementation of knowledge management systems in the business sector. The number of research studies on knowledge management systems in library environments is still very small but interest in this area is said to be growing (Dato'Ahmad & Abdullah, 2007:1).

It is important to note that, academic libraries are facing a number of challenges as they work towards providing services to users, these challenges as highlighted by Arif and Alsuraihi (2012:528) are in the areas of: services and access, resources and collection development, instruction and research, staff and training, administration and cooperation. In this new environment that academic libraries are operating in, the expertise and knowledge of academic librarians are essential and seen as a crucial asset in enabling the libraries to overcome some of the above-mentioned challenges (Arif & Alsuraihi, 2012:528).

In view of this, Mavodza and Ngulube (2012:1) note that, organisations that can create, identify, store, share and value their knowledge assets are more likely to be more successful. In addition, knowledge management enables organisations to improve their efficiency and effectiveness and as noted by Rah, Gul and Wani (2010:25), libraries like any other organisation can also benefit from knowledge management initiatives. Rajurkar (2011:5) also adds that, the success of academic libraries depends on their ability to use staff knowledge to better serve the needs of the users in their academic community.

Many libraries in this digital age have already employed various information technologies to support a number of activities that range from user education to administrative jobs (Daud, Dato'Ahmad & Abdullah, 2007:1). In addition, libraries are using IT that has similar characteristics to tools used to enable KM processes without categorising this IT as a KMS. Such technologies include email used to share knowledge and exchange important information, organisational databases used to capture and store data and websites used to upload user education notes. According to Daud, Dato'Ahmad and Abdullah (2007:1), these activities are

part of KM processes that are enabled by information technology which may be referred to as a KMS.

Makerere University Library (Maklib) is the service unit for library and information services in Makerere University with the main library which comprises of ten sections and also with ten branch/college libraries, eight located on the university main campus and two off-campus (Makerere University Library, 2016:Online). As an academic library, Maklib exists to support three main activities at the university, namely: teaching, research and learning, Jain (2013:1-2) notes that due to the nature of their functions, academic libraries need to evolve in order to be able to support their institutions and address user needs that are ever changing.

The Library's mission is "to meet the study, teaching, research and outreach needs for sustainable development" and the vision is to be "a centre of excellence in the provision of library and information services in Africa" (Maklib, 2015:Online). In order to reach its goals and objectives, the library has its main resource as the library staff, these include librarians, IT staff as well as support staff. The library is gifted with skilled and dedicated staff working towards the achievement of the library's goals and objectives. Library staff are also involved in various projects and information sharing through regular training and dissemination seminars (Maklib, 2013).

Currently, there is no formal KMS for the library to enable library staff to participate in KM practices such as creation, storage, sharing and application of the library's knowledge. Library staff in the different sections and college libraries are using various tools and techniques to participate in KM some of which include the use of IT tools or doing it manually. IT systems such as the institutional repository and the Virtua-Integrated Library system are partly used by the library to create, store and share knowledge. The issue is that, these systems are also used for other library functions and operations that are not specifically focused on knowledge management. The library environment at Makerere University, therefore, needs to design and implement a formal KMS (Yaacob, Jamaluddin & Jusoff, 2010:19) to enable and enhance KM processes across the different sections and college libraries, both on and off-campus.

Despite the immense contributions of knowledge management systems towards enabling organisations to manage their knowledge and effectively improve employee productivity, it has been observed that there is little research directed towards the design and implementation of knowledge management systems in academic libraries. With this background, the aim of this

study is, therefore, to put forward the idea of a KMS for Makerere University Library by exploring how the library can successfully design and implement a KMS to enable the creation, storage sharing and application of knowledge among library staff.

1.3 Research question and sub-questions

1.3.1 Research question

This study was guided by the following research question:

How can Makerere University Library successfully design and implement a knowledge management system to enable knowledge management processes?

1.3.2 Research sub-questions

The study aimed at addressing the following research sub-questions:

1. What is library staff's understand of knowledge and knowledge management?
2. What IT tools and techniques are currently used for KM practices in the library?
3. What factors should the library consider in designing and implementing a KMS?
4. What are the benefits of implementing a KMS in the library and the challenges the library may face in implementing a KMS?

1.4 Aim of the study

The aim of the study is to explore how academic libraries can successfully design and implement knowledge management systems, specifically Makerere University Library to enable knowledge management processes such as creation, storage and sharing of knowledge and also put forward strategies that the library can follow to successfully design and implement a KMS.

1.5 Objectives of the study

In order to achieve the above-described aim of the study, the objectives below were identified to guide the study:

1. To ascertain the meaning library staff ascribe to the knowledge and knowledge management concepts;
2. To assess the technological infrastructure of the library and identify technological tools that can be used to support the implementation of the KMS in the library;

3. To discover the critical success factors in designing and implementing a KMS in academic libraries; and

4. To identify the benefits and challenges of implementing a KMS and suggest recommendations for the library to follow to successfully design and implement a KMS.

1.6 Research methodology

The aim of the study was to explore how Makerere University Library can successfully design and implement a KMS to enable knowledge management processes. The study adopted the qualitative research approach and used the case study and literature review research strategies. Purposive sampling technique was used to select the sample of eight research participants from the population of study to provide the relevant data for the study.

A combination of two research methods was adopted to help collect the data that is, the interview method and the document content analysis method. The primary data collection method was the interview method and with this method, face-to-face interviews were carried out to collect research data and involved interaction between the researcher and the participants at a time convenient to them. Several documents from Makerere University Library were also studied to find data relevant to the study. The data collected from the interviews and document content analysis was related to the various aspects of the design and implementation of knowledge management systems covered in the literature. The themes used for collecting the data corresponded with the four research sub-questions mentioned above in section *1.3 Research question and sub-questions*.

The population of the study consisted of two categories of library staff, that is the librarians and library IT staff from Makerere University Library who were involved in knowledge management activities with experience and knowledge on matters concerning KM in the library. The participants chosen for the study were believed to be in a position to provide the needed information relevant for the study. The collected data was then presented and discussed in themes guided by the research question and sub-questions.

For ethical consideration, clearance was obtained from the University of Pretoria, and research procedures from the University of Pretoria were followed. Participants' informed consent was obtained and privacy and confidentiality were maintained. Lastly, all sources used for the study

have been acknowledged to avoid any incidences of plagiarism. Details of the research methodology are provided in chapter three.

1.7 Research limitations

Like any other research, this study also had limitations. According to Sekaran and Bougie (2013:358), it is important for any professional report or study to point out the limitations of the study. Research limitations are important as they help the researcher to communicate and know what might affect the validity of conclusions and generalisations (Kumar, 2011:237). Below are the limitations of this study:

- The study was limited to few library staff, those perceived to have knowledge and information on KM; those actively involved in KM; and those in-charge of IT systems and services in the library. Therefore, the study is limited in regard to the generalisation of the study findings.

- The time frame allocated to complete the study was also a major limitation. The time allocated to finish the research was limited and since the research is academic in nature and it was expected that the final report of the study be ready by November 2016 to attain the MIT degree. However, the researcher together with the help of the study leader put in efforts to make sure that the study is completed in the stipulated time.

- Information from the top management at Makerere University Library would have been of value towards the study, but due to time, interviews with two members of the library's top management as previously planned were cancelled.

1.8 Scope of the study

The scope of the study is very important and should be carefully selected and defined in order to know what is to be included in the study. The scope was, therefore, categorised into two namely: the geographical scope and the conceptual scope.

1.8.1 Geographical scope

Makerere University Library was selected as the study area as it is the researcher's place of work. The library is the service unit at Makerere University responsible for providing information services to the university community. Makerere University is among the top universities in Africa and is perceived to be a knowledge-intensive organisation. A lot of knowledge is created and

acquired by the university and the library in particular which should be shared and applied in order to improve library service delivery, decision-making and problem-solving. The researcher particularly chose the library as it is involved in knowledge management activities such as creation, storage, sharing and application of knowledge and a knowledge management system would enable the above-mentioned knowledge management processes in the library.

1.8.2 Conceptual scope

This study covered various aspects in relation to how Makerere University Library can successfully design and implement a KMS to enable knowledge management processes, but what was not covered in this study are the details of the KMS architecture. Other systems implemented in the library are mentioned but their background and historical perspectives are not covered in detail. Although it was mentioned that there are several knowledge management systems that are available on the shelf most of which are proprietary and for purchase, the study sampled a few examples of tools that the library can implement as a KMS which are available for free.

1.9 Research gap

As much as knowledge management is gaining interest in academic libraries, it was noticed that, there is limited literature and studies in the area of the design and implementation of knowledge management systems in academic libraries to guide the design and implementation of these systems in academic libraries. Therefore, this study is meant to contribute towards narrowing this research gap.

1.10 Value of the study

This study comes at a time when academic libraries are realising the importance of knowledge and looking to use available technological tools to effectively manage their knowledge. The study generates important pointers to enable academic libraries and Makerere University Library, in particular, to successfully design and implement knowledge management systems. In addition, the recommendations from the study can assist the library to implement a KMS to enable knowledge creation, storage, sharing and application to address challenges in capturing knowledge, collaboration and communication between sections and college libraries.

Library management can use the findings from this study to further understand the current status of knowledge management in the library as well as the challenges staff are facing in participating in KM using available tools.

Furthermore, findings from the study can act as guidelines for other academic libraries and institutions that would like to implement a KMS to support their KM processes in the future. For instance, Makerere University as an institution can use these findings to guide the design and implementation of an institution-wide KMS.

The study also contributes towards the generation of relevant knowledge at Makerere University and provides a basis for further future research in the area of knowledge management.

1.11 Clarification of key terms

The key terms used in this study include knowledge, knowledge management, knowledge management systems and academic libraries. Clarification of these terms is provided below:

1.11.1 Knowledge

Alavi and Leidner (2001:109) define knowledge as information possessed in the mind of individuals; it is personalised information (which may or may not be new, unique, useful or accurate) related to facts, procedures, concepts, interpretations, ideas, observations and judgements. According to Davenport and Prusak (1998 as cited in Kumar, 2010:025), 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. It originates and is applied in the minds of the knower. In organisations, it often becomes embedded not only in documents and repositories but also in organisational routines, processes, practices and norms." For purposes of this study, knowledge includes useful information, ideas, values, experiences, lessons learned and best practices in an organisation.

1.11.2 Knowledge management (KM)

According to Jones (2003 as cited in Akhavan, Jafari & Fathian, 2006:98), knowledge management is an integrated, systematic approach to identify, manage and share all information assets in an organisation, including databases, documents, policies and procedures as well as previously unarticulated expertise and experience resident in individual officers. Yaacob, Jamaluddin and Jusoff (2010:14) define KM as the "process of capturing a company's collective

expertise wherever it resides in databases, on papers, or in the people's head and distributing it to wherever it can help produce the biggest payoff." Nonaka and Takeuchi (1995 as cited by Islam, Agarwal & Ikeda, 2015:41) define KM as the capability of a company as a whole to create new knowledge, disseminate it throughout the organisation, and embody it in products, services and systems. Alavi and Leidner (2001:114) add that, KM basically involves various activities such as creating, storing, retrieving, transferring and applying knowledge. For this study, knowledge management is concerned with the efforts made by an organisation to ensure that knowledge is effectively managed and includes processes such as creation, storage, sharing and application of knowledge in an organisation.

1.11.3 Knowledge Management Systems (KMS)

According to Rah, Gul and Wani (2010:25) a knowledge management system (KMS) refers to an IT-based system for managing knowledge in an organisation, supporting creation, capture, storage and dissemination of information. Alavi and Leidner (2001:114), defined a KMS as "a class of information systems applied to managing organisational knowledge, that is, they are IT-based systems developed to support and enhance the organisational processes of knowledge creation, storage/retrieval, transfer and application." Maier (2007:86) refers to a KMS as "an ICT system in the sense of an application system or an ICT platform that combines and integrates functions for the contextualized handling of both, explicit and tacit knowledge, throughout the organization or that part of the organization that is targeted by a KM initiative." For the sake of this study, a KMS consists of IT tools or platforms that support knowledge creation, storage, sharing and application in an organisation.

1.11.4 Academic libraries

Simmonds and Andaleeb (2001) refer to an academic library as one "within an academic institution of higher learning that is responsible for offering information services to support the research and teaching objectives of the institution." This study refers to academic libraries as service units that support the learning, teaching and research information needs of their academic institutions' community.

1.12 Division of chapters

In completion of the study, the researcher compiled a mini-dissertation comprising of five chapters. These chapters are described as follows:

Chapter one: Introduction

This chapter introduces the mini-dissertation and provides the background to the study, helping to set the stage for the study and putting the study into context. The chapter also covers the research question and sub-questions, aim and objectives of the study. Further, the chapter provides a summary of the research methodology adopted for the study, research limitations, scope of the study, value of the study, clarification of key terms and the division of chapters.

Chapter two: Literature review

This chapter presents literature reviewed on various aspects on the topic under study, discussing concepts such as knowledge and knowledge management in detail. Furthermore, the chapter provides discussions on KM and KMS in organisations, academic institutions and academic libraries and the critical success factors for KMS implementation in organisations and academic libraries

Chapter three: Research design and methodology

This chapter presents the methodology used for the study and also provides justification for methods used in the study using literature sources. It is in this chapter that the research design, research strategies and population of study as well as the data collection methods are covered. Also discussed in this chapter is the data analysis and presentation of findings, quality assurance and the ethical issues considered.

Chapter four: Presentation and discussion of findings

This chapter presents and discusses findings of the study according to the research sub-questions that guided the study which are mentioned in chapter one and chapter three. The presentation and discussion of the findings are done according to themes representing the four sub-questions and sub-themes are used to further discuss the findings more clearly.

Chapter five: Summary of findings, conclusions and recommendations to the study

This is the final chapter of the mini-dissertation and it presents summaries of key findings that may be drawn from the study according to the research sub-questions. Conclusions are then drawn from the study linking them to the different sub-questions and recommendations in the form of strategies for KMS design and implementation that are presented. Lastly, suggestions are made for areas for further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature on the design and implementation of knowledge management systems in academic libraries to enable knowledge management processes. The chapter gives an overview of knowledge management as a key concept in the study at hand, giving clarification on related terms based on knowledge management studies and literature. The chapter also explains the knowledge management system concept giving an elaborate understanding of the term. Further the discussion on knowledge management systems in organisations, academic institutions and libraries are also covered. This follows with the discussion on KMS design and also an explanation of approaches to KMS implementation, factors for successful implementation of KMS and barriers that may hinder the implementation of a KMS are covered. Lastly, best practices and lessons learned from case studies in KMS design and implementation in one organisation and one academic library are presented. The aim of reviewing the literature is this chapter is to discover what researchers have written in the past on the topic under investigation to find research gaps which the study will attempt to fill.

2.2 Knowledge management overview

The quest by organisations to be in the lead, have a competitive advantage over their competitors, grow and become innovative has led organisations to look at managing their knowledge resources (Cheng, Ho & Lau, 2009:313; Omona, Van der Weide & Lubega, 2010:83). Knowledge management (KM) has evolved over the years as an integral part of modern organisations as it contributes towards the development and growth of these organisations (Bast, 2015:136). There is an increasing belief that knowledge is an important factor in the success of businesses, universities, institutions, ministries and organisations (Kumar, 2010:024; Podgorski, 2010:283, Floyde et al., 2013:69; Bast, 2015:136) and that the collection of knowledge enables organisations to save money and time (Bast, 2015:136) and deal with specific challenges. Kumar (2010:024) adds that, knowledge that is embedded in an organisation's business processes and in the skills of staff equips a firm with capabilities that are unique to enable them to deliver services or products to customers.

The knowledge management concept emerged in the business world around the 1980s (Podgorski, 2010:283; Floyde et al., 2013:70) and has gained interest from various organisations

and institutions, and has also become popular in academic institutions (Lee, 2005:Online; Hoq & Akter, 2012:93). The wave of KM has also attracted the interest of researchers, consultants and practitioners all over the world, this is due to the argument "that intangible assets, such as knowledge, have replaced tangible assets as the principal driver of economic growth" (Boisot, 2002 as cited by Massingham, 2014:1076).

Podgorski (2010:283) notes that, knowledge management has been a centre of discussion by various authors in business as well as in academics. The interest in knowledge management is also evident in the various reports, books and articles that have been written about the topic since 1995. The number of conferences on KM has also increased and peer-reviewed academic journals on the subject are also plentiful (Omona, Van der Weide & Lubega, 2010:84; Hislop, 2013:1-2). In the academic arena, fields such as management science, information science and information studies, recognise knowledge management as one of the most significant developments (Kebede, 2010:416; Hoq & Akter, 2012:92). In the education arena, Maier (2007:5) observes that the interest in KM is also evident in the degree programmes at bachelor's and master's levels that are being offered at various institutions of higher learning. The increasing interest in KM in all these spheres of life is attributed to the growing importance of knowledge.

Knowledge management has emerged as an important field for organisations, firms, universities and businesses, knowledge management practices such as creating, organising, storing and sharing the organisation's knowledge enable the organisation to effectively solve problems and improve decision-making capabilities (Hoq & Akter, 2012:92). According to Ni et al. (2010:63), knowledge management enables organisations to improve on their innovativeness and efficiency and also attain the value of their knowledge assets. In academic libraries, KM has been identified as essential for the promotion of innovation by providing open communication channels through which ideas flow and also for improving the quality of services and decision-making efficiency (Roy, 2015:23).

Different scholars have presented various definitions and views of what knowledge management is. According to Aggestam (2006:295), knowledge management is all about managing knowledge and includes activities such as knowledge creation, organisation, sharing and utilisation. Skyrme (2011 as cited in Frost, 2014:Online), defines knowledge management as "the explicit and systematic management of vital knowledge and its associated processes of

creation, organisation, diffusion, use and exploitation in pursuit of objectives." For this study, knowledge management includes processes of creating, organising, sharing and applying of an organisation's knowledge resources.

The reasons for organisations adopting knowledge management vary, for instance Lin (2014:368) states that organisations adopt KM in order to improve on their problem-solving and also the performance of operation processes, while Akhavan, Jafari and Fathian (2005:1) argue that the need to create an environment where there is sharing of experiences, ideas and knowledge prompts organisations to take on knowledge management as part of their practices. Joe, Yoong and Patel (2013:913) observe that, with transfers, retirement and staff turnover in organisations knowledge resources are shifted or lost which is why organisations are turning to KM to effectively retain and transfer knowledge.

Daud and Hassan (2008:243) in a study carried out in Malaysian public universities, identify benefits of managing knowledge such as: improve quality, efficiency, decision making, instigate changes, be more effective, be up-to-date with new information and respond to needs of clients. Mostofa and Mezbah-ul-Islam (2015:50) also add that knowledge management is critical for individuals in organisations to work effectively.

With the increase in knowledge recognition in many spectrums of life, there is the emergence of new concepts, ideas and thoughts concerning knowledge usage for development and growth, since knowledge is recognised as a critical factor for the survival of an organisation, it should, therefore, be captured, managed, shared and used to foster development of the organisation (Hoq & Akter, 2012:93).

The knowledge management concept needs to be understood completely, but to do so it is important to comprehend knowledge, its features, forms and the processes of knowledge management, therefore, this knowledge management overview section discusses the meaning of the knowledge concept as well as other related terms and also covers the knowledge management processes.

2.2.1 Knowledge

Today's economy is increasingly being referred to as a knowledge-based economy as knowledge is no longer just "a resource" for the generation of wealth and profit but it has become "the resource" (Cheng, Ho & Lau, 2009:313). Hoq and Akter (2012:92) also agree that with the

emergence of the knowledge society, information and knowledge are seen as important elements for development.

In recent times, it is extensively believed that the value added in today's organisations is in the form of knowledge, not objects or things (Mason, 2009: Online; Hoq & Akter, 2012:93) making knowledge a central focus in the planning and management of organisations and institutions. Universities, for example, need to manage their knowledge and intellectual assets effectively to ensure the quality of research and education (Hoq & Akter, 2012:93).

According to Davenport and Prusak (1998:5 as cited by Podgorski, 2010:283), knowledge is understood in terms of contextual information, values, experience and expert insight that provide a basis for evaluation and incorporation of new information, ideas and experiences (Ni et al. 2010:62). It is also important to note that knowledge starts and is applied in the minds of whoever owns it (Davenport & Prusak, 1998:5 as cited by Podgorski, 2010:283).

Knowledge assets that an organisation can possess include: databases, policies, procedures, documents and uncaptured personnel expertise (Bast, 2015:136) and these can be used to improve efficiency leading to the profitability of the organisation.

2.2.1.1 Data, information and knowledge

In order to understand the knowledge concept better, it is important to look at other related concepts such as data and information and try to distinguish between them. Data can be defined as facts, figures or observations that communicate something specific but are not organised and processed with no value or meaning until when they have been analysed and changed into information. Information relates to definition, description or perspective (who, what, where, when) (Fleming, 1996 as cited by Nazim & Mukherjee, 2011:Online). Kumar (2010:024) observes that information is a little more complex than data because "it organises data for meaningful purposes." Knowledge consists of practice, strategy, approach or method (how). Knowledge can also be said to be invisible and closely linked to action and decision (Kumar, 2010:025). Figure 2.1 shows the three terms and the difference between them is made clear.

Knowledge
Know-how, understanding, experience, insight, intuition, and contextualized information

Information
Contextualized, categorized, calculated and condensed data

Data
Facts and figures which relay something specific, but which are not organized in any way
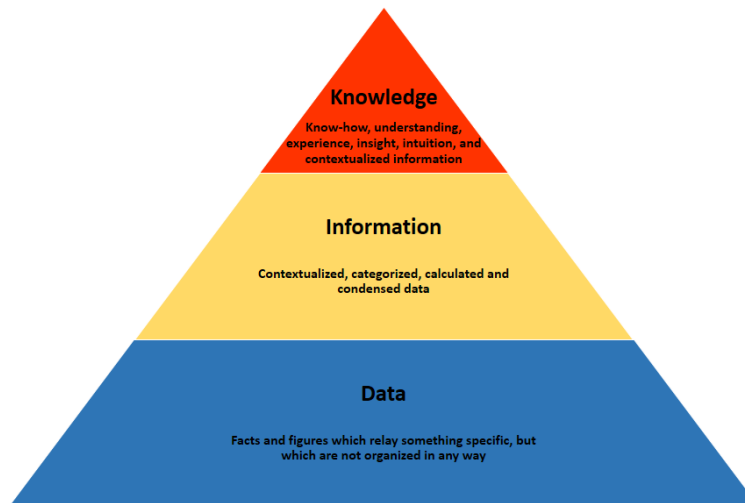
Figure 2.1: Data, information and knowledge (Source: Frost, 2013:Online)

Most times the terms information and knowledge are frequently used interchangeably but according to Nonaka and Takeuchi (1995 as cited in Nazim & Mukherjee, 2011:Online), the difference between the two is that knowledge is "what an individual possesses after assimilating facts and putting them into context, while information is knowledge that is shared."

2.2.1.2 Organisational, structural and individual knowledge

According to Podgorski (2010:284), there are three kinds of knowledge, namely: organisational, structural and individual knowledge. Organisational knowledge, also called organisational memory, is a product of an organisation's learning process and includes knowledge and information that are processed or created by the organisation. Podgorski (2010:284) notes that, "an understanding of the process of creating organisational knowledge is the basis of KM in enterprises." Individual knowledge resides in the minds of the owner and is hard to get hold of. Structural knowledge is knowledge that is fairly easy to grasp, access and codify, this type of knowledge can be found in reports, instructions, databases and procedures. Nonaka and Takeuchi (1991 as cited in Podgorski, 2010:284) refer to structural knowledge as formal or explicit knowledge that can be grasped or codified and informal knowledge is referred to as tacit knowledge. Knowledge is classified into two forms namely, tacit and explicit knowledge. The two forms of knowledge are further discussed below.

2.2.1.1 Tacit and explicit knowledge

There are two forms of knowledge in organisations namely, tacit and explicit knowledge (Hoq & Akter, 2012:94; Hislop, 2013:21; Mostofa & Mezbah-ul-Islam, 2015:50; Roy, 2015:21). According to Hoq and Akter (2012:94), tacit knowledge is knowledge which is "embedded in the behaviour, attitude, perception, ideology and beliefs of individuals and draws on the accumulated experience and learning of a person and is hard to reproduce or share with others." Hislop (2013:21) also supports this definition of tacit knowledge and adds that, tacit knowledge represents knowledge that individuals possess which may significantly shape their thinking and behaviour, but cannot be fully turned into explicit knowledge. Roy (2015:21) also adds that, tacit knowledge remains in the minds of people and that acquisition of tacit knowledge can be improved through a trial and error process during practical experience. Explicit knowledge, on the other hand, is knowledge that is known, can be captured and shared with others, can be put in documents, databases, subject portals and made public (Young, 2010:44; Duffy, 2000 as cited by Hoq & Akter, 2012:94; Floyde et al., 2013:70; Mostofa & Mezbah-ul-Islam, 2015:50; Roy, 2015:21). In other words, explicit knowledge represents knowledge that can be codified into tangible form, easy to share, objective, context independent and impersonal (Kumar, 2010:025; Floyde et al., 2013:70; Hislop, 2013:21), while tacit knowledge is knowledge that is inexpressible in a codifiable form, is personal, subjective, difficult to share and is context specific (Kumar, 2010:025; Young, 2010:44; Hislop, 2013:21). Edwards (2009:471) holds a view that tacit and explicit knowledge are not mutually exclusive concepts, but rather that any piece of knowledge has both tacit and explicit elements.

The two main forms of knowledge can be sub-divided further each with components such as grounded truth, experience, values, intuition, judgement, assumptions, intelligence and beliefs. It is important for an organisation's knowledge management strategy and knowledge management system to support all these components of knowledge (Tiwana, 2000:Online).

Dorasamy, Raman and Kaliannan (2013:1835) note that the main challenge in knowledge management (KM) is being able to manage both tacit and explicit knowledge effectively. Hoq and Akter (2012:94) also support this notion by recognising that organisations are indeed faced with challenges in managing tacit knowledge as it is found in the minds of personnel. In regard to recording tacit knowledge and converting it into explicit knowledge, it remains a challenge for organisations and for libraries in particular (Krishnan & Das, 2012:383). Yet according to Jain

(2013:1), the success of an organisation is largely dependent on how it effectively manages both its explicit and tacit knowledge resources.

For knowledge to be effectively utilised and exploited by an organisation and individuals, it must be properly organised and managed (Floyde et al., 2013:70). In the management of knowledge, some authors have presented the knowledge life cycle also known as the KM life cycle to enable organisations to adapt KM (Schulte et al., 2004:583; Karadsheh et al., 2009:70; Chan et al., 2013:2). The life cycle consists of four processes which are known as the KM processes. These include: knowledge creation/acquisition, knowledge storage, knowledge transfer/sharing and knowledge application/utilisation (Karadsheh et al., 2009:70). The knowledge management processes, therefore, can be represented by the KM life cycle (Chan et al., 2013:2). Figure 2.2 as adopted from Schulte et al. (2004:583) is used to show the KM processes in the KM life cycle.

Knowledge creation
Research, adaptation, generation, discovery

Knowledge transfer
Distribution, dissemination, and diffusion

Knowledge utilisation
Application to problems, systems, situations
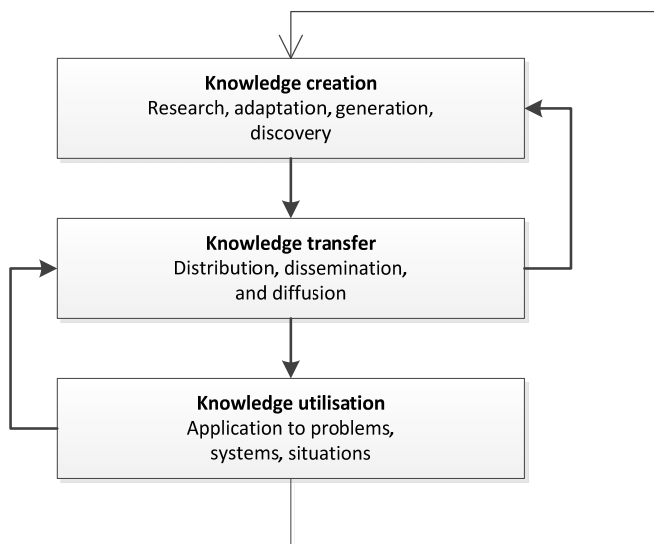
Figure 2.2: *Knowledge life cycle* (Source: adapted from Schulte et al., 2004:585).

The discussion in the next section *2.2.2 Knowledge management processes* focusses on the knowledge management processes in detail.

2.2.2 Knowledge management processes

Knowledge management processes are vital processes that enable the creation, acquisition, capture, sharing and application of knowledge (Swartbooi, 2010:49). Various authors such as Tiwana (2000: Online); Karadsheh et al. (2009:70); Swartbooi (2010:4); Peng, Jiang and Zhang

(2013:97) and Hislop (2013:77) have identified and recognised several KM processes, these are explained below:

2.2.2.1. Knowledge creation/acquisition/generation

Ni et al. (2010:63) observe that knowledge acquisition is the primary process of knowledge management which refers to the creation and development of skills, insights and relationships (Tiwana, 2000:Online). Knowledge creation consists of the generation of new knowledge or replacing content that already exists with new explicit or tacit forms of knowledge (Swartbooi, 2010:50). According to Peng, Jiang and Zhang (2013:97), knowledge can be created through exploitation, exploration or codification. Ramachandran and Ismail (2009:208) claim that, knowledge can be created through discovery, for instance in academic institutions, academics and researchers create knowledge by developing new ideas and new ways of doing certain things. In so doing, organisations are able to add value to existing information (Kumar, 2010:025). It should be noted that, in order to create knowledge, organisations have to depend on individuals to do so (Bernius, 2010:585), that is why it is important for organisations to promote an enabling environment and provide support to these individuals in their knowledge creation (Nonaka, 1994 as cited in Bernius, 2010:585).

Roy (2015:24) observes that in academic libraries, knowledge can be acquired through: attending training programmes, workshops, conferences and seminars, networking or establishing links with other libraries and institutions, subscribing to online virtual communities of practice and list serves, developing taxonomy controlled vocabulary, developing their own knowledge internally, indexing and abstracting services, developing their everyday jobs and roles and also by buying knowledge resources or products in the form of blueprints, manuals, reports and research reports.

From empirical evidence, knowledge that has been created should be captured and stored in formats that allow reuse because organisations may create knowledge, generate ideas and learn from experiences, but this knowledge is bound to be forgotten and lost if not captured and stored (Swartbooi, 2010:52). Therefore, knowledge that is created is of no use if not captured and stored for reuse.

The application of IT such as a KMS in knowledge creation and acquisition enables organisations to enlarge their scope of knowledge acquisition, increase the speed of acquiring knowledge and reduce knowledge acquisition costs (Kumar, 2010:028; Jain, 2013:9). Section

2.3.3 IT tools used in implementing a KMS presents several technological tools that facilitate knowledge creation.

2.2.2.2. Knowledge storage, organisation and retrieval

Knowledge storage, organisation and retrieval are important components of KM and are frequently referred to as organisational memory which includes knowledge that resides in electronic databases, written documentation and closed or open repositories (Alavi & Leidner, 2001:118). It is important to note that, once knowledge has been generated or acquired it has to reside somewhere and as observed by Schulte et al. (2004:587) knowledge can be stored in company guidelines, standard operating procedures, journal articles, textbooks, organisational publications, databases, government documents, academic institutions, and websites.

The storage, organisation and retrieval of knowledge is important for organisations because as much as they learn and create knowledge, there is a possibility of forgetting or losing track of the knowledge that has been acquired (Alavi & Leidner, 2001:118). Therefore, in terms of supporting creation and transfer of knowledge, knowledge storage and retrieval are crucial processes (Bernius, 2010:587). In regard to supporting an organisation's memory and enabling people to access knowledge, knowledge storage and retrieval are recognised as vital processes where knowledge storage provides indexing and coding of knowledge for later retrieval (Karadsheh et al., 2009:70).

IT facilitates storage, organisation and retrieval of knowledge, Chou (2005: Online) states that, storage technology that is sophisticated and IT-enabled retrieval techniques, for example, intranets, e-mail, expert systems and multimedia databases, play important roles in enabling individuals to retrieve and categorise knowledge. Section *2.3.3 IT tools used in implementing a KMS* further discusses some tools that can enable knowledge storage, organisation and retrieval.

2.2.2.3. Knowledge transfer/sharing

Knowledge transfer can be defined as "the communication of knowledge from a source so that it is learned and applied by a recipient" (Ko et al., 2005:62 as cited by Bernius, 2010:587). According to Karadsheh et al. (2009:70), knowledge transfer provides communication channels and faster means for people to access knowledge. Bernius (2010:587) observes that the process of transferring knowledge is made up of two main components namely, the sender or source that is sharing the knowledge, and the receiver who acquires the knowledge.

Once knowledge has been created, there is a need for it to be shared and distributed widely and quickly, as noted by Cheng, Ho and Lau (2009:313) "active knowledge is the 'gem' while idle knowledge is the stone." Knowledge is seen as power and, therefore, not sharing knowledge is not different from holding the power that enables an organisation to compete in this new knowledge-based economy (Cheng, Ho & Lau, 2009:313).

From a general point of view, knowledge sharing is about knowledge communication among a group of people who may include individuals working in an institution that is formal such as colleagues in a work environment or informal for instance among friends (Cheng, Ho & Lau, 2009:314). The reason for sharing knowledge within the group is to make use of existing knowledge to improve the performance of individuals in the group (Cheng, Ho & Lau, 2009:314).

Through knowledge sharing organisations are able to transfer knowledge from one part to other parts of the organisation (Peng, Jiang & Zhang, 2013:98) or from one department to another. By doing this group knowledge is accumulated and refined through storing knowledge that is new and deleting duplicates. Knowledge sharing can enable individuals in an organisation to improve their quality of work, efficiency in problem-solving, skills in decision-making and also with other competencies that benefit the entire organisation (Syed-Ikhsan & Rowland, 2004; Yang, 2007 as cited in Cheng, Ho & Lau, 2009:314). For academic institutions that are knowledge-based, sharing of knowledge is very important (Cheng, Ho & Lau, 2009:314). Peng, Jiang and Zhang (2013:98) add that, knowledge sharing bridges communication gaps among members of a group and improves the activities and performance of individuals and the organisation as a whole (Peng, Jiang & Zhang, 2013:98).

Cheng, Ho and Lau (2009:314) identify two ways of knowledge sharing namely, open-network sharing and closed-network sharing. Sharing in an open-network involves members sharing through an open and central repository while in a closed-network, sharing is done person-to-person. In a closed-network, a person has liberty to choose the mode to use in sharing knowledge and also decide who to share the knowledge with, enabling direct sharing and a more personal touch among individuals. It is, therefore, believed that the success of sharing in a closed-network is dependent on factors such as trust and personal relationships. In an open-network sharing model, sharing of knowledge is done among individuals in a group through a knowledge management system which is similar to a central database system. This comprises of several persons sharing various knowledge assets in a system. Open-network sharing is widely

adopted by organisations and used in sharing organisational knowledge (Cheng, Ho & Lau, 2009:314). However, effective and intense sharing of knowledge in an open-network is largely dependent on the incentive system, IT system friendliness and the organisational culture of an institution (Cheng, Ho & Lau, 2009:314).

Technology is a vital mediating factor in sharing knowledge (Cheng, Ho & Lau, 2009:315; Kumar, 2010:025), and as such, technologies such as wikis, blogs and social networking services have been identified as important solutions for knowledge sharing. These technologies and more are further discussed in section *2.3.3 IT tools used in implementing a KMS.*

2.2.2.4 Knowledge application/utilisation

According to Ni et al. (2010:63), application of knowledge is the direct aim of KM which leads to improvement in working efficiency and also the enhancement of work results. With knowledge application, an organisation is able to become more innovative which leads to the creation of more new knowledge which enables the continuation of the KM process. Karadsheh et al. (2009:70) add that, the process of knowledge application enables an organisation to apply knowledge to new scenarios and also learn from it. In addition, Karadsheh et al. (2009:71) state that, knowledge utilisation enables the integration of knowledge into the practices, services and products of an organisation. While Schulte et al. (2004:587) argue that knowledge utilisation is intended to ensure prevention and control in an organisation.

The above discussion has presented various ideas and views of different authors on KM processes, for this study focus is on the design and implementation of a KMS to enable KM processes that include: creation, storage, sharing and application of knowledge in Makerere University Library. The next section gives an elaborate discussion on KM in academic institutions and libraries.

2.2.3 Knowledge management in academic institutions and libraries

Knowledge management is one of the many concepts that have come up and it is increasingly becoming popular in business organisations as well as academic institutions (Hoq & Akter, 2012:93). Academic institutions and universities, in particular, have identified knowledge as a critical asset (Daud & Hassan, 2008:339; Omona, Van der Weide & Lubega, 2010:84) and in recent times, knowledge management activities have moved to these institutions (Cheng, Ho & Lau, 2009:316) and debates are rising and becoming popular on practices such as knowledge

sharing. According to Panigrahi, Zainuddin and Azizan (2014:202) academicians and researchers have both highlighted the importance of knowledge management over the past decades (Panigrahi, Zainuddin & Azizan, 2014:202).

Academic institutions such as universities are taking on new roles that are not in research and education alone, but roles in decision-making and formulation of policies on various levels (Hoq & Akter, 2012:96). Society expects universities to birth new concepts and ideas and because of this, universities have started to pursue knowledge management practices and invest in building knowledge management infrastructure as well as creating environments that are conducive for all staff, patrons and other stakeholders to participate in creating and utilising knowledge effectively (Hoq & Akter, 2012:92,96).

In this digital environment, academic libraries have to redefine their role to remain relevant to the community they serve (Islam, Agarwal & Ikeda, 2015:40; Roy, 2015:20). This can be done through leveraging the library's strengths to innovate in order to create services that are convenient and responsive (Johnson & Lilly, 2012 as cited in Islam, Agarwal & Ikeda, 2015:40). As organisations are embracing knowledge management (KM) to improve performance of their operational processes (Lin, 2014:368), innovation and competitive advantage, it is becoming necessary for academic libraries to also adopt KM to be able to become more innovative and provide better services to users (Islam, Agarwal & Ikeda, 2015:40; Mostofa & Mezbah-ul-Islam, 2015:50; Roy, 2015:20, 23). With the emergence of the Internet, mobile technologies and digital data, libraries no longer manage knowledge only, but also create knowledge within the library (Islam, Agarwal & Ikeda, 2015:40).

Jain (2013:1) calls for academic institutions to have appropriate KM due to the fact that the generation, sharing and application of knowledge is their central 'raison d'être' in this contemporary world. University libraries play a fundamental role in knowledge management in universities, this is because libraries are centres where knowledge is preserved and distributed and are, therefore, well-placed to champion knowledge management practice in the universities (Hoq & Akter, 2012:98). Jain (2013:1) also points out academic libraries as having a key role they are supposed to play in helping with managing knowledge of their parent institutions. In support of the above statement, Krishnan and Das (2012:383) observe that, libraries as learning organisations should provide strong leadership in knowledge management which involves the management of both explicit and tacit knowledge. This means that academic libraries should

play a leading role in KM for their parent academic institutions and also move from being custodians to being partners in KM programs (Krishnan & Das, 2012:381). In addition, Hoq and Akter (2012:98) state that, library professionals possess skills and competencies that are relevant for knowledge managers and can play a vital role in supporting, coordinating and championing knowledge activities in the university. Lee (2005:Online) and Kumar (2010:024) claim that, since libraries and librarians are at the centre of managing information and library professionals are seen as trained experts in information selection, acquisition, preservation, searching, repackaging and dissemination, library staff possess a great deal of expert knowledge which should be inventoried, indexed and made available, searchable and accessible through a central database developed and maintained by the library. Krishnan and Das (2012:381) add that, librarians should also play an important role in collecting, storing, organising and disseminating knowledge to the community.

There is a revolution going on in academic libraries and as such, the role of librarians is changing drastically (Jain, 2014:7). The management of knowledge in academic libraries once was regarded to be a fad but with the realisation that academic libraries like any other organisation can benefit from KM initiatives (Rah, Gul & Wani, 2010:25), that has now changed and academic libraries are including KM as an important part of their knowledge strategy (Kumar, 2010:024). In regard to benefits of KM to academic libraries, Islam and Ikeda (2014:140) hold the view that, integrating KM in the library can add value to the library's efforts to build a knowledge sharing culture, promoting the KM culture and eventually lead to improved efficiency, increased output and satisfaction of library users. Jain (2014:7) also adds that, KM enables academic libraries to become more productive. KM in academic libraries can also improve communication among staff and management and make libraries more effective and efficient (Islam, Agarwal & Ikeda, 2015:42; Mostofa & Mezbah-ul-Islam, 2015:50). It is also important to note that, "the success of academic libraries depends on their ability to utilise information and staff knowledge" in order to effectively serve the needs of the academic community (Mostofa & Mezbah-ul-Islam, 2015:50).

The most important knowledge management tools in academic libraries have been identified as training programmes, professional development, communities of practice, knowledge sharing and information technology (Nazim & Murkherjee, 2011:Online). According to Islam and Ikeda (2014:151), KM in libraries consists of the following steps; "identifying knowledge needs, identifying knowledge resources, acquisition, creation or elimination of knowledge related

resources/processes/environments, storage of knowledge, and retrieval, application and sharing of knowledge."

Despite the benefits of KM, academic libraries are faced with a challenge in managing their knowledge. Krishnan and Das (2012:383) suggest that, the challenge faced by libraries in managing knowledge can be undertaken by providing a database or a repository for all the knowledge resources and also by using all manner of technologies to successfully manage knowledge. According to Islam, Agarwal and Ikeda (2015:40), libraries need to leverage employee and user knowledge, along with rapidly evolving technology. In the United States of America, many university libraries are actively involved in managing their knowledge through means such as maintaining data warehouses and databases of knowledge and also mapping human knowledge within their libraries (Krishnan & Das, 2012:383).

In academic libraries' endeavours to manage knowledge, they are faced with a number of challenges. Raja, Ahmad and Sinha (2009:702), Kumaresan (2010:5), Nazim and Mukherjee (2011:Online) and Jain (2013:6) identify some of the challenges that academic libraries face in implementing knowledge management namely: misunderstanding of knowledge management concepts by library staff; lack of a knowledge capturing and sharing culture; inadequate staff training; lack of motivation to participate; lack of sufficient funds/budget, as well suitable IT infrastructure; lack of clear guidelines or centralised policies; lack of suitable tools and technologies; and lack of management commitment and support to incorporate KM practices into the library. It is important to note that, the above-mentioned challenges may also hinder the design and implementation of a KMS in an academic library. It is, therefore, important for the library to have these in mind while implementing the KMS.

IT is an important support for knowledge management and has continuously played a prominent role in knowledge management research and processes (Aggestam, 2006:295; Hislop, 2013:202; Bast, 2015:136). According to Dorasamy, Raman and Kaliannan (2013:1835) an effective information technology (IT) solution enables KM. This study focusses on the IT-based knowledge management systems and the next section 2.3 *Understanding knowledge management systems* presents a discussion to enable one understand what knowledge management systems are.

2.3 Understanding knowledge management systems

In the world today, organisations are recognising that the environment they are operating in is highly competitive and, therefore, they are opting to create and reuse the organisational knowledge to efficiently and effectively develop business value (Dulipovici & Robey, 2012:4062). With the fast development of computer and communication technologies, organisations are, therefore, looking to developing and implementing knowledge management systems (KMS) and strategically align them to improve their organisation's agility (Dulipovici & Robey, 2012:4062). These systems, if designed appropriately, help organisations in efficiently and effectively managing knowledge while ensuring that staff's time is not wasted in KM activities such as creating, storing, sharing and retrieval of knowledge (Bast, 2015:136). It should, therefore, be noted that, knowledge management systems have become important and useful tools to manage organisational knowledge (Peng, Jiang & Zhang, 2013:96; Dorasamy, Raman & Kaliannan, 2013:1835).

Over the years many researchers of knowledge management have gained interest in the topic, but it still very evident that research on areas in KM such as knowledge management systems is still limited (Dorasamy, Raman & Kaliannan, 2013:1835). Xu and Quaddus (2012:18) also argue that, while many organisations are using knowledge management systems to manage their knowledge, scholars and researchers have not yet extensively explored the topic of knowledge management systems in an empirical way. On the contrary, Frost (2015: Online) states that, the issue of knowledge management systems has been one of the most debated and discussed topics in the field of KM, generating a lot of interest from researchers, practitioners and academicians. Researchers with an interest in knowledge management systems have discovered that, some of the outstanding features in today's knowledge-based economy include: knowledge management systems, technological applications and innovation (Cheng, Ho & Lau, 2009:313).

To understand the meaning of knowledge management systems, different authors and scholars have defined a KMS in different ways. Frost (2015: Online) refers to a KMS as "any type of IT system that facilitates the storage and retrieval of knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge or in some other way enhances the KM process." While Bast (2015:136) defines a KMS as "an IT-based system used by an organisation to manage knowledge through creating, capturing,

storing, used within that organisation." Dulipovici and Robey (2012:4062) refer to a KMS as a kind of information system (IS) that enables organisations to more effectively leverage their intellectual assets. According to Maier (2007:86) a KMS refers to "an ICT system in the sense of an application system or an ICT platform that combines and integrates functions for the contextualised handling of both, explicit and tacit knowledge, throughout the organisation or that part of the organisation that is targeted by a KM initiative." For this study, KMS are IT tools or platforms that support knowledge creation, storage, sharing and application in an organisation.

The difference between knowledge management systems and traditional information systems is that, information systems refer to the software, hardware and processes that organisations use to facilitate communication and information processing, while a KMS of an organisation is an information system sub-system, specifically, a firm-based network which supports the acquisition, storage, dissemination and retrieval of organisational information and knowledge (Alavi & Leidner, 2001 as cited by Adams & Lamont, 2003:144).

Alavi and Leidner (2001:114) argue that, "there is no single technology comprising knowledge management systems" this argument is also supported by Swartbooi (2010:59) who states that "a KMS does not refer to a single system but rather to a class of IT applications that support and enhance the organisational processes for discovery, storage, retrieval, sharing and utilisation of corporate knowledge." However, Dulipovici and Robey (2012:4067) argue that some organisations that have been using many knowledge management tools may prefer to implement a single and integrated system for members to use leading to the development of a KMS.

The KMS industry has grown immensely to the point that there are many various product offerings and it is becoming hard to understand the differences and similarities between them (Housel & Bell, 2001 as cited by Swartbooi, 2010:60). The simple function of a KMS is to capture knowledge that is explicit and codified into an organisation's repository and enable searching and categorising this knowledge into formats that are meaningful. Swartbooi (2010:60) also urges that a KMS enables an organisation to have access to tacit knowledge through identifying experts in the organisation and connecting them to members that need the ideas, experience and knowledge that they have. Peng, Jiang and Zhang (2013:97) discuss that, the reason why

organisations implement knowledge management systems is to support the creation, storage, and transfer of knowledge in the organisations.

In using a knowledge management system to share, search and use knowledge, Abdullah et al. (2008:286) observe that suitable rewards and incentives should be given as motivation. While Abdullah et al. (2008:286) support the idea that rewards and incentives should be given to motivate people to use the KMS, Dulipovici and Robey (2012:4062) suggest that since knowledge management systems are people-oriented, contributions towards the knowledge base through the KMS should be done on a voluntary basis.

2.3.1 Types of knowledge management systems

From the literature reviewed, various authors and researchers have identified several types of knowledge management systems also referred to as IT related to knowledge management by Maier (2007:7). The types of knowledge management systems as identified by Gupta and Sharma (2004); Maier (2007:7, 274-281); Raja, Ahmad and Sinha (2009:703); Swartbooi (2010:60-63); and, Dorasamy, Raman and Kaliannan (2013:1835) are further discussed below:

- **Intranet infrastructures:** These provide basic functionality for communication through means such as email and teleconferencing and also enable storage, sharing, searching and retrieval of documents and data.
- **Workflow management systems:** These systems support organisational processes that are well-structured and handle the execution of workflows.
- **Expert systems:** These are systems that are used in making choices that are usually performed by a domain expert, for example, the diagnosis of a problem.
- **Groupware systems:** These enable collaboration among staff in an organisation and enable the sending of messages or sharing of appointment calendars amongst themselves. Groupware systems also enable discussions, time management, meetings and workshops among teams and work groups.
- **Document management systems:** Enable users to create, store, share and retrieve documents effectively as well as enable easy searching within the documents. Examples of this type of system include; Lotus Notes, distributed databases and the web (Rah, Gul & Wani, 2010:25).
- **Decision support systems:** Comprises of tools that may be used to support organisational knowledge that exists and is applicable while determining the right

approach during decision making. Such technologies may include: simulators, online analytical processing and data mining capabilities. Users are presented with information in a way that can enable them to easily make informed decisions.

- **Business intelligence tools:** Support the analytic process that transforms fragmented organisational data into goal-oriented knowledge.
- **Artificial intelligence technologies:** These support activities such as text and web mining, user profiling and of profiles, search and retrieval of documents.
- **Database management systems:** Enable the use of a collection of data kept in a database more effectively by ensuring easy storage and retrieval.
- **Simulation systems:** Enable users to model real world scenarios and to test the effects of scenarios that are unsafe or not economical to perform with their real-world equivalents.
- **Workgroup support systems:** These are general systems that support teams of knowledge workers in doing their jobs better. Work group support systems may include: document repositories, electronic mail and messaging, expert directories, project management, on-line catalogues of library material, desktop video conferencing, and workflow tools (Gunnlaugsdottir, 2003, cited by Lin, 2014:368).
- **Ontology/taxonomy based systems:** These are related to the document based systems in a way that terminologies systems are used to summarise a document for instance; by author or subject (Rah, Gul & Wani, 2010:25).

It is further stated that any of these or a combination of two or more of the above-mentioned types can be designed by an organisation to make a KMS (Maier, 2007:7).

2.3.2 Components of knowledge management systems

According to Pan and Scarborough (1999 as cited by Hoq & Akter, 2012:96), there are three socio-technical components that encompass the three main layers of a knowledge management system and these include:

- Infrastructure – This includes technical components like software and hardware to facilitate communicational and physical contact among individuals using a network. For knowledge management systems to work effectively, components such as hardware, software, data, networks, human resources, facilities and support services are important. These enable individuals participating in the knowledge management activities of an organisation via the KMS to interact, communicate and contact one another.

- Infostructure – Comprises of the formal rules that govern the exchange and sense-making among individuals in a network offering a set of intellectual resources to allow individuals to make sense of happenings on the network. These resources may include common language and metaphors.

- Infoculture – Includes the background knowledge rooted in workgroup processes and in social relations. This component of the KMS defines the constraints on information and knowledge sharing.

In addition, an organisation's website, information databases, digital repositories, archives and library are also considered main components of an organisation's corporate knowledge system (Hoq & Akter, 2012:95; Jain, 2014:14) which enable organisations to manage, maintain and distribute their knowledge content.

In another view regarding the components of a KMS, Edwards (2009:474) and Abokhodiar (2014:121) observe that, there are three components of a KMS which include: people, processes and technology. These three elements must be coordinated well to ensure successful implementation of a KMS, since knowledge management systems are more than just technology representing an organisation's deliberate, conscious attempts to manage knowledge. The way in which the three elements interact is illustrated in figure 2.3 below.
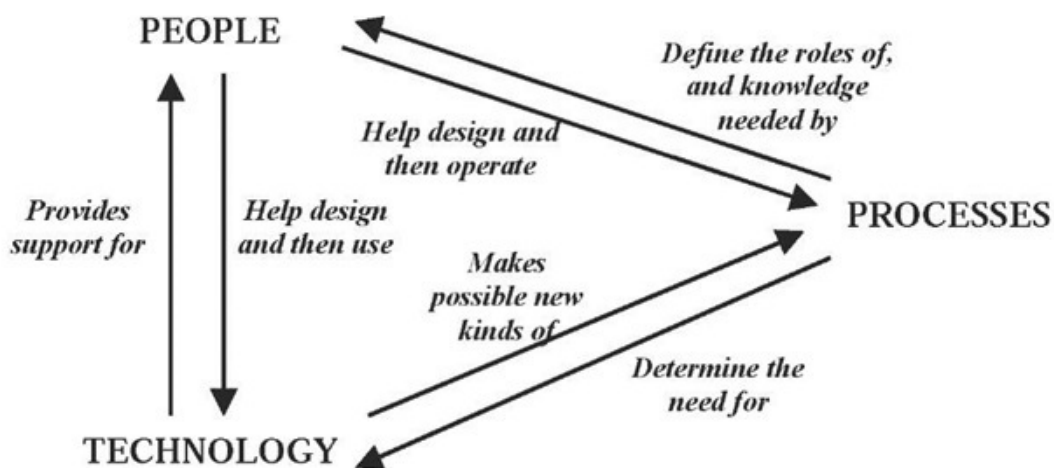
Figure 2.3. *People, processes and technology in a KMS.* (Source: Edwards, 2009:474).

2.3.3 IT tools used in implementing a KMS

Below are some tools that can be used to facilitate knowledge management that can be used by academic libraries to implement a KMS.

2.3.3.1 Wikis

A wiki is a special kind of knowledge base used in an organisation for a group of people to collaborate, create, share and have access to knowledge (Young, 2010:44). Knowledge wikis can also be described as "personal websites hosted by people or groups of people with interest in specific topics" (Swartbooi, 2010:56). According to Rah, Gul and Wani (2010:31), a Wiki is a collaborative website which allows adding and editing of content by any individual who has access to it.

Several authors have discussed some of the benefits of implementing wikis in organisations, for instance, Swartbooi (2010:56) and Young (2010:44) agree that, the implementation of wikis enables members in teams to have ownership and control which encourages them to participate actively in the sharing of knowledge. Pei Lyn Grace (2009:69) in a study on the implementation of wikis as KM tools found that, the ability to track and edit, ease of use, ability to be a central repository of information, save time and money, impact on building a trusting culture and their collaborative nature led organisations towards using wikis for KM. Rah, Gul and Wani (2010:31) also add that, wikis are good tools to be used for collaboration and sharing of explicit knowledge. Agarwal and Islam (2014:333) observe that, wikis help in the creation and sharing of knowledge online and also enable access to a document from anywhere. Eid and Al-Jabri (2016:18) also support the idea that wikis are important tools that enable organisations to create and share knowledge. In creating knowledge, wikis enable staff to archive documents and have places where several individuals in an organisation can upload or update documents (Agarwal & Islam, 2014:333). In using Wikis, pages can be changed by anyone that has permission to do so and also individuals can create web documents together (Rah, Gul & Wani, 2010:31). Wikis can also be used to retain knowledge of outgoing employees in an organisation and to transfer knowledge to incoming employees (Agarwal & Islam, 2015:163).

A Wiki as a knowledge management tool works as a content management system to manage web pages and documents to enable easy searching and categorisation of information, and also as a form of groupware system used to improve collaboration and communication (Rah, Gul & Wani, 2010:31). A Wiki is, therefore, a combination of a collaboration system and a content

management system. Section *2.3.1 Types of knowledge management system* describes what groupware and content management systems are.

There are several wiki hosting sites that organisations can consider implementing and these include: EIWiki and Wikia as identified by (Pei Lyn Grace, 2009:65), other wiki solutions include: wikispaces (www.wikispaces.com), TWiki, Clearspace and MediaWiki which hosts Wikipedia a well-known example of a wiki (Pei Lyn Grace, 2009:65). Functions of wikis as identified by Scarso and Bolisani (2016:437) include: reading, searching, printing, editing, changes notification and changes tracking.

While Wikis have many benefits as seen above, Wikis also have drawbacks in using them as KM tools. Nicholl (2012:23) identifies one drawback as the lack of a monitoring body to regulate the knowledge contributions from members which may lead to misinformation through the Wiki. Pei Lyn Grace (2009:64) identifies several issues that organisations need to look out for in using wikis as a KM tool, these issues include: control, security and technical issues like data migration. With regard to security, since wikis provide freedom and flexibility for individuals using them in organisations, there is a need for organisations to have someone to monitor them to make sure that the content created and shared on the platform is secure and does not present any legal, regulatory or competitive issues for the organisation. On the issue of data migration, it has been found that, different wikis use variant mark-up language making it difficult to migrate existing content from one wiki engine to another. This calls for rigid scrutiny to examine the adaptability of the wiki solution to be adopted by the organisation (Pei Lyn Grace, 2009:69). In instances where an organisation does not train the users, it will have users at different levels of technical skill such as expert users and novice users of the wikis. It is, therefore, important to train users to ensure that all are on the same level of technical skill (Pei Lyn Grace, 2009:69).

2.3.3.2 Knowledge portals

Knowledge portals are intranet based websites that are used to show the knowledge that an organisation has on various topics (Swartbooi, 2010:56). Portals can be developed using any hosting solution on the Internet and access to the portal can be restricted using login systems (Rah, Gul & Wani, 2010:30). Individuals can be given different levels of permission to access the portal and the contributions made by different authors (Rah, Gul & Wani, 2010:30). Organisations can use knowledge portals to share experiments, innovations, best practices, failure stories and so on (Rah, Gul & Wani, 2010:30).

Among the key features of knowledge portals include: the author posting, rating system, feedback from members and administration (Rah, Gul & Wani, 2010:30).

Portals enable topical searching using keyboards and menus enabling the extraction of knowledge to the user's taste (Swartbooi, 2010:56). Knowledge portals contain structured information, discussion forums, knowledge communities and networks and enable the transfer of explicit and tacit knowledge (Young, 2010:78). Through knowledge portals, an organisation is able to identify the key knowledge areas and know their key knowledge assets (Young, 2010:78). Knowledge portals enable the creation, storage, sharing and application of knowledge (Young, 2010:3-5). In addition, knowledge portals support the personalisation of knowledge resources by allowing personalised queries from end users and retrieval of knowledge content that meets queries from users (Desta, Garfield & Meshesha, 2014:9). Another advantage of using knowledge portals is that, organisations are able to use and re-use knowledge (Surve & Natarajan, 2015:925). Also, once an organisation's knowledge has been electronically codified, it can be posted into a knowledge portal where individuals in the entire organisation can access it anytime (Swartbooi, 2010:56).

In implementing knowledge portals to support KM, Nguyen and Kifor (2015:7) identify one key limitation which is in line with the ease of collecting all forms of knowledge. According to Nguyen and Kifor (2015:7), with knowledge portals, not all forms of knowledge can be collected easily, particularly tacit knowledge.

2.3.3.3 Virtual Communities of Practice (VCoPs)

A community of practice (CoP) is a group of individuals that have a specific activity in common, and as a result have some shared knowledge, some overlapping values and a sense of shared identity (Hislop, 2013:157). In recent times, CoPs have become popular means for knowledge management processes such as creation, sharing and retention of knowledge (Ardichvili, 2008:2; Levy, 2011:586). The proliferation of new online tools and availability of network access has led to the emergence of virtual communities of practice (VCoPs) (Chiu, Hsu & Wang, 2006:1872; Ardichvili, 2008:2). VCoPs are online social tools used in organisations to facilitate knowledge creation, sharing, collaboration, collective learning and engage in social interaction (Chiu, Hsu & Wang, 2006:1873; Ardichvili, 2008:2). Al-ghamdi and Al-ghamdi (2015:409) define VCoPs as "groups of professionals brought together by shared goals and common concern regarding participation, exchange, trading, organising and management of their tacit and explicit

knowledge in order to improve their professional performance, as well as the performance of their organisation as a whole."

VCoPs leverage several information technologies such as wikis, blogs, chatrooms, forums and question-and-answer systems (Moore & Serva, 2007 as cited in Pan et al., 2015:62). Al-ghamdi and Al-ghamdi (2015:409) add that, VCoPs depend on Internet virtual spaces and the use of social Web 2.0 tools like social networks. An important fact about VCoPs is that they can be designed to run on desktop and laptop computers as well as support the use of mobile technologies (Lara et al. 2016:10).

With regard to the use of VCoPs in organisations, Chiu, Hsu and Wang (2006:1872) note that, there has been positive feedback to the IT industry from virtual communities which means that those involved in these communities have found them useful in enabling KM activities such as knowledge creation and sharing. Pan et al. (2015:62) state that, VCoPs are good tools used to facilitate the generation and dissemination of tacit knowledge. In regard to innovation, Al-ghamdi and Al-ghamdi (2015:409) observe that, VCoPs enable the capturing of tacit knowledge, knowledge sharing and collaboration and facilitate innovation through collaborative thinking by enabling individuals to create, share and use knowledge to solve problems that staff faces in the organisation.

The success of virtual communities of practice is largely dependent on continuous generation and sharing of knowledge and these communities can be an organisation's means to improve and promote the knowledge sharing culture (Cheng, Ho & Lau, 2009:315). It is also important to note that, as much as communities of practice are self-driven, they need to be nurtured and organisations should encourage individuals to participate in order for them to evolve (Swartbooi, 2010:57).

Concerning the challenges with using VCoPs, Chiu, Hsu and Wang (2006:1873) observe that, in developing virtual communities the main challenge is members' willingness to share knowledge with others in the community. Another challenge with using VCoPs is that, they cannot function in areas that are remote and have no Internet connectivity (Lara et al. 2016:10) which hinders the participation of individuals in KM activities.

2.3.3.4 Collaborative virtual workspaces

The essence of collaborative virtual workspaces is that they allow individuals to participate in activities together irrespective of their geographical location. With collaborative virtual workspaces, people are able to engage in document sharing, collective editing and video/audio conferencing (Young, 2010:64). In using these workspaces organisations are able to identify and access skilled personnel from anywhere in the world, create, store, share and apply knowledge (Young, 2010:3-5).

Organisations choose to use collaborative virtual workspaces due to the fact that they allow an organisation have access to the best skills from anywhere in the world, they enable the reduction of travel costs; and allow individuals to work from when and where is more effective for them giving them access to needed information (Young, 2010:64). Collaborative virtual workspaces also support the creating and capturing of knowledge (Surve & Natarajan, 2015:925).

Examples of some software suppliers that offer virtual collaborative services include: Google Docs/Google Drive, Adobe Connect Pro and Teleplace (Young, 2010:65). Despite the availability of these suppliers, organisations may choose to assemble their own set of tools to cater for their specific needs.

With the benefits identified above of using collaborative virtual workspaces, there are challenges with using them such as: they cannot work properly with poor quality equipment and slow Internet which gives users a negative experience and may discourage them from using the collaborative virtual workspaces again in the future (Young, 2010:64). Another challenge is that without training, users will not effectively use the collaborative virtual workspaces, therefore, training of users is important for the successful implementation of collaborative virtual workspaces.

2.3.3.5 Blogs

A blog is a simple website in the form of a journal with a list of dated entries arranged in reverse chronological order starting with the latest on a specific theme (Rah, Gul & Wani, 2010:31; Young, 2010:50). The entries in a blog can contain text, videos, photographs, audio recordings or a combination of the different types. Blogs can be used by individuals or a group of people in an organisation to create, store, share and apply knowledge (Young, 2010:50). Agarwal and

Islam (2015:163) also identify blogs as tools that can be used to retain knowledge of outgoing employees and transfer knowledge to incoming employees.

Blogs can be hosted on the organisation's/institution's/library's intranet or popular blog sites such blogger (blogger.com) and WordPress (wordpress.com) can be used as a platform for individuals to post and share their opinions (Rah, Gul & Wani, 2010:31). According to Eid and Al-Jabri (2016:18), organisations are using blogs for knowledge content creation and sharing. Chan et al. (2013:1) also agree that blogging is important for creation, sharing and application of knowledge. Blogs are powerful tools for disseminating information as well as soliciting for comments and links, and also allow the classification and archiving of blog entries (Chan et at., 2013:2). It can, therefore, be said that, blogs are effective platforms for creating, organising and sharing knowledge as well as building and maintaining relationships among communities (Fiedler, 2003 as cited by Chan et al. 2013:2).

One limitation with using blogs for KM is that they have limited interactive and collaborative features such as group notification and private messaging (Chan et al., 2013:7).

2.2.3.6 Social networking services (SNS)

With the advancement of web 2.0 technology, social network services (SNS) have become a powerful platform for individuals to communicate, collaborate and share knowledge (Pham, 2011:Online). A social network is a group of people that share a similar area of interest or community of individuals interested in exploring activities and interests of others (Rah, Gul & Wani, 2010:25; Young, 2010:52). Chua and Banerjee (2013:238) define social networking services as social media services that allow users to create and display their profiles within a bounded system, and clear lists of other individuals with whom they share connections.

According to Young (2010:52), social networks offer tools that are cheap and effective for knowledge sharing and allow the bringing together of individuals with common needs and interests, putting them into groups to enable them to communicate easily and share content that include relevant websites, documents and so much more. Another benefit of using SNS is that they provide various means through which people interact, for instance: messaging, chat, voice, email, file sharing, group discussion and blogging (Rah, Gul & Wani (2010:30). Chua and Banerjee (2013:241), SNS support interconnectedness among organisations and in so doing allow the initiation of constructive conversation and dialogue. Eid and Al-Jabri (2016:16) observe

that, SNS are appropriate tools to support interactions among individuals, sharing of knowledge and exchange of personal experiences.

Examples of social networking services include Facebook, Twitter, Youtube, Myspace and LinkedIn (Young, 2010:53; Chua & Banerjee, 2013:239; Chan et al., 2013:2). According to Rah, Gul and Wani (2010:25), these SNS are increasingly being deployed in organisations in order to "provide a more organic approach" to the creation of a KMS. Pham (2011:Online) also supports the above statement by stating that, social network services are suitable platforms for organisations to implement new knowledge management systems and for forming a new kind of organisational structure that facilitates knowledge creating and sharing (Pham, 2011:Online). Chan et al. (2013:6) add that, in using suitable social media technologies for KM, it can improve the social motivation of those using these technologies.

Despite the benefits of implementing social networks for KM, there are challenges in using social networks. According to Chua and Banerjee (2013:238), since individual create and post content without any peer-review process, incorrect or biased knowledge about the organisation may be shared which may damage the reputation of the organisation.

2.4 Knowledge management systems in organisations, academic institutions and libraries

According to Hislop (2013:202), many of the academic research publications on KM today focus on the use of technology to facilitate knowledge management activities. The interest in using IT for KM was due to the optimism that organisations had that by developing and implementing the relevant IT systems, this would enable them to manage their knowledge successfully, facilitate collaboration within teams and among individuals in different locations and enable interactive and rich forms of communication. The benefits of using IT for knowledge management as stated by Raja, Ahmad and Sinha (2009:702) include: saving the time of users, reduced service costs, improved services, customer satisfaction, improved productivity and quality improvement.

With the transition from an economy that is industrial-based to one that is knowledge-based demands that organisations, industries and institutions have a KMS to have a competitive edge and the capacity to learn (Mason, 2009:Online) and, therefore, organisations are developing and implementing suitable tools and techniques such as: data warehouses and data mining system,

knowledge portals, business intelligence applications, e-learning tools, workflow-based systems and managerial decision support system to support their KM activities (Podgorski, 2010:284).

For organisations that would like to start managing their knowledge as a resource, there are several issues that they need to put into consideration such as: design and install processes and procedures to generate, use and protect known knowledge, plan and build settings that will permit personnel to feel secure in order to discover and release their tacit knowledge freely (Mason, 2009:Online). A KMS create an environment that allows people in an organisation to improve their skills and capabilities and also blossom and be the best that they can be (Mason, 2009:Online). In addition to this, Daud and Hassan (2008:339) recommend that, the environment created by a KMS should enable the organisation and people to participate in KM activities without intruding on the day-to-day tasks and imposing new demands on the organisation.

Many academic institutions have already employed IT to enable activities that range from administrative jobs to teaching (Daud & Hassan, 2008:339). These activities are part of KM processes in these institutions that are supported by IT. This follows the realisation that knowledge is an important asset for organisations and particularly for academic institutions. Even though institutions of higher learning are using IT for various KM activities, Peng, Jiang and Zhang (2013:96) note that the importance and value of a KMS have not yet been fully recognised in the education sphere. It should be noted that while many profit-based institutions have built knowledge management systems, few academic institutions have their own knowledge management systems (Peng, Jiang & Zhang, 2013:96).

Hoq and Akter (2012:95) in another view concerning knowledge management systems in universities, support the idea that universities should be at the forefront of advocating for knowledge management systems to foster creation and sharing of knowledge among researchers, faculty, non-teaching staff, patrons, students and other stakeholders. Daud and Hassan (2008:341) also support the design and implementation of knowledge management systems in academic institutions to enable the sharing and integration of knowledge. With the advancement in IT in universities, many are considering the possibility of applying knowledge management systems (Loh et al. 2003:6 as cited in Jain, 2013:1).

Academic libraries are adopting IT into their processes and functions, Integrated Library Systems (ILS) are being used to automate library services to enable access to available library materials and resources (Thompson & Pwadura, 2014:66). As libraries transform into knowledge-based societies, ILSs need to be supplemented with other technology tools that can capture the knowledge of the library effectively (Agarwal & Islam, 2014:329).

In academic libraries, Lee (2005:Online) and Kumar (2010:027) observe that, libraries should make use of the latest technology as an enabler for KM and the library director should be the library's chief knowledge officer to champion the design and development of a KMS together with the IT center and human resource department. Kumar (2010:029) further puts emphasis on the use of IT and systems in libraries to effectively support the implementation of KM and also adds that librarians should be involved in building an appropriate KMS for the library together with the IT specialists. Latest trends in KM implementation in academic libraries show that these libraries are adopting information technologies such as: social media and web 2.0, virtual/online reference services, digitisation of library collection, institutional repositories (IRs) together with knowledge management systems to enable librarians to create, store, share and apply knowledge (Jain, 2013:4-5). In the building of a KMS for the library, Lee (2005:Online) recommends that it should be built on the library's existing IT infrastructures that include the Internet, upgraded intranet and available software to enable the knowledge capturing, organisation, storage and sharing among the users.

In libraries today, web-based knowledge management is increasingly becoming important as libraries join the knowledge economy. According to Rah, Gul and Wani (2010:25) as an organisation's data continues to grow rapidly it becomes hard for users to find, organise, access and maintain the information required. Since the majority of individuals can access data through the web, academic libraries can also look at implementing web-based knowledge management systems to help easy access to knowledge among librarians.

2.4.1 Importance and benefits of a KMS in organisations and academic libraries

There are many reasons why organisations design and implement knowledge management systems. According to Mason (2009: Online), the best reason for a KMS in an organisation is to improve their competitive advantage in the marketplace through changing an organisation's intellectual assets into value through innovation. Bast (2015:136) states that a KMS is a valuable

asset for organisations to improve their employees' performance, customers' satisfaction, quality of service and communication.

A KMS is developed to support and enhance knowledge-intensive tasks, procedures or projects for example, of knowledge creation, organisation, storage, retrieval, transfer, refinement and packaging, (re)use, revision and feedback (also called the knowledge life cycle) (Maier & Hadrich, 2006:443). The knowledge life cycle is discussed towards the end of sub-section *2.2.1 Knowledge*. Lin (2014:368) also observes that, knowledge management systems that are technology based can improve knowledge management processes such as storage, generation, codification, sharing and transfer. In facilitating the storage and retrieval of organisational knowledge, for example, on clients, projects and other issues, a KMS allows the reuse of the knowledge that the organisation has acquired and contributed by individuals in the organisation (Dulipovici & Robey, 2012:4062).

Knowledge management systems enable the flow and support movement of knowledge around the organisation (Massingham, 2014:1076). With regard to knowledge sharing, many organisations are making use of a KMS to enable knowledge sharing (Daud, Dato'Ahmad & Abdullah, 2007:1; Wang, Noe & Wang, 2014:978).

In universities for instance, knowledge management systems are being considered to support activities such as web-based learning, Peng, Jiang and Zhang (2013:96) observe that, a KMS makes learning easier and those using the system are able to organise knowledge the way they want and search for knowledge in the system conveniently.

According to Maier and Hadrich (2006:442), knowledge management systems are seen as enabling technologies for organisations to effectively and efficiently manage knowledge. Xu and Quaddus (2012:18) add that, knowledge management systems are used widely by organisations to strategically manage their knowledge resources more systematically and effectively.

In order to add value to an organisation through knowledge management, IT-based knowledge management systems are needed to facilitate the generation, preservation and sharing of both explicit and tacit knowledge (Daud & Hassan, 2008:341; Alavi & Leidner, 2001 as cited by Xu & Quaddus, 2012:18; Panigrahi, Zainuddin & Azizan, 2014:203).

Floyde et al. (2013:69) believe that a knowledge management system helps in the improvement of an organisation by facilitating learning. Roy (2015:24) notes that knowledge management systems enable academic libraries also facilitate learning where individuals are able to learn from one another across the organisation. Tiwana (2000:Online) observes that an effective KMS enables individuals to learn from good and bad decisions made in the past and apply these lessons to the decisions and choices they make in the future. Another importance of a KMS is noted by Dorasamy, Raman and Kaliannan (2013:1836) that a KMS enables organisations in dealing with situations that are complex and dynamic for example, emergencies.

Rah, Gul and Wani (2010:25), note that, the idea of a knowledge management system is to allow personnel to have ready access to the organisation's documented base of facts, sources of information and solutions. Sharing knowledge with the entire organisation can lead to new ideas that can lead to improvement in the organisation.

Benefits of implementing a KMS as noted by Alavi and Leidner (1999:19-20) include: enhanced and faster communication, improved efficiency, reduction of problem-solving time, faster delivery of services, delivery of better services to users or clients, improved project management and increased staff participation. The implementation of a KMS in organisations and academic libraries has several benefits, but in order to realise these benefits, a KMS have to be designed appropriately. The next section *2.5 Knowledge management systems design* discusses factors to consider in designing a KMS.

2.5 Knowledge management system design

Knowledge management systems are designed for the collection, dissemination, sharing and utilisation of an organisation's knowledge (Peng, Jiang & Zhang, 2013:97) to improve the quality of work, facilitate the flow of ideas, improve decision-making capabilities and problem-solving skills. In other words, a KMS is developed to enable an organisation's knowledge management activities. In the design of an organisation's KMS, Kumar (2013:40) affirms that, the design of an organisation's KMS should largely be dependent on the needs of the organisation. Swartbooi (2010:30) also supports this idea by asserting that, an organisation must carry out a requirements assessment from the employees who are going to use the new system so as to understand the technical, functional and user requirements of the system to be implemented (Swartbooi, 2010:32). Zimmermann et al. (2000:140) add that, it is important to design a system that will be used by people in the organisation. This means that the people to use the system

must have a say in the kind of system they would like to have. Some of the goals and requirements for the KMS designed for Bell Atlantic include: support and enhance communication among members in the organisation, document group decisions, sharing of lessons learned and best practices (Zimmermann et al., 2000:138).

In a KMS designed and implemented to support web-based learning in Tsinghua University in China, the KMS consists of three modules, these include: group knowledge management, individual knowledge management and public knowledge management (Peng, Jiang & Zhang, 2013:97). Individual knowledge management module used by an individual student or teacher to store and organise and record their notes. The group KM module was used to support teams' study and research and the public KM module was used to manage an open knowledge resource.

In the design of a KMS, it is important to also consider the features that an organisation wants in the KMS. First of all, the KMS should enable the capturing, indexing and retrieval of knowledge objects of any kind such as drawings, images, emails, voice mail, video and so much more. In order to do the above, the KMS should have features that enable it to function as expected and some of these include: full text searches, metadata searches, ability to capture emails and electronic documents, ability to search within the system and across in other repositories and databases, ability to import and export data, an easy to use and powerful user interface and the ability to integrate with other systems (McKenna, 2008:6-7). For example, some of the features proposed for the web-based KMS for university libraries include: hot discussions, hot topics, what is new, documents of the month and best read (Rah, Gul & Wani, 2010:36). Floyde et al. (2013:71) observe that one of the key features of KMS is the ability to conduct audits which enable continuous monitoring and improvement of the system and user friendliness.

According to Daud, Dato'Ahmad and Abdulla (2007:7), the design of a knowledge management system should also be entrenched in and guided by an understanding of the types and nature of the knowledge in the organisation. This helps to further understand what will matter, what works, what should be trusted, where things can go wrong and how they can be fixed (Daud, Dato'Ahmad & Abdullah, 2007:7). It is also vital to know the knowledge resources of an organisation that the KMS will support (Yaacob, Jamaluddin & Jusoff, 2010:19). According to Daud and Hassan (2008:340), knowledge resources may include knowledge that is carried out

or embedded in reports, policies and procedures, financial statements, minutes of meetings, business processes, business plans, email messages and day-to-day decisions.

In the context of an academic library, a KMS should be designed to meet identified needs and requirements of the academic library (Roy, 2015:22).

In the design and implementation of a KMS organisations are facing challenges such as: what knowledge to be managed and why it should be managed and identifying who to involve in KM (Edwards, 2009:472). It is, therefore, essential for an organisation to categorise its knowledge assets and make sure that they are recorded, stored, shared and protected, which constitutes the core of the knowledge management system (Yaacob, Jamaluddin & Jusoff, 2010:19).

2.6 Knowledge management systems implementation

This section explains the different approaches to KMS implementation, the factors for successful implementation of a KMS and the factors that may hinder KMS implementation.

2.6.1 Approaches to KMS implementation

Various authors have discussed different approaches to the implementation of a KMS. According to Hecht et al. (2011:Online) there are three stages for an organisation to successfully implement a KMS and these are: adoption, acceptance and assimilation. Each stage has tasks as seen below:

- KMS adoption – Hecht et al. (2011:Online) identify key factors that influence the adoption process such as: characteristics, price, cultural values, commercial advantage, system quality and compatibility. During the adoption stage, the organisation needs to carry out an internal analysis, assess the knowledge needs and flows, communities of practice and communication lines to enable the organisation to determine the kind of system to be implemented. It is also vital to make a comprehensive cost-benefit analysis, putting in mind factors such as the number of users, size of the organisation, maintenance and updating costs, training costs, system structure complexity and frequency of use.

- KMS acceptance – The key factors that influence the acceptance process as identified by Hecht et al. (2011:Online) include: ease of use, extrinsic and intrinsic motivation, self-efficacy, usefulness and complexity. During this stage, an organisation needs to involve the systems' users during the design and implementation process, make the system

intuitive and user-friendly and provide adequate managerial and technical support (Frost, 2015:Online).

- KMS assimilation – Hecht et al. (2011:Online) identify factors such as: use of communication channels, knowledge embeddedness, organisation size, top management championship, process cost and quality and promotion of collaboration that influence the assimilation process. According to Frost (2015:Online), during this stage an organisation should ensure that the content in the system is kept relevant by revising, updating, organising and filtering to ensure that the system stays useful, management should use the advantages of the system to convince users to use the system and proper budgeting should be done to ensure an effective and cost efficient KMS is implemented.

According to Morrissey (2006:17), there are seven steps of the KMS implementation process and these include: assessing the critical knowledge required by the organisation, assessing the degree of sharing and retention in the organisation, obtaining support from top management, designing a system that is integrated with tools and technologies, designing incentives to be used, measuring impact of the KMS and lastly, promoting and advertising the KMS success.

According to Maier and Hadrich (2006:448), there are four main approaches to deploying a KMS in organisations, these include:

- An organisation can deploy a KMS as part of a general infrastructure to support knowledge work in the entire organisation.

- A KMS can be deployed in an organisation targeting particular projects, business processes, and/or theme-oriented activities that are connected to using knowledge.

- A KMS can be deployed to support knowledge sharing among communities and networks in the organisation.

- An organisation may design a KMS to support the creation, storage, sharing and application of certain types of knowledge such as: best practices and lessons learned.

2.6.2 Factors for successful knowledge management systems implementation

In order for a KMS to be successful, there are several factors that should be considered, these are also referred to as critical success factors for KMS implementation. The discussion below is,

therefore, centred on some of the critical success factors for KMS implementation as identified in the literature.

KMS strategy

According to Daud, Dato'Ahmad and Abdullah (2007:1), the first step in implementing a KMS as a total solution for KM in libraries is to design a KMS strategy. It is important for the strategy to be aligned with the business strategy of the library or the implemented KMS will fail to achieve goals for which it was implemented. Daud and Hassan (2008:339) and Pham (2011:Online) also observe that a well-planned implementation strategy is essential for the successful implementation of a KMS. The KMS implementation strategy is needed in order to devise and manage an implementation plan; administer a common vision; define knowledge requirements and use the feedback to refine the strategy further (Daud, Dato'Ahmad & Abdullah, 2007:2). In choosing an appropriate strategy for implementing KMS in any organisation, it is important to follow a basic framework (Daud, Dato'Ahmad & Abdullah, 2007:2). This framework should include stages such as:

- Analysis of current situation.
- Problem definition.
- Identification of needs and desired position.
- Identification of organisational enablers/resistors.
- Selection of technique/strategy and implementation.

KMS alignment to organisation's strategy

According to Dulipovici and Robey (2012:4062), the alignment of a KMS to the organisation's strategy is key for successful implementation of the KMS. Strategic alignment of a KMS to the organisation's strategy enables the achievement of the organisation's strategic objectives through providing the needed support and intellectual resources. Business strategy is a key driver of KMS (Dulipovici & Robey, 2012:4067). Tiwana (2000:Online) states that, "knowledge drives strategy and strategy drives knowledge management", therefore, it is important for an organisation to have a link between knowledge management and its business strategy, so that a KMS can deliver according to the organisation's set goals and enable the organisation to achieve its goals.

Top management leadership and support

Strong leadership, commitment and vision from top management are very important for the library to succeed in implementing a KMS and this positively influences the efforts of the university in promoting knowledge sharing (Hung, 2005:167-170; Pham, 2011:Online; Krishnan & Das, 2012:385). According to Kumar (2010:029) for any library to succeed in KM implementation, strong leadership and vision from top management are essential. Abokhodiar (2014:126) adds that support and encouragement from top management are critical for the success of KMS implementation.

Technological infrastructure

Kumaresan (2010:4-5) observes that, in implementing knowledge management systems academic libraries need to consider technology factors such as whether to use advanced software which means that the library has to make a large investment in acquiring the software or consider using available technology to implement a KMS. Whichever choice a library makes varies from one library to another.

It is also imperative for the library to determine the kind of technology that they will use in implementing the KMS depending on the financial resources and budget of the library. Some existing technology in today's libraries include: Microsoft Access, Excel, Office suite, intranet, Email – Microsoft Outlook or open sources systems that are available can be used as KM tools to support the creation, storage, sharing and retrieval of relevant knowledge (Kumaresan, 2010:5). Pham (2011:Online) also adds that, suitable technology is key to the success of the KMS and must be explained and applied to support knowledge management processes. Ali, Sulaiman and Cob (2015:65) observe that, various types of information technologies and their applications that are presently available in universities can be used to support KMS implementation.

KMS audit

Another success factor for a KMS as identified by Hung (2005:167-170) and Floyde et al. (2013:71) is a KMS audit. Continuous performance measurement is vital for a KMS as auditing of the system helps the organisation to identify the gaps between the desired level of performance and the current performance of the KMS. A KMS audit helps identify any problems with the system and offers information on how to improve the system (Floyde et al., 2013:71). KMS audit can be based on performance indicators.

User satisfaction

In a study carried out by Panigrahi, Zainuddin and Azizan (2014:207), it was found that user satisfaction also contributes to the success of a KMS. For the KMS implementation process to succeed, the users of the system must be happy and content with it in order to use it for knowledge management activities. Employee participation is important (Hung, 2005:167-170; Pham, 2011:Online), and users will not use the system if not satisfied with it and what it does. This is why it is important to carry out a user requirements assessment as mentioned in sub-section *2.6.1 Approaches to KMS implementation* before implementing the system.

Motivation of staff

Kumaresan (2010:5) identifies motivation of staff as a key factor to the success of a KMS in organisations and in libraries specifically. Staff contributes towards the pool of knowledge and, therefore, their motivation is vital and it enables successful KMS implementation (Kumaresan, 2010:5, Ali, Sulaiman & Cob, 2015:66). Rewards and incentives should be considered to motivate people to participate in KM practices and contribute towards the knowledge of the organisation (Abokhodiar, 2014:126).

Training of staff

Another critical success factor for KMS implementation is the training of staff. For the implementation of the KMS to be successful, it is important to train staff to sensitise them on the benefits of using the system and also train them on how to use it (Hung, 2005:167-170; Pham, 2011:Online). Akhavan, Jafari and Fathian (2006:108), observe that training programmes help staff to completely and deeply become familiar with knowledge concepts and also enable an organisation to build up and maintain personnel's skills and expertise.

Understanding of KM concept

Daud and Hassan (2008:339) observes that another critical success factor for KMS implementation in libraries is a clear understanding of the KM concept by people in the organisation who are to use the system. It is important that people understand the KM concept, what it entails and the benefits of KM to the organisation and to individuals as well.

Organisation culture

According to Hung (2005:167-170) and Pham (2011:Online) an open, trusted and appropriate organisational culture is important for the successful implementation of a KMS.

Policies and guidelines

Policies and guidelines in an organisation play a key role in the implementation of a KMS (Abokhodiar, 2014:121). These guide people in the organisation on how to create, share and use knowledge. Still in regard to policies and guidelines, Ali, Sulaiman and Cob (2015:66), point out the need for security policies and regular changes in these policies to avoid misuse of knowledge.

Other factors for successful implementation of a KMS include: having a unified implementation model, employee empowerment, an information systems structure that is reliable and flexible, teamwork that is trustworthy, a knowledge structure that is effective and benchmarking (Hung, 2005:167-170; Daud & Hassan, 2008:339; Pham, 2011:Online).

2.6.3 Failure factors of knowledge management systems

There are also factors that may cause a KMS to fail and it is important for organisations to consider these factors to make sure that the implementation process in successful.

Strategic misalignment of the system may lead to the failure of the KMS implementation project in the organisation (Dulipovici & Robey, 2012:4063). As discussed in section *2.6.2 Factors for successful knowledge management systems implementation,* the alignment of a KMS to the business strategy of an organisation is key for the success of the KMS, therefore, misalignment of the system will lead to its failure. According to Dulipovici and Robey (2012:4063), it is important that a KMS like any other information system is structurally and strategically aligned to the business strategy of the organisation so that there is an increase in performance.

Pham (2011:Online) suggests the lack of a framework for KMS implementation and suitable technology for a KMS as key factors in KMS implementation failure in organisations.

According to Abokhodiar (2014:126), lack of awareness about the benefits and importance of knowledge management at both organisational and individual levels may hinder the implementation of a KMS.

Another failure factor is the lack of sufficient incentives that encourage personnel to participate in KM activities by contributing to the organisation's knowledge base through the KMS (Abokhodiar, 2014:126).

Akhavan, Jafari and Fathian (2005:4) and Frost (2015: Online) identify several failure factors and problems related to a KMS and these include: lack of adequate support and commitment from top management; reliance on technology as the sole solution to an organisation's KM; failure to ascertain the exact needs of the organisation, for example, technologically; lack of understanding of the precise functions and limitations of the system; lack of acceptance from the organisation; assumptions that once the system is implemented it will be used for KM practices; lack of suitable organisational culture; lack of adequate quality measures (such as lack of content management); lack of organisational fit (such as does it improve work in the organisation or does the system fit in one department or area and not another); lack of a separate budget; lack of time by members of staff to participate in KM activities through the system; resistance to change by staff in their work practices; lack of adequate technical skills; lack of cooperation between the KM team and the organisation's staff; and wrong planning and improper forecasting for the KMS project.

When implementing a KMS it is important to also consider the above-identified failure factors to ensure that the implementation process is successful and also to make sure that the KMS that is implemented is effective and suitable according to the requirements of the organisation.

2.7. Best practices and lessons learned from case studies in KMS design and implementation in organisations and academic libraries.

There have been few case studies on the design and implementation of a KMS in academic libraries. Rah, Gul and Wani (2010:24) in a study carried out at the University of Kashmir, Srinagar, India propose the implementation of a web-based KMS for university libraries to enable creation, storage, organisation, dissemination and utilisation of the libraries' knowledge assets. In this study, existing knowledge management systems were surveyed and technological tools identified that best suits the needs of the library. Rah, Gul and Wani (2010:37), also observe that, the Internet, IT and broadband connectivity are important requirements for the successful implementation of a web-based KMS in the library.

In an organisation known an Engineering Consulting XYZ a KMS system was implemented to enable the creation, storage and re-use of knowledge in project management, one of the challenges faced is that the system was designed in a way that it did not interact with other systems in the organisation which made it hard for people to access knowledge in other areas of the organisation. Another challenge is that, it was hard to convince people of the benefits of

using the system which had much to do with the lack of an organisational culture that supports KM to show people the benefits of using the system to create and share knowledge (Owen & Burstein, 2005:148-149). Lessons learned from this case are that an organisation's culture is important for the successful implementation of a KMS and also that an implemented system should integrate with other systems in the organisation to enable easy access to knowledge in the entire organisation. Another lesson learned is that, a KMS that is implemented should support the capturing of tacit knowledge as well to complement the explicit knowledge (Owen & Burstein, 2005:150). In addition, training of staff is vital to make sure that staff know the benefits of the KMS and also how to use the system (Owen & Burstein, 2005:150).

2.8 Conclusion

The above chapter shows the literature reviewed that is related to the design and implementation of knowledge management systems in organisations, academic institutions and academic libraries in particular, however, a gap has been identified in the literature regarding the design and implementation of knowledge management systems to enable KM processes specifically for academic libraries, and, therefore, more research needs to be done in this area. The next chapter which is chapter three will focus on the research methodology adopted for the study.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

In chapter two, the relevant literature on the design and implementation of knowledge management systems in academic libraries was reviewed, analysed and presented. This chapter elaborates on the methodology used for the study and provides means for the researcher to systematically address the research question. Firstly, the chapter provides a discussion of the research design and approach adopted for the study, followed by an overview of the research strategies used. Furthermore, the data collection methods used as well as the population of the study and the sampling techniques used to obtain a suitable sample for the study are also presented. In addition, the validity and reliability procedures used and data analysis and presentation methods used are also covered. Lastly, the ethical issues considered in the study are discussed. The chapter ends with a conclusion and an introduction to chapter four which includes the presentation and discussion of findings.

3.2 Research design

A research design is a general strategy used for addressing a research problem. It provides the complete structure of methods and techniques the researcher is to follow to collect, analyse and present the research data (Leedy & Ormrod, 2014:76). In other words, a research design is a blueprint (Yin, 2011:75) that enables a researcher to solve fundamental problems, such as: what will be studied, who will be studied and how will the data be collected. As noted by Yin (2011:75), every research study should have a design to enable the researcher to strengthen the validity of their study and also ensure that, the data collected properly addresses the research topic being studied. Leedy and Ormrod (2014:76) add that, it is important for a researcher to carefully plan the overall research design of the study as this helps in ensuring that their research efforts are successful.

This study consisted of studying existing literature in line with designing and implementing a KMS and a qualitative research approach was adopted which the researcher believes suits the study at hand. The research instruments used include an interview guide and a document content analysis guide. The interview guide was used to collect relevant data from librarians and IT library staff of Makerere University Library which is the case and documents from Makerere University Library reviewed to find secondary data essential for the study and findings are discussed in chapter four.

3.3 Research approach

There are two broad categories of research, namely quantitative and qualitative (Leedy & Ormrod, 2014:97). In comparing quantitative and qualitative research approaches, Leedy and Ormrod (2014:97) observe that, quantitative research includes looking at quantities or amounts of one or more variables of interest. A researcher who does quantitative research characteristically tries to measure variables in some way, possibly by means of generally acknowledged measures of the physical world such as oscilloscopes, rulers and thermometers or measures that are designed to carefully study psychological behavioural characteristics, for example, questionnaires, tests and rating scales. On the other hand, qualitative research involves looking at qualities or characteristics, which cannot easily be reduced to a numerical or mathematical value (Leedy & Ormrod, 2014:97). A researcher who carries out qualitative research usually aims to study the many complexities and nuances of a specific phenomenon (Kumar, 2011:13). Qualitative research is most likely to be seen in research that involves complex human situations, for instance, the in-depth perspective of an individual about a certain issue, the values and behaviours of a specific cultural group or complex human creations such as works of art and television commercials. According to Yin (2011:3), researchers choose to use the qualitative research approach when they want to study a real-world setting and discover how the people in that setting are thriving.

Qualitative research enables a researcher to carry out an in-depth study about a broad range of topics (Yin, 2011:6). The researcher chose to use the qualitative research approach in order to be able to dig deeper and get a complete understanding of the phenomena being studied (Leedy & Ormrod, 2014:142). Qualitative research enables the collection of numerous forms of data that can be studied from various viewpoints in order to build a meaningful and rich picture of a multifaceted and complex situation (Leedy & Ormrod, 2014:142). Yin (2011:7) identifies five qualitative research features that distinguish qualitative research from other forms of research and these include: people's lives are studied under real-world settings; people's views and perspectives in a study are represented; the contextual conditions within which people live are covered; insights are contributed into emerging or existing concepts that can help to explain human social behaviour; and rather than rely on a single source of evidence, multiple sources are used.

According to Creswell (2014:185-186), qualitative research has the following characteristics:

- Natural setting: a researcher collects data in a place where the participant faces the problems under study or where they experience the real issues being studied.

- Researcher as the key instrument: Meaning that the researcher collects data and carries out the research themselves by observing participants' behaviour, interviewing them or examining documents. The researcher may use instruments such as interviews and questionnaires to help collect the data, but it is the researcher who actually collects the data

- Multiple sources of data: researchers that do qualitative research gather multiple forms of data using research instruments like questionnaires, interviews, observations and documents and do not depend on a single source for data.

- Inductive and deductive data analysis: with inductive data analysis, the researcher builds their themes, patterns, and categories from the bottom going up by organising the data into progressively more abstract units of information. Deductive data analysis, the researcher takes a look at their data from themes to decide whether they need to gather more information or if more evidence can support each theme

- Participants' meaning: throughout the entire qualitative research process, the researcher focuses on learning the meaning held by participants concerning the issues or problems and not the researcher's meaning or the meaning held by authors in reviewed literature

- Emergent designs: this means that the initial plan in the qualitative research process is not fixed from the beginning but keeps changing as the researcher enters the field and starts to collect data

- Reflexivity: the researcher has reflections about their role in the study, their personal background, experience and culture which have the potential to shape their interpretation and the direction of the study, for example, the meaning they assign to the data.

3.4 Research strategies

For this study, the case study and literature review research strategies were adopted for the qualitative research and these strategies are further discussed below;

3.4.1 Literature review research strategy

The study used the literature review research strategy in order to clarify the concepts and terms that are associated with the design and implementation of knowledge management systems in academic libraries to enable knowledge management processes. Review of literature in a study can be described as looking out for relevant literature related to the study at hand which enables the researcher to decide whether the topic being studied is worth studying (Creswell, 2014:15). The literature review also helps provide insight into means to help the researcher limit the scope to a needed area of inquiry.

For this study, online databases were searched for e-books, journals and articles related to the topic being studied. Databases searched include: ProQuest, Emerald, EbscoHost, Sage and Google scholar which provided a broad way to search for literature across many sources and disciplines. Some of the search strategies such as "knowledge management"; "knowledge management" AND "academic libraries"; "Knowledge management systems" and more were used by the researcher to get relevant literature for the study. Other sources such as textbooks and websites were also used to get the relevant literature. The literature reviewed from the above-mentioned sources is considered as secondary data since it is developed from the works and findings of other authors that have already been published.

3.4.2 Case study research strategy

According to Creswell (2014:13), a case study is a viable way to conduct qualitative research. Case studies enable a researcher to develop an in-depth analysis of a case, activity, event, program, process or one or more individuals over a specific period of time (Creswell, 2014:14; Leedy & Ormrod, 2014:143). According to Yin (2011:17), a researcher seeks to study the case in its real-world context and data is extensively gathered using methods such as observation, interviews, documents, audiovisual materials and past records (Leedy & Ormrod, 2014:143). Since cases are bound by activity and time, researchers are able to collect detailed information by means of various data collection procedures over a sustained period of time (Yin, 2012:10). For this study, the researcher used interviews and documents from Makerere University Library to collect data relevant to the study.

As observed by Leedy and Ormrod (2014:143), researchers sometimes choose to focus on one case because of its uniqueness and exceptional qualities that can promote understanding or inform practice in situations that are similar. The researcher used Makerere University Library as

the case study, as it is an academic library and is a knowledge-intensive organisation to provide an experiential element of the study at hand. The study involved interacting with librarians from Makerere University Library who are involved in KM activities and also with IT library staff who are in charge of library IT and implementation of library systems to get their insight and opinions on the topic. Their opinions enabled the researcher to address the research sub-questions and formulate strategies for the library to design and implement a KMS.

Finally, it can be said that, the study of Makerere University Library can provide an understanding of similar situations in other academic libraries. As observed by Leedy and Ormrod (2014:143), in a case study, the researcher identifies the context of the case and in so doing helps the readers of the report to draw conclusions about the extent to which the findings from the study can be generalised to other situations.

3.5 Population of study

The population of study or target group consisted of librarians and library IT staff from Makerere University Library. Librarians were chosen for this study as they actively participate in KM activities in the library and their opinion regarding the design and implementation of a KMS is very relevant to the study, the library IT staff were selected because they deal with library systems and technologies and ensure that the library has the necessary IT appropriately designed, installed and implemented as well as also participate in knowledge management activities in the library.

3.6 Sampling

In any qualitative study, there is a need to identify samples that are appropriate from which to collect the needed data for the study, the process of selecting the sample for the study is known as sampling (Leedy & Ormrod, 2014:154). As stated by Jain (2013:5), the purpose of any sampling is to "secure a sample which will represent the characteristics of the entire population." According to Sekaran and Bougie (2013:244), "Sampling is the process of selecting a sufficient number of the right elements from the population, so that a study of the sample and an understanding of its properties or characteristics make it possible to generalise such properties or characteristics to the population elements." There are two major types of sampling designs namely, probability sampling and non-probability sampling. Probability sampling is where the elements in the target population have some known, non-zero chance or probability of being

selected as sample objects while non-probability sampling, the elements do not have a known or predetermined chance of being selected as subjects (Sekaran & Bougie, 2013:245-252).

This study used the purposive sampling technique, an example of non-probability sampling design, to select librarians and library IT staff to interview from Makerere University Library. This is because the purposive sampling technique enables the researcher to restrict the research to particular individuals who can provide the needed information. According to Kumar (2011:207), "the primary consideration in purposive sampling is your judgement as to who can provide the best information to achieve the objectives of your study." The researcher used this sampling technique to choose library staff that were likely to have the capability to provide the required information and were willing to share it. The sample of this study consisted of librarians and library IT staff at Makerere University Library. The library comprises of about fifty professional library staff and four of these are in the library IT department and are responsible for library IT systems and providing IT support. Out of the library staff, six librarians were chosen from three sections and three college libraries of the library as part of the study, as well as two library IT staff from the library IT department, the total number of participants was eight.

3.7 Data collection methods

It is important for the researcher to make decisions and plan for how to obtain the data needed for resolving the research problem (Leedy & Ormrod, 2014:82). In qualitative research, a researcher can choose to use multiple data collection methods to obtain the data needed to answer research questions or research problems (Leedy & Ormrod, 2014:143). For this study, the researcher used the interview method and document content analysis method to collect research data. These data collection methods are further discussed below:

3.7.1 Interview method

Interviews have been widely used for collection of research data in both qualitative and quantitative research (Sachan, Singh & Sachan, 2012:8). The interview method comprises of asking a series of questions but an interview is not just a set of questions, it is more than the oral aspect and the researcher can also observe the personality, behaviour and beliefs of the participant or interviewee (Sachan, Singh & Sachan, 2012:9).

There are various types of interviews that a researcher can use to collect data and these include: face-to-face or one-on-one or in-person interviews, telephone – researcher interviews by phone,

focus group – researcher interviews participants in groups and email – Internet interviews (Creswell, 2014:191). Interviews enable a researcher to yield a great deal of information that is useful (Leedy & Ormrod, 2014:155). In a qualitative study, interviews conducted are either open-ended or semi-structured (Leedy & Ormrod, 2014:156; Patton, 2014:14). The interviews are aimed at yielding in-depth responses from people's feelings, opinions, experiences, perceptions and knowledge (Patton, 2014:14) and the data collected includes verbatim quotations.

For this study, the face to face interview method was used to collect data from participants who comprised of librarians and library IT staff and semi-structured questions in the interview guide were used to collect the data.

According to Kumar (2011:144), interviewing is a commonly used method to collect information from people and involves person-to-person interaction which can be face-to-face or otherwise between two or more people with a specific purpose in mind. The purpose for using interviews was to collect information regarding the design and implementation of a KMS for Makerere University Library to enable knowledge management processes leading to the formulation of strategies for the library to follow in designing and implementing a KMS.

3.7.1.1. Advantages of the interview method

There are various advantages of using the interview method to collect data from research participants and these include the following:

1. The interview method enables a researcher to have control over the line of questions (Creswell, 2014:191) since the researcher has control, they can ask and probe with additional questions relevant to the study and can control the quality of information from the interview easier than other research methods (Rawlins, 2008:115).

2. In an interview, the researcher or interviewer can clarify on questions that may not be understood by the participant and ensure that the responses are appropriately understood, by rephrasing or repeating the questions (Sachan, Singh & Sachan, 2012:13; Sekaran & Bougie, 2013:124).

3. In using the interview method, a small number of participants can be used to obtain rich and detailed data (Creswell, 2014:191).

4. The interview method enables the researcher to directly observe the research participants (Creswell, 2014:191). Sekaran and Bougie (2013:124) add that, a researcher is able to pick up any non-verbal cues from the participant, for instance, any stress, discomfort or problem may be shown in the participant's body language.

5. The interview method provides appropriate means to obtain information related to issues that are complex (Sachan, Singh & Sachan, 2012:13).

3.7.1.2. Disadvantages of the interview method

Using the interview method to collect data also has disadvantages. Creswell (2014:191-192) and Rawlins (2008:115-116) identify disadvantages of the interview method as seen below:

1. With the interview method, information is sometimes provided in a designated place rather than in a field setting that is natural. For this study, the researcher requested interviewees to be interviewed from their places of work, therefore, information was provided while in the library's natural setting.

2. Interviewers being present may bias the responses from the participant. The individual being interviewed may give responses to questions just to please the interviewer. In this study, participants were encouraged to feel free to provide responses to the interview questions and that no response was considered wrong.

3. Not all individuals that are chosen for the interview are equally perceptive and articulate which may lead to interviewee responses being misunderstood. In the case of this study, the researcher asked the participants to kindly repeat their responses where responses to questions were not clear.

4. The interview method is costly both in money and time. The researcher spends time interviewing participants and also may have to spend money to schedule for interviews in other geographical places that are further from the usual natural field setting. This was addressed by sending out the interview questions before the interviews to give interviewees enough time to read through the questions and set a convenient time for the interview to take place within the library.

5. Since the researcher and interviewer have control over the interview and can change the questions, they may affect or alter the results. Also, the attitude of the person

interviewing and the way in which they ask the questions may bias the way the interviewee responds. This was addressed by the researcher ensuring that interview questions were not changed to alter results.

3.7.2 Document content analysis method

According to Leedy and Ormrod (2014:150), content analysis is a "detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes, or biases." Bowen (2009:27) states that document analysis is "a systematic procedure for reviewing or evaluating documents – both printed and electronic (computer-based and Internet-transmitted) materials."

In the document content analysis method, documents that can be reviewed include: public documents such as agendas, minutes of meetings and private documents such as personal diaries, journals and correspondences (Bowen, 2009:27; Creswell, 2014:191; Patton, 2014:14). Data collected by means of document content analysis consist of captured excerpts from documents that enabled the researcher to address the research question (Patton, 2014:14).

The researcher used the document analysis method to collect data to address the research question and sub-questions. There are documents in the library that the researcher used to get relevant information concerning the study and as such the researcher designed a document content analysis guide to help find the information from documents such as the library strategic plan, reports and policy documents.

3.7.2.1. Advantages of the document content analysis method

The advantages of the document content analysis method as identified by Creswell (2014:191-192) include the following:

1. In using the document content analysis method, the documents can be accessed at a convenient time for the researcher and documents are seen as unobtrusive sources of information.

2. Documents used to obtain research data may be of good quality containing information that is detailed.

3. Documents are also very useful, particularly when tracking changes over time.

3.7.2.2. Disadvantages of the document content analysis method

The disadvantages of the document content analysis method as identified by Bowen (2009:27) and Creswell (2014:191-192) include the following:

1. Information may be protected and not available for private or public access due to confidentiality issues. In this study, the researcher made sure to request for permission from library management to use library documents for the study and the document used were available for public access and use.

2. The researcher may be required to search out for the relevant information in hard-to-find places. For purposes of this study, the researcher used electronic copies of the documents which were easier to search for the needed information.

3. Insufficient details may be found in the documents, since documents are often designed without research in mind, some material may be incomplete and may not be able to answer research questions. The information got from the documents was used to supplement information already provided by the interviewees and the researcher made sure that documents used were complete.

4. The documents may not be accurate or authentic and thus may not completely represent the phenomenon being studied. In this study, the researcher carefully chose documents that would provide the needed information.

3.8 Application of interview questions to the study

This study is based on a research question and four sub-questions as presented in sub-section *1.3 Research question and sub-questions*. The questions asked in the interview guide were aimed at addressing the research sub-questions identified which eventually led to answering the main research question. The interview guides are divided into sections to address the above-mentioned research sub-questions as elaborated below:

Section B of the interview guides for librarians and library IT staff consists of questions aimed at collecting data related to the first research sub-question which is: What is library staff's understanding of knowledge and knowledge management? Section B is titled *Knowledge and knowledge management* and the questions in this section were aimed at determining librarians'

and IT library staff's understanding of the two concepts which are knowledge and knowledge management.

Section C of the interview guides for librarians and library IT staff addresses the second research sub-question which is: What technological tools and techniques are currently used for KM practices in the library? This section is titled *tools and techniques used for KM in the library* and the questions in this section were all aimed at receiving responses to the second research sub-question.

Section D of the interview guides for both librarians and library IT staff focuses on the third research sub-question which is: What factors should the library consider in designing and implementing a KMS? This section aimed at collecting data to enable the researcher to identify the critical success factors for implementing a KMS at the Makerere University Library. The section is titled *Factors to consider in designing and implementing a KMS for the library*.

Section E of the interview guides has questions focusing on addressing the fourth sub-question which is: What are the challenges and benefits of a KMS in the library? Questions created in this section were aimed at finding out the opinion of librarians and IT library staff regarding the challenges that the library may face in implementing a KMS as well as the perceived benefits of implementing a KMS for the library.

3.9 Data analysis and presentation

After the data has been collected, the next step is for the researcher to make meaning out of the collected data. In data analysis and presentation in qualitative research, Yin (2011:177) presents a five-phase cycle which includes phases like: compiling, disassembling, reassembling (and arraying), interpreting and concluding. These phases are similar to the steps identified by Creswell (2007) and Stake (1995 as cited by Leedy & Ormrod, 2014:143) as typical steps for data analysis in qualitative research for a case study. These steps include:

a) Organisation of details about the case, this includes arranging the facts about the case in a logical order.

b) Categorisation of data, this includes the identification of categories to help cluster the data into meaningful pieces.

c) Interpretation of single instances, specific documents, occurrences and other bits of data are examined for specific meanings that they might have in relation to the case.

d) Identification of patterns, this entails the scrutinising of the data in order to get the underlying themes and other patterns that can help to characterise the case more broadly than a single piece of information can reveal.

e) Synthesis and generalisations, here a general representation of the case is made, conclusions are drawn that may have implications beyond the particular case that has been investigated.

For this study, the above-mentioned steps were followed in analysing and presenting the data. The researcher prepared and organised the data for analysis and then read through the collected data making corrections where necessary. It should be noted that, data analysis was guided by the research sub-questions in order to make sense of the collected data. According to Yin (2011:179), substantive themes can be used to re-organise the different pieces of data. For this study, the data was analysed using themes derived from the research sub-questions and in presenting the data the researcher used quotations where appropriate

It should also be noted that, data from the interviews was analysed using the content analysis method and according to Flick (2014:429), the qualitative content analysis method is one of the classical procedures used to analyse textual material regardless of where the material is coming from, ranging from media products to data from interviews (Bauer, 2000 as cited by Flick, 2014:429). The qualitative content analysis method is also referred to as a method used to systematically describe the meaning of qualitative data (Schreier, 2014:170). This is done by allocating consecutive parts of the data to the categories of a coding frame. In content analysis, categories are used with the main aim of reducing the material.

Conclusions from the analysed and presented data enabled the researcher to answer the research question and sub-questions.

3.10 Quality assurance (validity and reliability)

The questions asked to participants in a study are the basis of the researcher's findings and conclusions (Kumar, 2011:177), therefore, it is important for the researcher to attempt to establish the quality of the findings. According to Leedy and Ormrod (2014:91), the research instruments must have both validity and reliability for their purpose.

It is important for a researcher to find out the quality, appropriateness and accuracy of the measures used to get answers to the research questions. This research process is known as

validity. Validity refers to the extent to which a research instrument measures what it is intended to measure (Leedy & Ormrod, 2014:91), and reliability means the consistency in the findings from the research instrument when used again and again (Kumar, 2011:184).

In order to measure the validity and reliability of the interview questions, the researcher pilot-tested the questions with two colleagues in the library to ensure that the questions asked in the interview elicit the kind of information that the researcher is seeking and also to find out if the interview questions were understood by the participants and also to determine the duration of the interview. Pilot-testing the interview questions enable a researcher not to use questions that are misleading or ambiguous (Leedy & Ormrod, 2014:201). Validity and reliability of the instruments were also ensured by going over the interview questions and making revisions where necessary.

3.11 Ethical issues

Creswell (2014:92) observes that it is important for researchers to put into consideration the ethical issues they anticipate to arise during the course of their study. According to Punch (2005, cited by Creswell, 2014:92), research is about "collecting data from people and about people". It is important for researchers to "protect their research participants; develop a trust with them; promote the integrity of research; guard against misconduct and impropriety that might reflect on their organisations or institutions; and cope with new, challenging problems" (Israel & Hay, 2006 as cited in Creswell, 2014:92). Flick (2014:54) emphasises the need to consider ethical issues at every stage in the research process from deciding the research topic through to identifying the sample to conducting the research and dissemination of the findings.

Within various disciplines such as education, social sciences, medicine, criminology and related areas of study, it is common to use human beings in research. Human beings have the potential to feel, think and experience psychological or physical distress, therefore, it is important for the researcher to look closely and carefully at the ethical implications of what they are proposing to do (Leedy & Ormrod, 2014:106). Most research ethical issues fall into one of four categories which include: informed consent, protection from harm, right to privacy, and honesty with professional colleagues (Leedy & Ormrod, 2014:106). For this study, informed consent and privacy were considered. First of all, informed consent forms were issued to participants in order to obtain their consensus to participate in the research by signing the forms. The term informed consent implies that the research participants know and understand the risks and benefits of

participating in the research (Flick, 2014:54). It is important for participants to also know that their participation is completely voluntary (Flynn & Goldsmith, 2013:10 as cited in Flick, 2014:54). Secondly, confidentiality and anonymity of both librarians and library IT staff that participated in the study were guaranteed and no names are disclosed in the mini-dissertation.

Flick (2014:53) observes that ethics committees are established in order to ensure ethical standards and this is done in order to examine the research design and methods to be used before they can be applied. For this study, the researcher obtained clearance to carry out the research from the University of Pretoria's Faculty of Engineering, Built Environment and Information Technology Research Ethics and Integrity committee as well as from Makerere University Library management.

3.12 Conclusion

This chapter looked at the methodology adopted for the research with relevant and elaborate evidence found in the literature to support the strategies used by the researcher. The chapter discussed the research design and research approach adopted for the study, furthermore, the research strategies used are highlighted. The chapter also described the population of the study and sampling techniques used, and elaborated on the data collection methods used to collect research data. The data analysis and presentation methods and techniques applied are then discussed, followed by the quality assurance and ethical issues considered. The next chapter is chapter four which covers the presentation and discussion of the findings.

CHAPTER FOUR: PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

Chapter three gives details on the research methodology used for the study. This chapter covers the presentation and discussion of key findings from the study carried out at Makerere University Library on various aspects related to the design and implementation of knowledge management systems in academic libraries. The chapter incorporates two parts, first and foremost, the chapter presents the findings that the researcher made by using the interview and document content analysis research methods where librarians and library IT staff were interviewed and several documents were analysed to obtain data relevant to the study. Secondly, the chapter provides the discussion of the findings, relating these findings to some of the literature reviewed in chapter two. The findings are presented and discussed logically under identified major themes

It is important to note that the researcher obtained the study findings by using a qualitative research approach using methods considered suitable for qualitative research. These methods as already mentioned above consist of interviews as well as document content analysis. The presentation and discussion of the key findings are done according to the research sub-questions specified in chapter one under *section 1.3 Research question and sub-questions.*

The interviews carried out for the study consisted of a total of eight participants of the ten participants originally selected purposively, of which six were librarians and two were IT staff working in the IT department in Makerere University Library. The reason for using these two categories of participants was to get their views on several aspects of the study and be able to compare their opinions where necessary. Interview guides were used to interview participants in these two categories as seen in *Appendix II: Interview guide for librarians at Makerere University Library* and *Appendix III: Interview guide for IT staff at Makerere University Library.* The documents reviewed for the study from Makerere University Library comprise of the Library Strategic plan 2013-2018/19, section and college library reports of 2015 and the University ICT report 2016-2020 and these are also listed in *Appendix IV: Document content analysis guide.*

As noted above, the presentation and discussion of findings is done according to themes, namely: description of research participants; understanding of knowledge and knowledge management by library staff; technological tools and techniques used in the library for KM; factors to consider in designing and implementing KMS in the library; and benefits and

challenges in implementing KMS in the library. Under each of these themes, there are sub-themes to further present findings from the specific questions asked in the interviews. The researcher presents findings from both categories of participants indicating the views of librarians as (Librarian interviewee #1-6) and views of IT staff as (IT interviewee #1-2). The presentation and discussion of key findings from the study follow below.

4.2 Description of research participants

This section describes the participants that took part in the study, providing clarity on their characteristics, positions in the library, the different sections and college libraries where they currently work, and their periods of service in the library. As already specified in section 4.1 above, there were eight participants of which six were librarians and two IT staff from Makerere University Library. In describing the participants, this section is further divided into two sub-sections, namely: participants' response rate and the characteristics of participants as seen below.

4.2.1 Participants' response rate

Response rate is the percentage or amount of all research participants that respond and take part in an interview, answering a questionnaire or survey for a study as anticipated by the researcher. In this study, a total of 10 participants were expected to take part in interviews conducted by the researcher to collect research data, therefore, emails with the interview guides attached were sent out to all 10 participants prior to the interviews, of which eight were librarians and two were IT staff at Makerere University library. Six of the librarians responded and participated in the interviews while all two of the IT staff responded and took part in the interviews. This means that there was an 80% response rate to the study.

4.2.2 Characteristics of participants

The first section of the interview guide which was section A, requested for the demographic details of the participants that took part in the research in order to clearly understand who they are and what they do. Findings regarding the characteristics of participants are presented and discussed as follows:

4.2.2.1 Section or college library of operation

The participants from Makerere University Library were requested to give information regarding the section or college library of operation in order for the researcher to understand where the

participants work in the library. From participants' responses, librarians that were selected to participate in the study, three work within the main library's sections while three are stationed in college libraries outside of the main library. The sections where the participants work include: Technical services, reference and circulation, and digitisation, while the college libraries include: College of Humanities and Social Sciences (CHUSS) Library, College of Health Sciences (CHS) Library, and College of Business and Management Sciences (CoBAMS) Library. Librarians in the above sections and college libraries were purposively chosen by the researcher (who also works at the library) due to their vast experience and knowledge accumulated while working in Maklib and also, their experience in participating in KM activities in the library. For the IT staff, the findings revealed that both participants selected were working in the library IT department which is located in the main library, but both offer IT support to the entire library including the college libraries.

It can, therefore, be noted that, Makerere University Library has got various sections and college libraries that can benefit from the design and implementation of a knowledge management system to support knowledge management processes such as creation, sharing and application of knowledge across all the sections and college libraries.

4.2.2.2 Position of participants within the library

The participants were also asked to state their position in the library and it was revealed that, from the six librarians chosen for the study, three were in the 'Librarian II' position and three in the 'Librarian I' position. According to the Makerere University Library Strategic Plan (2014:21), positions in the library are given according to an individual's education qualification. For instance, the Librarian II position comprises of staff with a Bachelor's degree while the Librarian I position is for staff with a Master's degree. For the IT staff selected for the study, it was revealed that one is in the position of 'systems administrator' who also works as head of the IT section, while the other is in the position of ICT technician for Makerere University Library. According to the Makerere University Library Strategic Plan (2014:23), the person in the position of systems administrator possesses a Master's degree in Computer Science or any ICT related field while the ICT technician position is for staff with a Diploma in Computer Science or any IT related field. The ICT technician works under the supervision of the head of the IT department (Makerere University Library, 2014:23).

The purpose for asking the question about the position of participants was to discover if the participants for both categories were in the best position to understanding the questions asked in relation to the design and implementation of knowledge management systems in academic libraries and, therefore, give valuable responses relevant to the study.

4.2.2.3 Kind of work performed at the mentioned position

After looking at the sections and college libraries where participants worked within the library and their positions, the study sought to further understand what the participants really did in their job positions. The reason for requesting the participants to elaborate on the work they do in the library was to get a clear picture of the duties they perform in the library and understand the kind of knowledge they may need to effectively perform these duties as well the knowledge they can generate and share in the library.

Findings revealed that participants working as librarians had some similar work duties and some different ones depending on the section or college library where they work. Participants in the Librarian I position stated several kinds of duties that they perform such as: processing information materials in accordance to set standards to facilitate accessibility to users; participate in reference work; take part in user training; maintain the Online Public Access Catalog (OPAC); library project management; staff supervision; carry out research and maintaining library local databases through the digitisation of library materials; and, cleaning, editing and uploading records into the university institutional repository. Findings further showed that participants at the Librarian II position had similar work duties as those at the Librarian I position except that they also work on the circulation of library materials and answering user queries at the information desk and also online through the 'Ask a librarian' chat window, e-mail and social media platforms such as Facebook.

For participants working as IT staff, the study revealed that, the position of systems administrator is responsible for providing, installing, configuring and maintaining library systems hardware and software, as well as related infrastructure; and, making sure that all library operating systems, software and hardware adheres to the values of the library and those of Makerere University. This position is also responsible for keeping track of trends, developments and innovations in IT infrastructure in order to make recommendations for future upgrades (Makerere University Library, 2014). The findings also reveal that the ICT Technician position provides IT support throughout the library's sections and college libraries; carry out repairs that are minor; install new

software and upgrade applications that already exist in the library; respond to IT queries face-to-face, via e-mail, over the phone; and getting feedback from staff and users on the usage of library IT infrastructure and facilities.

From these findings, it is clear that while participants working as librarians have some similar duties and responsibilities, there is a clear distinction between duties performed by librarians and IT staff. It can also be observed from the above findings that IT staff support librarians in using IT to do their work in the library.

4.2.2.4 Period of service

Participants were asked for the period they have served in the library, this was relevant as the researcher believed that responses to this question would help to know the years of experience of participants which would also influence the trustworthiness and reliability of the responses they give in the interviews. From the findings it was revealed that, for the librarians that participated in the study, one had worked in the library for fifteen years, one for thirteen years, two had worked in the library for nine years, and two for seven years. Findings from the study also showed that one of the IT staff had been working in the library for a period of five years while the other participant had worked in the IT department for four years. For the IT staff this may imply that, over the years, the library has had some of its staff in the IT section leaving the library leading to the loss of valuable knowledge since the present staff have four and five years of work experience compared to the librarians whose work experience ranges from seven to fifteen years.

In comparing the above findings for the librarians and IT staff's periods of service, the researcher can conclude that, librarians have longer periods of working in Maklib than the IT staff.

4.3 Understanding of knowledge and knowledge management

For the library to design and implement a KMS, library staff must clearly understand the two concepts of knowledge and knowledge management. The study, therefore, investigated library staff's understanding of the knowledge and knowledge management concepts for both the librarians and IT staff. Section B of the interview guide comprised of a set of questions geared towards understanding if staff in the library know what knowledge and KM are and what meaning they ascribe to the two concepts, and also if they can identify the different knowledge resources in the library and the format they are in and also describe the different knowledge management

processes that take place in the library. This section is linked to the first research sub-question of the study which is: What is library staff's understanding of knowledge and knowledge management and the questions asked in the interview guide were focused on answering this research sub-question. Findings in this section are, therefore, presented and discussed in sub-themes as seen below:

4.3.1 Understanding of knowledge

In order to find out the understanding of knowledge by both librarians and IT staff in Makerere University Library, participants were asked for their idea of knowledge and how they can define knowledge, this is because so many times people think knowledge is information and that knowledge management is information management. From the interviews held for both librarians and IT staff at Maklib, it was discovered that, both categories had an idea of what knowledge is, although when asked to define knowledge all interviewees in the librarian category and one from the IT staff category appropriately defined it, only one participant in the IT staff category had a vague definition of what knowledge is. These findings are showed in the participants' responses below:

"Knowledge is what is contained in a person's head and is revealed in skill to operate in certain conditions [sic]. It can be acquired through training, education or experience" (Librarian interviewee #1)

"I would define knowledge as experiences gained from activities being continuously carried out and through interacting with people of various professional and informal backgrounds" (Librarian interviewee #3)

"Knowledge are the skills gained due to experience and being aware of what I do and how to do it" (IT interviewee #2)

From the definitions of knowledge, it can be said that library staff understand knowledge as skills, experience, familiarity, awareness and useful information gained through education, training, experience and interacting with people. Since one of the participants in the library IT staff category provided a vague definition of what knowledge is, it means that the library needs to put in efforts in training staff, organising conferences and workshops to teach and demonstrate what the knowledge concept is and what it is all about. This is because

understanding of the knowledge concept among library staff is a key foundation for the implementation of a KMS in the library.

4.3.1.1 Library knowledge resources

For the library to design a suitable KMS library staff must have a say in the process and their understanding and ability to identify some of the different knowledge resources in the library and the format these resources are in is essential. Also, the identification of the knowledge resources in the library is important to understand what knowledge is crucial to the library that can be captured by the proposed system and shared among library staff. Both librarians and IT staff were asked to identify some of the knowledge resources available in the library and findings showed that all participants were able to identify at least two library knowledge resources some of which include: reports, policy documents, manuscripts, human resources, minutes of meetings, memos, PowerPoint presentations, online databases, best practices and lessons learned, manuals, books and statistics. IT staff specifically pointed out manuals from vendors as a very important knowledge resource in doing their work. In regard to the format of the knowledge resources, it was revealed that these resources are in various formats such as: electronic, physical files and knowledge held in people's heads. Some of these resources as identified by the participants are shown in the following responses:

"Minutes of various professional and welfare meetings presented in paper format and kept in physical files" (Librarian interviewee #6)

"Reports on different library activities, systems and projects, library annual reports and staff handover reports for those transferred to other sections and those leaving the library" (Librarian interviewee #3)

"Library and university policy documents available in textual format and stored as electronic pdf, posted on the library website and also printed and kept in hard copy format" (IT interviewee #1)

"Human resources in the library or the various staff categories in the library hold massive knowledge especially the tacit knowledge" (IT interviewee #2)

4.3.1.2 Importance of knowledge

A question was asked in the interviews regarding the importance of knowledge to the participants as well as to their particular job positions. From the findings, it was revealed that

participants in both the librarians and IT staff categories find knowledge as important to them and to their positions in the library. The responses range from knowledge being important for decision-making, problem-solving, training others, innovation in library services and their delivery, learning from past experiences, quick response to library users' queries and efficient and effective library service delivery. These findings are demonstrated in the following participants' responses:

"With knowledge, user needs can effectively be met especially those related to research and also with knowledge there can be improved service delivery to users" (Librarian interviewee #4)

"There is efficiency in library services as the possession of knowledge about a particular activity results in high-quality output. For example, knowledge of cataloguing standards results in entry of high-quality bibliographic records into the production database of the library system" (Librarian interviewee #3)

"Innovation is paramount in the ICT world, things keep changing every other day, therefore, knowledge is required to keep up" (IT interviewee #2)

From the above findings, the importance of knowledge cuts across the different categories of staff in the library. These findings are relevant to the study because in the design and implementation of knowledge management systems in academic libraries the importance of knowledge to the individuals and to the library is considered as well and contributes to the effective use of the system when implemented.

4.3.2 Knowledge management and knowledge management processes in the library

Participants in the study were then asked about what they think when they hear the term knowledge management and what it entails. They were also further asked to identify the knowledge management processes that take place in the library. Findings from the study reveal that both librarians and IT staff understand what knowledge management is and what it involves. This can be attributed to the support that staff in the library receives from library management to attend short courses and study Masters' degrees that teach and train in knowledge management. Participants demonstrated their understanding of the knowledge management concept in some of their responses below:

"Knowledge management is a subject or practice concerned with identifying, managing and sharing the intellectual assets of an organisation. It involves identifying sources of knowledge within and without the organisation, storing, maintaining and sharing the knowledge with others" (Librarian interviewee #5)

"From the onset, I think KM refers to how a person or an organisation handles knowledge from the moment it is created to when it is passed on to other individuals. KM entails the creation, acquisition, sharing and application of knowledge" (Librarian interviewee #4)

"KM involves the creation and development of knowledge repositories and building of IT solutions to manage knowledge assets and improve knowledge access and transfer" (IT interviewee #1)

From the findings above, it can be noted that librarians understand knowledge management in terms of practices that involve identifying, creating, acquiring, storing, sharing and applying knowledge. IT staff, on the other hand, look at knowledge management from a technological viewpoint, where repositories are developed to effectively manage knowledge.

Participants in the study were also requested to identify the KM processes that take place in the library. From the responses in the interviews, participants mentioned knowledge creation, acquisition, storage and sharing as the key processes of KM that take place in Makerere University Library. However, two participants also responded that knowledge application is also practised in the library. These processes as identified by participants in both categories are presented and discussed below:

Knowledge creation: In Maklib, participants identified knowledge creation as one of the processes that takes place in the library and according to the findings, knowledge is created through activities such as: education (when library staff go for further studies), write conference papers, interacting with colleagues in meetings, working on library routines and projects with others. Some participants revealed that knowledge is created when posts are made on social media and also on the library website.

Knowledge acquisition: Participants also revealed that the library acquires knowledge through training and recruitment of staff.

Knowledge storage: Knowledge that is created needs to be stored. Findings revealed that in Maklib, knowledge is captured and stored in library documents such as: reports, policies, minutes and, also in databases and library systems.

Knowledge sharing: Librarians identified means through which knowledge is shared in the library such as: mentoring, training, teamwork, verbal conversations, workshops, group chats and email. It was also revealed that during strategic planning knowledge is shared.

Knowledge application: It is important that knowledge that is created is applied to various situations in an organisation. Findings showed that one librarian and one IT staff identified the use of knowledge as a KM process that takes place in the library. For instance, a librarian states that:

"Library staff use knowledge while cataloguing and classifying information materials, carrying out reference services, circulation and while also while training library users" (Librarian interviewee #6)

4.3.3 Strategies for proper knowledge management in the library

According to the findings, the library has in place several strategies to ensure proper management of knowledge. Participants in both categories were asked which strategies are in place to ensure proper management of knowledge. IT staff were particularly asked to give IT strategies. Findings on this question are described as below:

From the librarians' point of view, the findings reveal that the library has employed the following strategies to ensure proper knowledge management:

- Knowledge capturing and storage in the institutional repository.
- The library has put in place dissemination seminars for staff to share knowledge.
- Library management emphasises the making of reports from heads of sections and college librarians, quarterly and at the end of the year. Also, those transferred from one section to another are required to make a handover report as well as staff leaving the library. This is done to promote the practice of retaining knowledge.
- Training of staff to transfer knowledge, for instance, senior librarians training staff at lower levels.

- Job rotation for library staff from one section to another or from a section in the main library to a college library and vice versa to transfer knowledge and help individuals learn from new challenges and also spread best practices across the library.
- Efforts have been put into developing policies to guide the creation, sharing, storage and use of knowledge namely: the IR, social media and copyright and access policies.

Participants in the IT staff category gave the following IT strategies:

- Creation of a virtual environment in the library where staff can collaborate to create and share knowledge.
- Implementation of systems such as the institutional repository and the integrated library system to capture and store knowledge.
- Established communication channel through the university email system to facilitate the sharing knowledge.

Findings to the question on strategies were meant to find out if Makerere University Library has made any strides towards ensuring that there is proper management of knowledge and to also demonstrate the library's commitment to KM.

4.4 IT Tools and techniques used for KM in the library

This section presents and discusses findings in line with the second sub-question regarding the technological infrastructure at Makerere University Library, which includes the information technologies available and IT tools and techniques currently used in the Library for KM activities. Participants in both categories were asked to, first of all, identify the information technologies currently available and used in Maklib, and then asked to describe the IT tools they are using for KM as well as provide other techniques used for KM whether formally or informally, and then state the challenges they are facing in participating in KM and give suggestions to address the challenges. Findings are presented and discussed as below:

4.4.1 Information technologies at Makerere University Library

Interviews carried out for both librarians and IT staff members at Maklib as well as data gathered through the document content analysis method of the library's IT section's report and annual section reports from other sections and college libraries of 2015 revealed that, there are several information technologies and IT systems available in the library that are used in performing

various activities. These can be categorised as: hardware, software, library networks and other technologies that did not fall into the three categories and findings are further discussed below:

Hardware

Makerere University Library in its endeavours to fully automate all library functions, has put in place various hardware to be used for various activities in the library. Hardware can be described as the key tangible components of a computer system. Findings revealed that hardware used in the library include: desktop computers, laptops, keyboards, monitors, mouse devices, printers, scanners, digital cameras, projectors, barcode readers, hard disk drives and flash drives. Hardware like scanners and digital cameras are mostly used in the digitisation section of the library as revealed by the participant from that section. Findings also revealed that, library management endeavours to equip all the library sections and college libraries with the necessary equipment, but according to some reports reviewed equipment was not in good condition and needed to be repaired or replaced. One college library report indicated that their hardware had been stolen. These findings show that as much as the library is trying to equip the library with hardware, there is a need to put in more efforts and financial resources to procure the needed hardware and also put in place measures to ensure the security of the hardware.

Software

According to the findings, it was revealed that, several software applications are used in the library. These are further explained as follows:

Integrated Library System – Virtua: The software was acquired by Makerere University Library in the year 2003. The Virtua system was procured from Visionary Technology in Library Solutions Inc (VTLS) the software vendors and the library became the first in Sub-Saharan Africa to implement the system (Maklib, 2013:11). The modules supported by the system that have been fully implemented in Makerere University Library include: Cataloguing of library materials; Online Public Access Catalog (OPAC) which is used by library users to search for information materials across the different sections and college libraries; serial control used for the management of periodical publications; an acquisition module used to manage the acquisition of library materials and resources; circulation used to check out and check in information materials; and the archival module used to manage the library's archival collections. The data on this system was obtained from the interviews as well as from reviewing the Makerere University Library's Strategic Plan (2014:14).

DSpace software: Findings from the study show that, this software is used in the library for the Makerere Institutional Repository (MakIR). DSpace is open source software used to build open access repositories and was acquired by the library in 2005 in order to collect the scholarly output of staff and students of Makerere University. The repository collects scholarly output which includes: conference papers, technical reports, working papers, books, articles, e-theses and dissertations and digital library collections (MakIR, 2016:Online). Findings reveal that the digitisation section is in charge of the repository but library staff in college libraries are required to collect and archive scholarly output of their specific colleges.

Operating systems: The Library uses operating systems (OS) for example Windows OS and Linux OS on computers in the library. The Windows OS is widely used in the library and findings revealed that most computers in the library are running on three versions of Window OS which include: Windows 7, 8 and 10. The Linux OS is used to install and run the DSpace software on the Ubuntu server for the Makerere University Institutional Repository.

Application software: Findings also revealed that application software such as: Microsoft Office versions 2007 and 2010 are used in the library. With the advancement in technologies in the library, librarians and IT staff also revealed that they were using cloud services and storage technologies, for example, Google Drive which performs some similar functions to the application software like Microsoft Office.

Library networks

Responses from the interviews carried out for librarians and IT staff in the library and also data gathered from document content analysis revealed that, in order for the library to connect to the Internet, there are several networks on which the library operates, namely: the University Wide Area Network (UWAN) which is run by the Makerere University unit in charge of IT, that is the Directorate of Information and Communications Technology (DICTS) (ICT policy, 2016:10). Findings revealed that the library also operates Local Area Networks (LANs) to enable library IT operations and services. Besides the UWAN and the LANs, the library also has several wireless networks (Wi-Fi) hotspots for library staff and users. Findings showed that, these are the networks used in the library to enable Internet connectivity in all sections and college libraries.

Other information technologies revealed in findings include: online databases such as the Database for African Thesis and Dissertations (DATAD) used to manage dissertations in Africa of which Makerere University Library makes contributions to the database. Social networking

sites such as Facebook, blogs, twitter and Google Plus were also revealed in findings as information technologies used in the library. The library also had recently implemented a discovery tool called LibHub used for easy online information searching and retrieval across the various systems and databases in the library. The use of electronic mail to communicate with colleagues and users was also mentioned in the findings as part of the information technologies used in the library. Lastly, the library website was also mentioned by participants from the library IT section as IT used to communicate with users, direct users to important links and information and post important announcements regarding library services.

As mentioned in sub-section *2.3.2 Components of knowledge management systems* technology is a key component of knowledge management systems and a KMS cannot be implemented without a well-established technological infrastructure. Also, various authors as seen in sub-section *2.6.2 Factors for successful KMS implementation* have established that available IT in an organisation plays a major role in supporting KMS implementation. From the findings above, it can be concluded that Makerere University Library has several information technologies in the form of hardware, software and networks that make up the library's technological infrastructure. This question was put forward in this study, to find out the current state of Makerere University Library regarding information technologies that are currently in place and can support the implementation of a KMS.

4.4.2 IT tools, systems and techniques used for KM activities

The study also looked into the IT tools, systems and techniques currently used in the library. Participants were asked to identify IT tools and systems as well other techniques used in creating, sharing, storing and applying knowledge in Makerere University Library. Participants in both the librarian and IT staff categories gave responses that were similar and findings are presented and discussed below:

4.4.2.1 IT tools used for KM activities

Social media sites: When asked which tools they used for KM activities in the library, all participants revealed that they used at least one or two social media tools or sites to create and share knowledge with colleagues across the library. Several social media sites were mentioned, namely: Facebook, Google+, Blogs, LinkedIn and Twitter. Findings also showed that, the use of

these tools is done informally as staff still await the approval of the social media policy to guide them on using social networking tools and sites.

Library website: The library website was also revealed by participants as an important tool, for instance, participants in the IT staff category noted that they used the library website to share and communicate with staff and users.

Dropbox and Google drive: Interviews conducted for both categories of staff showed that, library staff are using cloud services and storage such as Dropbox to share and store knowledge and also Google drive to create, store and share knowledge as well as collaborate on creating knowledge in teams.

Instant messaging: Tools like Google hangout and WhatsApp were also mentioned as part of the tools used by some participants to share timely knowledge and receive feedback on certain issues in the library.

Electronic mail through the university intranet: The library listserv was pointed out as a tool used in sharing knowledge with all staff in the library that are subscribed to the listserv. Findings also revealed that librarians use email to communicate with colleagues across the sections and college libraries on various issues.

4.4.2.2 IT systems used for KM activities

Among the IT systems in Makerere University Library, participants that were interviewed revealed that there are two systems that are used in KM activities in the library.

Makerere Institutional Repository (MakIR): The institutional repository as described above under sub-section *4.4.1 Information technologies at Makerere University Library* Is used to capture and store knowledge from individuals in the university. Findings from the study revealed that, MakIR is used by library staff to self-archive their knowledge found in conference papers, reports and e-theses. According to the findings, the repository is also used to search and retrieve knowledge as required by an individual.

Virtua Integrated Library System (Virtua – ILS): Findings from the interviews conducted revealed that librarians used the Virtua-ILS to capture, search and retrieve bibliographical details of knowledge resources. It was revealed that the OPAC which is part of the modules of the Virtua-ILS is an important tool to search for available knowledge resources in the library.

4.4.2.3 Techniques used in KM

From the interviews conducted, it was revealed that apart from the IT tools and systems used by staff in Makerere University Library, there are various techniques used for knowledge management activities. Techniques revealed in the findings include the following:

- Meetings, conferences, seminars and workshops.
- Report writing.
- Communities of practice: for example communities for cataloguers and trainers.
- Training and supervision of staff.
- Mentoring and coaching new staff.
- Research – library staff carry out research on library services and publish findings in books and journals, and also present at conferences.
- Collaboration and teamwork – Library staff collaborate on projects and in research.
- Other techniques include: group discussion and conversations where knowledge is shared.

The purpose of identifying the above techniques was to find other means used for KM that can be supported by the KMS.

4.4.3 Challenges faced in using the tools and techniques for KM

Both librarians and IT staff were asked to state the challenges they faced in using the above-mentioned tools and techniques and their responses are discussed below:

Time constraints: Participants pointed out that they did not have enough time to use the available tools to create and share knowledge. Participants in the IT staff category particularly revealed that sometimes they have busy schedules and this does not allow them to use the tools appropriately and regularly.

Limited training: It was also revealed that the training offered by the library in using information technologies for KM is not enough. This was revealed by participants in the librarian category who also pointed out that, the fact that, the training is limited, they only have the basic skills and lack enough skills to effectively use the tools.

Inadequate infrastructure and resources: Findings showed that, there is a challenge in having technological infrastructure that is not enough and is not up-to-date. Participants revealed that,

some of their computers did not have up-to-date software which hinders their use of certain tools for KM.

Lack of interest from colleagues: Some participants revealed that not all colleagues in the library are interested in sharing their knowledge using the available tools and in some instances sharing may be one sided where some staff share their knowledge and those they share with are reluctant to share. This may be attributed to the lack of a well-developed knowledge sharing culture in the library.

Different tools used by different people: It was also revealed that, there is a challenge in using a particular tool, while others are using different tools in the library to create and share knowledge, which means there is no coordination in which tools library staff should use for KM activities.

Hard to retrieve knowledge: One participant noted that with the so many tools used in the library, it is hard to locate and retrieve some knowledge resources that may be stored in any of the tools and that it takes a lot of time for an individual to search for the knowledge. Another participant mentioned that, knowledge that is kept in physical files is also hard to retrieve sometimes.

Lack of incentives and rewards: Several participants also revealed that, there is no motivation to use the tools. One participant noted that, there is no recognition for those who share their knowledge using the tools.

Limited awareness: It was also revealed that there is limited awareness among staff about using the available tools for KM, sensitisation of the importance of knowledge and the benefits of participating in KM activities is also limited and not done regularly.

Lack of clear policies and guidelines: It was also revealed that the library does not clear policies and guidelines to guide all staff in the use of the tools for KM.

The reason for asking about the challenges faced in using the tools and techniques in KM was to identify those challenges that the library staff are currently facing, that may also hinder the design and implementation of the KMS.

4.4.4 Addressing the above-identified challenges

Librarians and IT staff were asked to provide suggestions as to what they thought can be done to address the challenges faced in using the IT tools, systems and techniques. This is because the library must address these challenges in order to ensure that the implementation of a KMS is successful. Responses provided by participants that were interviewed included the following suggestions:

- **Allocation of time:** It was suggested that, the library needs to allocate time for staff to use the tools to create, share and use knowledge.
- **Create awareness and sensitisation** of library staff on the importance of knowledge so that they gain interest in using the tools to create and share knowledge.
- **Unified platform:** It was suggested that, the library should think of having a platform to facilitate the sharing of knowledge across the different sections and college libraries. Another participant suggested that, the library needs to establish a database for the entire library to facilitate the capturing and sharing of knowledge across all the sections and college libraries of the library instead of staff using the different tools.
- **Procure new equipment**: It was also suggested that, the library IT budget should be enhanced to cover the procurement of the necessary new and up-to-date equipment to facilitate KM activities in the library.
- **Motivation:** Participants also suggested that incentives and rewards should be put in place to encourage staff to participate in KM activities.
- **Training of staff** in the use of technology should be done frequently and adequately so as to impart adequate skills for library staff to use the tools to share knowledge.
- **Policies and guidelines:** Findings revealed that the library needs to create a KM policy and lobby for the fast approval of the pending policies that are currently in a draft format that can guide library staff in the use of the tools for KM.

4.5 Factors to consider in designing and implementing a KMS for the library

The focus of this section in the interviews was to, first of all, ascertain the meaning that librarians and IT staff in Makerere University Library ascribe to the term 'knowledge management system' and if they support the idea of the library designing and implementing a formal KMS. The section also further seeks to get an overview of suggestions from both categories of staff regarding the factors they think would influence the design and implementation of a KMS, in order to get the

critical success factors for designing and implementing a KMS in Makerere University Library. Relevant documents were also reviewed to find vital data for this section. The findings are, therefore, presented and discussed below:

4.5.1 Understanding of knowledge management systems

Librarians and IT staff were asked what they understood by the term knowledge management system and from the findings, it was revealed that, the term has several meanings ascribed to it that range from being an IT system, computer system, a platform, a tool to being a set of tools used in knowledge management practices or used to effectively manage knowledge. Some of the responses from participants are sampled below:

"KMS is a platform that facilitates creation, sharing and use of knowledge throughout the whole organisation or library" (Librarian interviewee #4)

"Knowledge management system is an IT system that is used for creating, storing, locating, maintaining, retrieving and sharing knowledge sources and is also used by groups for collaboration" (IT interviewee #1)

When asked if they think the library should design and implement a KMS and why or why not, all participants in both categories answered with a YES. This means that, staff in the library recognise the need for the library to have a KMS. The reasons given for why they think the library should have a KMS are shown in the responses below:

"The system would make knowledge management easier but awareness to library staff is first and foremost important regarding the key concepts in knowledge management for the library to fully benefit from the system" (Librarian interviewee #1)

"The library is the centre of knowledge creation and sharing (sic) in Makerere University and as such, requires such a system to effectively manage the available knowledge and also capture and create new knowledge" (Librarian interviewee #3)

"This is to help the library manage its knowledge well and create an avenue for easy access, sharing, creation and maintaining library knowledge" (IT interviewee #2)

"This will quicken the KM processes and their establishment. It will also be easy for the library to acquire all existing knowledge in accord with the legal deposit act" (Librarian interviewee #4)

4.5.2 Factors that may influence the design of a KMS for the library

It can be said that a KMS is successful when it performs well all the functions for which it was designed to do, which may include facilitating creation, storage, sharing and application of knowledge. In the design of a KMS, there are factors that influence the design that the library should consider in order to implement a KMS that will effectively be used by library staff. Participants were asked to suggest factors that they think would influence the design of the library's KMS and according to the findings, the following factors were put forwards by both the librarians and IT staff of Makerere University Library.

KMS objectives: The objectives of the KMS to be implemented will determine the design acquired by an organisation. Participants mentioned that the purpose for which the KMS is intended will determine the design of the KMS.

Existing challenges: One participant pointed out that the challenges currently facing the library in managing knowledge will also influence the design of the KMS.

User interface: a KMS' user interface will also determine the system adopted by the library. Responses from participants revealed that an interface that is simple to navigate even for novice users and is user-friendly is preferred by library staff.

Available resources: Available resources in the library namely: human resource, financial and IT. The library can decide on which KMS to implement depending on the human resource present and their skills to use the system to contribute towards knowledge, the library can also look at the financial status and the budget specifically to ascertain if it can use freely available tools or go for systems that are available for purchase. For the library, a member suggested that the system should be low-cost using freely available and inexpensive technological components due to the current financial status of the library.

KMS requirements: It is important that the library carries out a needs analysis before concluding on which KMS to be implemented. Both library staff's requirements and those of the library will determine the KMS design. Participants expressed their view on this matter by indicating that, the needs of library staff determine what kind of system the library should implement. From the IT staff's point of view, technical requirements such as a network, equipment like a server and staff to provide technical support were pointed out as important technical requirements.

KMS features: The features of the KMS should also be considered in designing of a library's KMS. Participants were asked to suggest features that they think the KMS should have and from their responses these include: download, print, easy searching and retrieval, quick capturing of knowledge, edit, collaborative creation and editing, Q and A support, sharing, online discussion and mobile access features. One of the responses from participants is shown as below:

"The KMS should have features to enable access using mobile devices like smart phones" (Librarian interviewee #3)

Capabilities of the system: what the system can do is an important factor that influences the design of a suitable system. Participants revealed some examples of what capabilities they would like the system to have, these include: communication, collaboration, communities of practice, document management and data migration capabilities.

Security: Security of content is an important factor to consider in designing a KMS. Both participants in the IT staff category pointed out that security of their contributions is important, therefore, security should be guaranteed with access controls such as passwords.

Other factors mentioned in the interview that can influence the design of a KMS include factors such as: the size of the library, the number of staff that can use the system, the quantity of knowledge in the library to be captured and in what format and how the system can be linked with available systems and tools used in the library to allow easy access and retrieval of the knowledge resources.

4.5.3 Factors that may influence the implementation of KMS in the library

To guide the successful implementation of a KMS, there are critical success factors that need to be considered. In the study, research participants in both categories were asked to suggest some of the factors they thought would influence the implementation of a KMS in the library and according to the findings some of the factors relate to those mentioned in the literature reviewed in sub-section *2.6.2 Factors for successful knowledge management systems implementation,* while others were pointed out by the participants as key influential factors for implementing a KMS in the library. The responses from the interviews of both categories of participants were similar and these are presented and discussed as follows:

Library mission and vision: As already noted in section *1.2 Background to the study*, the library's mission is "To meet the study, teaching, research and outreach information needs for sustainable development" and the vision is to be "a centre of excellence in the provision of library and information services in Africa." The library's mission and vision influence the implementation of a KMS according to some participants. The findings from the interviews revealed that participants mentioned the strategic direction of the library as a key factor that would influence the implementation of the system. This means that, the agenda of the KMS should be in line with what the library is trying to achieve otherwise the purpose for which it is implemented will fail.

Support from university and library management: In the implementation of any program, service or project in any organisation, the success of that program, service or project will depend on the support of top leadership or management. In the same way, the implementation of a KMS in the library will be influenced by the level of library management support and commitment. Findings from the study showed that another factor that would influence the implementation of a KMS would be the support from library management and also from the top university management which would ensure that the implementation of the system is done in an effective manner. Findings revealed that, support from library management also includes support and commitment towards the provision of the needed resources and budget for the KMS implementation and sustainability. Continuous support and commitment from the library's top management and the provision of the necessary resources would positively influence the implementation of the KMS. This is reflected in the response below from an IT staff member at the library.

"From my experience with implementation of systems in the library, library management's backing is very vital and without it, there is no use of thinking of implementing the system, this is because library management approves budgets, lobbies for finances from university management and ensures sustainability of the system" (IT interviewee #2).

Library culture: A library culture that supports and encourages knowledge sharing enables a KMS to thrive in the library environment. A culture where people are respected, motivated, empowered, and feel a sense of belonging encourages them to use the system and engage in creating, sharing and using knowledge. Also, a library culture that is friendly, open and built on trust, collaboration and cooperation among staff across the entire library is important for the successful implementation of a KMS. It is also important to note that, a culture where staff are

given time to share and re-use knowledge influences the KMS positively. Participants pointed out key factors in relation to library culture such as having cooperative and courteous colleagues to share with knowledge as important for the successful use of the system in the library.

Policies and guidelines: Currently, the library does not have a formal knowledge management policy, but there are plans to develop one. Library policies that are in their draft stages that can influence the implementation of a KMS include: the library social media policy, the institutional repository (IR) policy, library ICT policy and the copyright and access policy. The university has got several policies and guidelines that would also influence the implementation of a KMS such as the University ICT policy, the University Human Resource manual of 2009, the University strategic plan and most importantly the Library strategic plan. A statement picked from the University's ICT policy 2016-2020 as seen below is one of those guidelines that can influence the KMS implementation in the library.

"The adoption and utilisation of Information and Communications Technologies (ICT) within the university is aligned with the university strategic plan……..all University Colleges, Departments, Units undertaking the development of any information system shall ensure compliance with this policy" (ICT policy, 2016:32)

Training programs: In the implementation of a KMS in any kind of organisation, it is important for individuals in that organisation to become deeply and completely familiar with key knowledge concepts which can be done through training. Participants in both categories pointed out the presence of programs to train all library staff as an essential factor that would positively influence the implementation of the KMS. One response from a participant in the IT staff category is shown below:

"…the amount of training given to all staff before the system is implemented, during and after it has been implemented will affect how staff welcome it and how they use it…." (IT interviewee #2).

Findings from the study revealed that, all participants suggested training as a key influential factor in implementing a KMS and contributes towards the success or failure of the implementation of a KMS.

Knowledge strategy: A clear and well-planned knowledge strategy drives the success of a KMS implementation process. This is because the strategy attaches more importance to the KMS that is to be implemented. It is also important to note that the strategy should be linked to

the library's business strategy and cover both tacit and explicit knowledge. In a response from one participant, it was revealed that, it is important for the library to have a knowledge strategy, this is revealed in the response below:

"….as much as I agree that the library needs to implement a formal KMS, presently the library does not have a clear and documented knowledge strategy on which to base on to implement the system [sic] …." (Librarian interviewee #2)

Skilled library staff: Skilled library staff to implement, operate, maintain and use the system is an important resource and a key factor that would influence the KMS implementation. Findings from the interviews revealed that most of the participants pointed out the importance of having staff members that are skilled in implementing, training and using technology as an important factor for KMS implementation and called for the library to recruit the right people and facilitate training for those present to be able to successfully implement the KMS.

"…the level of skills possessed by staff especially in using IT will most likely influence the implementation of the KMS" (IT interviewee #1)

Budget: In the implementation of a KMS a budget that is specifically for the KMS should be in place to enable the buying of the necessary technologies and training of staff to use the system, maintenance, marketing and promoting the system. Findings revealed that several participants indicated the presence of a budget with funds allocated towards KM and the implementation of a KMS as a factor that would positively influence the KMS implementation.

Rewards and incentives: As already noted in the challenges faced by library staff in using available tools for KM activities in sub-section *4.4.3 Challenges faced in using the tools and techniques for KM*, the lack of motivation discourages members to create, share and use knowledge using the available tools. Responses from participants also revealed that, the presence or absence of rewards and incentives will influence the implementation of a KMS. This is because it is important to motivate library staff to contribute towards the library's knowledge base and use the knowledge for the improvement of library services and operations. Findings from the study showed that the creation of incentives and rewards for individuals to take part in using the system for KM activities encourages members to create, share and use library knowledge.

Technological infrastructure: A well-developed technological infrastructure is essential for the implementation of a KMS as it facilitates and supports knowledge activities and processes, and also connects individuals to knowledge, therefore, to successfully implement the KMS, participants stated that, the necessary IT equipment, software and IT tools should be in place as these would influence the implementation of the system. Other parts of the infrastructure mentioned by participants specifically in the IT staff category include: bandwidth and Internet connectivity. This is reflected in the participant's response below:

"Fortunately the bandwidth of the university has been recently increased and the library can benefit from this initiative, which means the Internet is faster than it was previously…..in implementing a KMS, the library can benefit from it" (IT interviewee #2)

Still, regarding the technical infrastructure, one participant in the IT category revealed the importance of the KMS's ability to integrate and communicate well with other technologies in the library, this is shown in the response below:

"There are already existing systems and software applications in the library, and the ability of the KMS to integrate with these systems and applications is important and will influence the implementation of the KMS" (IT interviewee #1)

Technical support: The participants in the IT staff category were asked how they would help and support the library in the implementation of a KMS and their responses include:

- Offering technical support throughout the design and implementation of the system.
- Installing the necessary software and operating systems for the KMS to function as expected.
- Support in the maintenance of the system, the hardware and all other infrastructure.
- Training of library staff to utilise the system.

Library staff involvement and empowerment: People are an important component of a KMS, therefore, it is important that individuals in an organisation are fully empowered and involved in the implementation of a KMS from the time of initiation to the full implementation of the system. It is important to make sure that library staff are, first of all, empowered to take part in the implementation of a KMS. Also, library staff's involvement especially in choosing a suitable system through user requirements analysis, was also pointed out as a key factor to influence the implementation of a KMS for Makerere University Library.

4.6 Benefits and challenges of implementing a KMS for the library

This section looked at the participants' opinions on the perceived benefits of implementing a KMS for the library from their experience and also the challenges the library may face in implementing a KMS and how these challenges can be addressed to ensure that the library successfully implements and sustains the KMS. Relevant library documents were also reviewed to find relevant data for this section.

4.6.1 Benefits of implementing a KMS for the library

The identification of potential benefits to be realised with the implementation of a KMS in Makerere University Library is important. Participants in the librarian and IT staff categories were, therefore, asked to identify some of the potential benefits of the KMS that they think the library would realise with a KMS in place and each participant gave several responses. These benefits as identified by participants in the librarian and IT staff categories are presented and discussed as below:

Innovation in the library

According to the Makerere University Library Strategic Plan (2014:7), the library attaches great importance to innovation in order to encourage value addition behaviour among staff at all levels in the library. All participants agreed that, with a KMS in place to facilitate sharing of knowledge across the different sections and branch libraries, the library can improve in innovation and deliver innovative and exceptional services to library users. This is because a KMS eases access, sharing and use of knowledge which can support innovation in the library. One participant's response on KMS promoting innovation in the library is shown below:

"Since the library is trying to find ways to become more innovative and provide better services to patrons, the system can ease access to knowledge and enable library teams to work collaboratively to develop excellent services" (Librarian interviewee #5)

Problem-solving

As already discussed in sub-section *4.3.1 Understanding of knowledge*, knowledge is important to library staff because it supports them in problem-solving. One of the benefits identified by several participants of implementing a KMS was that of facilitating problem-solving and enabling the improvement in library staff's problem-solving skills and capabilities at all levels. The KMS can provide ready and easy access to knowledge which can be used in solving problems and

issues that may arise in the library. The library's goal is to improve library services and ensure that there is sufficient provision and utilisation of library services (Makerere University Library, 2014:9), and issues or problems are bound to arise along the way to achieving this goal. Participants pointed out that, the KMS would help improve their ability to solve library problems by provided ready and easy access to knowledge in the form of best practices and lesson learned.

Decision-making

Participants whose positions in the library necessitate them to make decisions in the sections or college libraries where they work, pointed out that a KMS would enable them to make well-informed decisions based on knowledge that can be accessed via the system. The response below from one participant shows how a KMS can support the making of decisions in the library.

"In the college library where am working I sometimes have to make crucial decisions, therefore with the system in the library I can use it to access available knowledge to make informed decisions in a faster and better way" (Librarian interviewee #2)

Communication and collaboration

Participants also noted that with a KMS in the library, there would be an effective flow of knowledge, improved communication and collaboration across library sections and college libraries among library staff at different positions. For those working in teams, responses revealed that, a KMS would enhance collaboration among staff working in teams and on various library projects. One librarian participant responded that:

"…..the system can enable wide and quick communication within and outside the library and allow team members to stay in touch and work together even when not in the same section" (Librarian interviewee #4)

Knowledge retention and transfer of knowledge

Over the years, there has been a number of staff members in the library working as librarians or in the IT section that retire or resign from their positions in the library. Participants pointed out that there is a need for the library to retain knowledge from librarians and IT staff that depart from the library and transfer of such knowledge to new staff, findings further show that, a KMS would help the library in retaining knowledge from retiring and resigning staff as is reflected in the response below:

"A KMS can enable the library to have some form of knowledge retention plan to retain knowledge from retiring and resigning staff" (Librarian interviewee #5)

Knowledge sharing

Findings from the study revealed that, another benefit of a KMS for the library can be improved knowledge sharing in the library which can lead to the development of a knowledge sharing culture in the library and also promote sharing of knowledge across all sections and college libraries. One participant responded that,

"….a KMS can enable easy and effective sharing of knowledge with colleagues in other sections…" (IT interviewee #2)

Improved staff performance and quality of services

Participants also indicated that, a KMS can facilitate improvement in library staff's performance and also enable improvement in the quality of services offered which leads to library user satisfaction. One response from a participant is showed below:

"….KMS will allow all librarians to follow certain standards as they will have the information readily available while working on [sic] their desks and this will ensure that there is uniformity in the library processes…." (Librarian interviewee #6)

Quick access to knowledge

It was also noted by participants that with a KMS, less time would be spent looking for knowledge and locating experts in activities like cataloguing, information literacy, digitisation, acquisition of library resources and reference services. The responses below from participants demonstrate the benefit of quick access to knowledge.

"….no need to move from my section to inquire of something in another section…..can inquire via the system and get response or search through the system to find knowledge I need regarding any issue...." (Librarian interviewee #2)

"….a KMS can simplify access to knowledge" (IT interviewee #3)

Improved knowledge capture

One participant in the librarian category revealed that, a KMS can facilitate the capturing of insights, experiences, best practices and lessons learned from all the sections and college

libraries of Makerere University Library and make these accessible for all. The response below shows findings on a KMS facilitating the capturing of knowledge.

"…..there is a challenge in capturing some of the experiences and best practices in other sections which may be useful to me or any other library staff…a KMS can enable the library to capture some of the tacit knowledge in the form of experiences, insights, thoughts and intuitions of staff and this can benefit the library" (Librarian interviewee #2)

Generation of new knowledge

Findings also revealed that a KMS would enable the generation of new knowledge in the library to add to existing knowledge base.

Other perceived benefits revealed by participants are:

- Facilitate continual learning in the library which leads to improvement.
- Leveraging experts in the library to attain better results.
- Quick response and feedback to key issues in the library.
- Development of professional and technological skills for librarians.
- Using the system to clarify on the library's business strategy and direction for staff that need clarity.
- More engagement and involvement of library staff in library activities.
- Promote coordination with other libraries.
- Creation of a society that is knowledge based in the library.
- Improved project management in the library.

From the above findings on the benefits of a KMS for Makerere University Library, it can be said that the perceived benefits of a KMS for the library are looked at in terms of improving knowledge sharing, supporting problem-solving and decision-making, improving quality of staff performance and services in the library and also enabling quick access to knowledge. The findings on KMS benefits for the library can be said to be consistent with some findings in previous studies as discussed in section *2.4.1 Importance and benefits of a KMS in organisations and academic libraries.*

4.6.2 Challenges in implementing a KMS for the library

Before the library implements a KMS, it is important to also identify the challenges that may negatively affect the successful implementation of the KMS so that thorough preparations are made to prevent problems associated with these challenges from occurring. Participants were asked to identify some of the challenges that the library must address in order to implement the KMS successfully and benefit from it. Responses from both librarians and IT staff are presented and discussed below:

Time constraints

The allocation of time to participate in KM activities is important for any organisation that would like to have a successful KMS implementation. A number of participants noted that the library currently does not provide them with time to participate in KM activities which may be a challenge when a KMS is implemented as library staff may not have time to create, share and apply knowledge using the system.

Resistance to change

In the implementation of any kind of system in an organisation, there is likely to be individuals that will not buy the idea. Participants in the study also pointed out resistance to change that comes with the implementation of the system by some members of staff as a challenge that the library may face, but this was attributed to the fact that some members may not know the benefits of using the system as reflected in the responses below:

"Resistance of members of staff in the library to change due to lack of awareness of what the KMS is all about" (Librarian interviewee #2)

"Acceptance of the change may be a challenge to the implementation of a KMS since some people do not want change and may resist the new system and not use it" (IT interviewee #2)

Lack of a budget and budget constraints

The lack of a specific budget for knowledge management to support the implementation of the KMS was also cited by several participants as a challenge that the library may face in implementing a KMS. One interviewee observed that, the library's budget has been cut several times over the past years and it may be a challenge for the library to cover some implementation costs. The fact is, the library will have to incur costs in implementing a KMS such as: purchase of equipment, acquisition of resources, training and motivating staff, and, therefore, a budget with sufficient financial resources is important. A participant's response on this issue is seen below:

"Inadequate financial support from library management in terms of budget and resources may be a challenge yet there is a need for full-time Internet connectivity, motivation of staff and purchase of the hardware and software" (IT interviewee #3).

Limited understanding of knowledge concepts: Participants also revealed, there may be a misunderstanding of knowledge concepts or library staff having a limited understanding of knowledge concepts which may be a challenge to the implementation of the KMS.

Limited expertise: Lack of enough skilled staff in the library in the use of technology and provision of technical support may be a challenge if the library does not recruit staff that is skilled in using IT and train present staff to impart skills to enable them to use the system to create and share knowledge. One participant in the IT category had this to say:

"The implementation of a KMS will require that IT staff in the library have enough technical skills to support the implementation of the system" (IT interviewee #1)

Policies and guidelines

The lack of clear policies and guidelines was also pointed out as a challenge that the library may face in implementing a KMS. The view of a participant on this issue is expressed in the response below:

"Absence of policies that are clear to support KM and unclear statements from the University ICT policy for implementing a KMS…" (Librarian interviewee #5)

Lack of rewards and incentives

The lack of incentives and rewards to motivate staff in KM can be a challenge to any organisations in its efforts to implement a KMS. Participants revealed that, since there is no rewards and incentives system to encourage library staff to participate in knowledge management activities by rewarding and recognising active users, it will be hard to get people to use the system to contribute their knowledge.

Security concerns

One participant stated that people will be afraid to share their knowledge via the system due to concerns regarding the security of their knowledge. In implementing a KMS it is important that library staff have confidence in the system.

Other challenges of implementing a KMS in the library as mentioned by participants include the following:

- Unwillingness of members to share their tacit knowledge.
- Getting staff to contribute in creating, sharing and using knowledge via the system.
- Intangible benefits of the system that may not be understood.

4.6.3 Suggestions to address the challenges above

Participants were asked to suggest solutions to the identified challenges above and their responses were as follows:

KMS budget

Participants in the study revealed that, though there are several technological solutions to implement a KMS, the library still needs a budget for the KMS. It was, therefore, suggested that, the library should develop a budget to purchase the necessary hardware, train staff in using technology and maintain Internet connectivity. One participant's response on the KMS budget is shown below:

"…..a separate budget should be developed to support KMS in activities like IT literacy training and purchase of hardware (IT interviewee #2)

This participant further suggested that,

"…..thorough search for best systems available should be done and with this, the library will avoid the wastage of resources on a system that would be abandoned a few years after it has been implemented due to financial constraints"

Another participant suggested that,

"Since the management of knowledge is important to the library, library management needs to set aside a budget for the purpose of supporting this initiative" (Librarian interviewee #1)

Still, on the issue of a budget for KMS, the Library's Strategic Plan states that one of the library's strengths is having staff with the ability to write grant winning proposals (Makerere University Library, 2014:7). One participant suggested that to address the challenge of lack of a separate budget the library can write proposals for funding. The response is reflected in the statement below:

"The library should write proposals for funding prior to the implementation of the KMS, so as to design and have a clear budget to support the KMS initiative" (Librarian interviewee #2)

Policies and guidelines

Participants suggested that, library management should push for the development of a comprehensive policy for KM in the library, to guide the implementation of the KMS. One participant noted that, policies that are in draft format need to be approved to support and guide the implementation of the KMS. Some of the responses from participants are shown below:

"….develop a library ICT policy and KM strategy that involves and covers development of a KMS" (IT interviewee #2)

"…..a KM policy should be designed for the library with clear guidelines" (Librarian interviewee #3)

"The library needs to ask for support from university management in order to pass the policies that are in draft form such as the institutional repository policy" (Librarian interviewee #6)

Appropriate change management

To address the challenge of resistance to change, two participants suggested the established of appropriate change management mechanisms such as: marketing and promoting the KMS to library staff and establishing communication channels to sensitise staff and make them aware of the KMS and its benefits. According to participants, the goal in doing this is to manage change and minimise resistance to the change caused by the KMS. One participant reported that,

"Communication of what the system is about and its benefits would enable the library limit resistance to the newly implemented KMS" (Librarian interviewee #3)

On creating awareness among staff, participants indicated that, the library needs to create awareness among staff about knowledge management and the importance of using the system to share and use knowledge across the library. The responses from participants on creating awareness are shown below:

"There is a need for sensitisation among library management and staff so that they can own the KMS" (IT interviewee #2)

"Massive KM awareness campaigns in the library before implementing the KMS should be done" (Librarian interviewee #3)

"Library management should create awareness about the concepts in knowledge management to all library staff and also enlighten staff on the benefits of creating, sharing and using knowledge" (Librarian interviewee #4)

Management support

Participants suggested that, support from library management is important for the implementation of the KMS, therefore, library management should champion the implementation by providing the necessary resources and encouraging library staff to participant in sharing knowledge which creates a favourable environment for the KMS to thrive. It was also suggested that, library management can ask for support from the university management to increase the library budget to facilitate KM initiatives in the library. On the challenge of limited time to share knowledge, one participant suggested that,

"Library management needs to think about allocating time for staff to participate in knowledge management activities, then they can be able to use the system" (Librarian interviewee #4)

Training and education

It was suggested that, advanced training in the use of technology and how to use the system to create, share and use the knowledge should be done regularly. Staff in the IT department pointed out the need for more training in designing and implementing the system in the library so as to gain skills to use the system and be able to provide the needed technical support throughout the library. One participant in the librarian category also suggested that, library staff should be encouraged to continue their education and gain more knowledge and understanding of key knowledge concepts. It was also suggested that, the library should facilitate further studies and training for its staff to gain more skills and knowledge.

Involve all staff

It is important that the library engages with all staff at the different positions in the library. The involvement of all staff in the implementation process was suggested as important to create awareness and improve on the willingness of library staff to contribute to knowledge using the KMS. One participant gives the response below in support of the suggestion to involve all staff from the beginning when the system is being designed

"In the initial stages of designing the system, all stakeholders should be involved, these include: library management and all library staff" (Librarian interviewee #2)

Technological infrastructure

In the implementation of a KMS, suitable technology should be in place to support the initiative. This is because the KMS must be established in an environment where the infrastructure is well built. Participant revealed that information technologies such as: hardware, the Internet connection and suitable tools should be put in place by the library to support the KMS. Other technological issues mentioned by participants include: security mechanisms to ensure the security of library staff's contributions, acquisition of up-to-date equipment and technical support.

Knowledge team

It was also suggested that, just like there are different teams in the library tasked to perform certain duties, one participant expressed the need for a knowledge committee to be set up by library management to lead in knowledge management initiatives in the library. It was also suggested that, the team can also develop the library's knowledge management policy and lobby for resources to support KM in the library.

Benchmarking

One participant suggested that, benchmarking should be done with other libraries or organisations that have implemented or have attempted to implement a KMS and learn best practices that can be applied in the KMS implementation for Makerere University Library.

4.6.4 Additional ideas from participants

Participants were asked at the end of the interview if they had any suggestions or additional ideas that were not included in the study but which they found relevant to the study, Six of the participants said there was nothing they wished to contribute towards the study, but two of the participants, one from the IT category and another from the librarian category had the following ideas:

"Keeping statistics and records of contributions towards the library's knowledge by librarians through the system is very important" (Librarian interviewee #1)

"Appropriate change management strategies should also be included in this study as this comes with every new IT implementation" (IT interviewee #2)

From these ideas presented by participants, it can be observed that performance indicators such as statistics are also essential in the implementation of the KMS as they can help in evaluating how the system is being used and also highlight areas where there should be an improvement.

The issue of change management strategies is also important and has been covered in some participants' responses to interview questions.

4.7 Conclusion

This chapter has presented and discussed the findings from eight participants interviewed - these participants include librarians and IT staff from Makerere University Library. More findings were also obtained through the document content analysis method where several documents were reviewed and these findings are also presented and discussed in this chapter according to the research sub-questions and under different themes.

The discussion of the findings was done according to the relevant literature covered in chapter two. In the next chapter, which is chapter five, a summary of key findings of the study, conclusions and recommendation as well as areas for future research are discussed.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter four covered the presentation and discussion of key findings from the study, this chapter which is the last chapter, presents the summary of major findings resulting from the study in accordance with the research sub-questions. The chapter further provides conclusions and recommendations of the study and also presents recommendations of areas for future research.

The study explored various aspects in relation with how Makerere University Library can successfully design and implement a KMS to enable knowledge management processes. The research design for this study was focussed on addressing the following four research sub-questions as presented in *section 1.3 Research question and research sub-questions* namely: what is library staff's understanding of knowledge and knowledge management; what IT tools and techniques are currently used for KM in the library; what factors should the library consider in designing and implementing a KMS for the library; and what are the benefits of implementing a KMS in the library and the challenges the library may face in implementing a KMS. The above sub-questions were identified to find solutions to the main research question which was: how can Makerere University Library successfully design and implement a KMS to enable knowledge management processes.

The study was conducted based on a qualitative research approach and interview and document content analysis methods were used to obtain findings. It should be noted that, interviews were primarily used in the study while additional data was obtained by analysing some documents through the document content analysis method. Participants interviewed comprised of six librarians from different sections and college libraries, and two library IT staff in the IT department.

5.2 Summary of major findings and conclusions

This section provides a summary of key findings from the study according to the four research sub-questions mentioned above in *5.1 Introduction.* It is important to note that, the summary of major findings is done in relation to findings in literature as discussed in chapter four. Conclusions, as drawn from the findings in the study, are also presented.

5.2.1 Understanding of knowledge and knowledge management

This section was intended to address the first research sub-question which was library staff's understanding of knowledge and knowledge management which is an important aspect of implementing a KMS in the library. In this section, findings from the study revealed that almost all Makerere University Library staff interviewed in both the librarian and IT staff categories understand the meaning of knowledge and knowledge management. Librarians and IT staff understand knowledge in terms of useful information, awareness, familiarity, experiences and skills gained over time through education, training and interacting with people. The understanding of the knowledge management concept by librarians was found to be in terms of what happens to knowledge from the moment it is created to when it is shared involving activities such as identifying, creating, acquiring, storing, sharing and using knowledge; while IT staff understand KM in terms of developing technological solutions such as knowledge repositories to effectively manage knowledge and improve access to it. It was also revealed that the library has got various knowledge resources namely: reports, policy documents, manuscripts, minutes of meetings, human resources, online databases and best practices which are in the form of electronic and physical files, as well as tacit knowledge found in library staff members' heads. It was also revealed in the findings that, knowledge is important to all staff in the library for reasons such as: decision-making, problem-solving, innovation, training others, learning from past experience and to enable staff to work efficiently and effectively to deliver services to library users.

From the literature reviewed in *2.6.2 Factors for successful knowledge management systems implementation,* it was established that, the clear understanding of knowledge and knowledge management concepts is important for the successful implementation of KMS and in *2.2.1 Knowledge,* knowledge is understood in terms of experiences, contextual information, skills and ideas, in this section, it is also revealed that knowledge starts in the mind of whoever owns it. Further, knowledge resources such as databases, policies and uncaptured personnel expertise some of which are similar to those identified by library staff in the study. *2.2 Knowledge management overview* and *2.2.3 knowledge management in academic institutions and libraries* demonstrate the growing importance of knowledge and in academic libraries, knowledge is revealed to be important for reasons such as promotion of innovation, improvement of quality of services and decision-making. In *2.2 Knowledge management overview,* it is stated that, KM consists of activities such as creation, organisation, sharing and utilisation of knowledge.

Based on the findings on library staff's understanding of knowledge and knowledge management, it can be concluded that the majority of librarians and IT staff in Maklib understand the meaning of the two concepts which is vital for the successful implementation of a KMS. It can also be concluded that, more training is still needed to clarify the two terms to staff who may not clearly define them.

5.2.2 IT tools and techniques used for KM in the library

The section was meant to address the second research sub-question regarding the IT tools and techniques currently being used for knowledge management activities in the library. It was, first of all, discovered that, the library has got various information technologies that make up the library's technological infrastructure. These include: hardware, software, networks and other technologies. The study also found that as much as these information technologies are available in the library, they are limited in number, some need to be repaired or replaced with up-to-date technologies to better support the KM initiatives in the library. It was also established that some of the hardware is vulnerable to being stolen which means security measures are vital to ensure that all library hardware is secure.

It was established from literature in *2.3.2 Components of knowledge management systems* that hardware, software and networks are important components of KMS.

It was also revealed that, there are various tools, systems and techniques used in the library for KM. The IT tools and systems include: social media sites such as Facebook, Google+, Blogs and Twitter to share knowledge; the library website which is used to share and communicate with staff; cloud services and storage such as Dropbox and Google Drive used to create, share and store knowledge; instant messaging with WhatsApp was also revealed as a tool used to share timely knowledge among colleagues; and electronic mail is another tool used in the library to share knowledge. IT systems such as the Makerere Institutional Repository and the Virtua Integrated Library Systems were found as tools used to create, acquire, store and share knowledge.

In relation to the above findings, literature in *2.3.3 IT tools used in implementing KMS, several* tools such as: blogs, social networking sites like Facebook are revealed as examples of tools that are used for KM, however apart from the tools discovered from the findings, there are other tools that were revealed in literature such as knowledge portals and wikis, that can also be used

for KM and can be used to implement KMS. In *2.4 Knowledge management systems in organisations, academic institutions and libraries,* more tools such as institutional repositories, integrated library systems and web 2.0 are identified as tools that are being adopted and used by academic libraries to manage knowledge.

From these findings, it can be concluded that, there are several information technologies available in the library as well as IT tools and systems used by staff to participate in KM activities. However, the library needs to improve on the available technological infrastructure to ensure that it is well-built to support the implementation of the KMS. Among the tools identified by staff, it can be said some of the tools are used informally and that library staff are facing some challenges in using these tools. It can also be noted that, some of these tools can support the implementation of a formal KMS.

5.2.3 Factors to consider in designing and implementing a KMS in the library

This section was meant to answer the third research sub-question which was: Factors to consider in designing and implementing a KMS in the library. Findings discovered that, in the design of a KMS factors such as KMS objectives, existing knowledge management challenges, the user interface, features, KMS requirements, available resources and capabilities of the system will influence the design of the library KMS.

In relation to the findings above, the literature reviewed in *2.5 Knowledge management system design* revealed that, the needs of an organisation, KMS features as well as the KMS requirements influence the design of a KMS.

On the factors to consider in implementing a KMS, it was discovered that, factors such as the library vision and mission, support from library management, library culture, policies and guidelines, training programmes, library knowledge strategy, skilled library staff, budget, rewards and incentives, involvement of all library staff and technological infrastructure would influence the implementation of the KMS and, therefore, are critical to the successful implementation of the system. The above can be identified as critical success factors for the implementation of a KMS for Makerere University Library.

In view of the above findings, it was established from literature in *2.6.2 Factors for successful knowledge management systems implementation* that factors such as top management support,

technological infrastructure, motivation of staff and training of staff influence the implementation of knowledge management systems and should be considered.

From the above study findings, it can be concluded that, critical success factors for designing and implementing knowledge management systems in academic libraries include: library management support, KMS budget, availability of training programmes, library mission and vision, library culture, policies and guidelines, rewards and incentives and a well-developed technological infrastructure.

5.2.4 Benefits and challenges of implementing a KMS in the library

This section was intended to find answers to the fourth research sub-question which was: Benefits and challenges of implementing a KMS in the library. Findings discovered that, there are several perceived benefits of the library having a KMS in place, namely: promotion of innovation in the library; support of problem-solving and decision-making; enhanced communication and collaboration; improved retention and transfer of knowledge; improved knowledge sharing; improved staff performance and quality of services; quick access to knowledge; improved knowledge capture; and creation of new knowledge.

Findings from literature in *2.4.1 Importance and benefits of a KMS in organisations and academic* libraries shows benefits of implementing a KMS such as improved communication, improved employee performance and quality of services and improvement in knowledge creation, sharing and utilisation.

Findings from the study also revealed that, there are several challenges that the library may face in implementing a KMS, of which the library needs to seriously address for the system to be implemented successfully. These challenges include: limited time for staff to use the system, lack of a KMS budget, resistance to change, lack of clear KM policies and guidelines, limited expertise, lack of rewards and incentives, lack of up-to-date technology, security concerns and unwillingness of members to use the system to share their knowledge.

In literature reviewed in 2.2.3 Knowledge management in academic institutions and libraries, it was established that in implementing KM, academic libraries face challenges such as: misunderstanding of KM concepts, lack of a knowledge sharing culture, inadequate training and lack of motivation. More challenges are identified in *2.6.3 Failure factors of knowledge management systems.*

In regard to the challenges above, participants suggested some solutions to enable the library to successfully implement the KMS such as allocation of more time to staff for KM activities, development of a budget specifically for the KMS, development of clear policies and guidelines, training and education, appropriate change management mechanisms such as communication, marketing and promotion of the KMS, management support was also suggested to ensure that there are enough resources and a conducive environment for the KMS to succeed. It was also suggested that, the library needs to build technological infrastructure that is up-to-date to support the KMS.

Based on these findings from the study and from literature, it can be concluded that, there are many benefits in implementing a KMS for the library, but to realise these benefits, the library needs to address the challenges identified that may hinder the successful implementation of the KMS.

5.3 Recommendations

A number of challenges have been identified in using the available tools and techniques for KM in the library. Similar challenges were pointed out by participants as challenges that the library may face in implementing a KMS. The proposed recommendations for the library to successfully design and implement a KMS are based on findings in the study and these recommendations are presented in the form of strategies for the library to successfully design and implement a KMS to enable knowledge management processes. The sections below present an outline of the various recommendations that Makerere University Library can follow to design and implement a KMS.

Knowledge team: There is a need for the library to establish a knowledge team to champion all the activities related to KM initiatives. The team can lobby for support and resources from library management and also participate in developing the KM policy and guidelines.

KMS strategy: In the design and implementation of a KMS for Makerere University Library, a KMS strategy that is linked to the library's mission and vision should be designed to ensure that the KMS does not fail. As revealed in the literature reviewed in sub-section *2.6.2 Factors for successful knowledge management systems implementation* and as suggested in the findings, a KMS strategy that is aligned with the library business strategy is important for the successful implementation of the KMS.

Library management support and commitment: Library management should show support and commitment for the KMS by sponsoring training programs intended to impart technology skill into library staff, encouraging staff to embrace and use the system through their formal communications and also by using the system themselves to encourage others to also do so. The success and sustainability of the KMS implementation will depend on continuous financial support from library management towards the KMS budget to cater for training of library staff, purchase and maintenance of equipment, and motivation of staff that use the system. Management should also support by allocating time to library staff to create and share knowledge.

Technological infrastructure: The library needs to critically evaluate its existing infrastructure and strengthen the existing technical infrastructure by procuring up-to-to-date equipment, ensuring that there is good Internet connectivity, security measures for people's contributions towards library knowledge, suitable tools and technical support for the entire library. Library IT staff could help in building a technological infrastructure that will support the KMS implementation. Some of the tools that are currently being used for KM in the library as well as those identified in literature in sub-section *2.3.3 IT tools used in implementing KMS* such as blogs, wikis and social networking sites can be adopted to implement the KMS.

Library staff involvement: All staff in the library should be involved in the design and implementation of the KMS, involvement of staff is important for the successfully implementation of the KMS and was revealed in literature and a key factor to be considered for the success of the KMS. The library can, first of all, involve staff by carrying out the user requirements assessment before the system is implemented to make sure that users are satisfied with the system to be implemented.

Rewards and incentives: Motivation of library staff to use the system is important for the successful implementation of the KMS, therefore, a rewards and incentive system with suitable rewards and incentives should be developed to encourage library staff to create and share knowledge using the system to improve library services.

Training of staff: Training is vital for the library in implementing a KMS as it enables staff to understand the key knowledge concepts and to make them aware of the benefits of participating in KM activities in the library through the system for individuals and for the library as a whole. It is important that, Makerere University Library introduces structured training programmes to engage

staff in training on how to use the system. This is essential for the library to successfully implement the KMS. Although it was revealed that librarians understand the knowledge and knowledge management concepts, there is still a need for training programmes, seminars and workshops to enable library staff to have a much clearer and better understanding of the two concepts especially for those who have an unclear understanding of the concepts. This is crucial in the design and implementation of a knowledge management system for the library.

Policies and guidelines: It is important for the library to have a KM policy, and other policies such as the ICT, IR and copyright and access policies. The policies can guide the implementation of the KMS and prompt library management to support the process. It can also be recommended that library policies that are in draft form should be approved to support the KMS initiative.

Knowledge sharing culture: The library needs to create a culture that supports the sharing of knowledge. This can be done by creating an environment where there is respect, trust, openness and people are interested in participating. A knowledge sharing culture is essential for the successful implementation of the KMS because such a culture encourages library staff to engage in creating, sharing and using knowledge.

KMS budget: There is a need for the library to create a budget specifically for the KMS to cater for costs and expenses such as: training, rewards and incentives and purchase and maintenance of equipment. The benefits of implementing a KMS are immense as seen in sub-section *4.6.1 Benefits of implementing a KMS for the library.* Therefore, the investment in implementing the system would be worthwhile for the library. A KMS budget should be developed with enough allocated financial resources to enable the successful implementation and sustainability of the system. The library can also consider writing proposals for funding to finance the KMS initiative.

Change management: With the implementation of the KMS, there will be changes such as technological changes that may affect the library and to keep up with the changes, appropriate mechanisms need to be used to manage the changes and minimise resistance to the changes by some library staff. Suggested mechanisms such as: marketing and promoting the KMS, opening up communication channels and creating awareness and sensitisation could be done by the library to effectively deal with the change.

5.4 Recommendations for further research

The literature review indicated that there is little research done on the design and implementation of knowledge management systems in academic libraries, which calls for more studies and research in this area. Further research can be carried out in the following areas:

- This study used a qualitative research approach to look into certain aspects related to the topic under study to understand the current situation at Makerere University Library regarding KM and factors that can influence the implementation of a KMS. It is, therefore, recommended that further research is done using quantitative or mixed method research approaches to further investigate how academic libraries can successfully implement a KMS to enable KM processes.
- Research can also be carried out to explore the relevance of knowledge management systems in promoting innovation in academic libraries.
- Further studies can also be carried out to develop a comprehensive knowledge management system strategy for academic libraries, such as the Makerere University Library.
- Comprehensive studies into testing of knowledge management systems adoption and diffusion models and relating these to academic libraries.

5.5 Final conclusion

In conclusion, the recommendations are mainly focused on strategies that Makerere University Library could adopt to design and implement a knowledge management system that can support knowledge management processes such as creation, acquisition, storage, sharing and application of knowledge. Furthermore, it is important that the library establishes a knowledge management strategy prior to the implementation of the KMS. This strategy can enable the KMS to address the needs of the library and of library staff. It is also important that all stakeholders are involved in the implementation process.

Having staff that have technological skills is essential in implementing a KMS, therefore, both librarians and IT staff should take part in training to gain the necessary skills.
Finally, with these identified strategies, other academic libraries and institutions in Uganda that would like to implement a KMS can adopt them making slight changes to suit their environments.

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APPENDICES

Appendix I: Informed consent form (Form for research subject's permission)

(Must be signed by each research subject, and must be kept on record by the researcher)

1 Title of research project: **The design and implementation of knowledge management systems in academic libraries to enable knowledge management processes: a case study of Makerere University Library.**

2 I ……………………………………… hereby voluntarily grant my permission for participation in the project as explained to me by **Sylvia Martha Munafu**

3 The nature, objective, possible safety and health implications have been explained to me and I understand them.

4 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

6 Upon signature of this form, you will be provided with a copy.

Signed: _____   Date: _____

Witness: _____   Date: _____

Researcher: Date: 4th August 2016

Appendix II: Interview guide for librarians

INTERVIEW GUIDE FOR LIBRARIANS AT MAKERERE UNIVERSITY LIBRARY

Munafu Sylvia Martha

Makerere University Library

Box 7062, Kampala.

4th August 2016

Dear Participant,

My name is Sylvia Martha Munafu, a student at the University of Pretoria, South Africa pursuing a Master in Information Technology (M.IT). In partial fulfilment of the M.IT programme, I am undertaking research for my mini-dissertation titled "The design and implementation of knowledge management systems in academic libraries: A case study of Makerere University Library."

As a librarian at Makerere University Library, you have particularly been chosen to take part in the above-mentioned study. Your responses to interview questions are to be used for academic purposes only and will be treated with confidentiality. You are hereby kindly requested to respond to the interview questions provided in the guide below in an interview which will be scheduled at a time convenient to you in a period of one week after receiving the interview guide via email. Your suggestions towards the study are also welcome at the end of the interview. Thank you.

Yours sincerely,

Sylvia Martha Munafu

Researcher

Section A: Demographic information

1. In which of the library's sections and branch libraries are you working presently?

UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

2. What is your job rank or position within the library?

3. What kind of work does this position involve?

4. How long have you been working in the library?

Section B: Knowledge and knowledge management (KM)

1. What is your idea of knowledge and how would you define knowledge?

2. What knowledge resources exist in the library and in what format are these resources? (reports, policies, minutes etc.)

3. How important is knowledge to you and your job position? (making decisions, innovation, problem-solving, lessons learned etc)

4. What do think of when you hear the term "knowledge management" and what does knowledge management entail?

5. Which knowledge management processes take place in the library? (creation, sharing, application etc) Please name them and elaborate on each.

6. How do you share knowledge with colleagues across the different sections and branch libraries?

7. What strategies has the library put in place to ensure proper management of knowledge?

8. a) What challenges do you face in participating in KM practices in the library?

   b) In reference to question 8a), what do you think the library can do to address the identified challenges?

Section C: Tools and techniques used for KM in the library

1. What information technologies and IT systems available in the library do you use for various activities? (software, hardware, web 2.0, the intranet etc.)

2. a) Of the IT tools and systems mentioned above, which ones are you using for KM activities such as creation, sharing and application of knowledge?

   b) What challenges do you face in using these IT tools for KM (mentioned at 2a)?

3. a) What other techniques are used to manage knowledge in the library?

   b) What challenges do you face in using these techniques for KM (mentioned at 3a)?

4. Do you think the library has the necessary infrastructure to support KM processes? Why or why not?

5. What infrastructure is available or what is needed to support KM processes?

Section D: Factors to consider in designing and implementing a KMS for the library

1. What do you understand by the term knowledge management system?

2. Do you think the library should design and implement a formal KMS? Why or why not?

3. What factors would influence the design of a suitable KMS for the library and why?
4. What factors would influence the implementation of a suitable KMS for the library and why?
5. What are the essential requirements for a KMS in the library?
6. What features would you like to have in the library's KMS?
7. What technological capabilities should the library have in place to enable the successful implementation of a KMS?

Section E: Benefits and challenges of KMS to the academic libraries
1. With a formal KMS in place, what are the benefits you foresee for the library?
2. What challenges will the library face in implementing a KMS?
3. How do you think the library can address these challenges to make sure that the KMS is implemented successfully?
4. Do you have any suggestions or additional ideas not included above that may be relevant to the study?

We have come to the end of this interview, thank you for participating!

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UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

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Appendix III: Interview guide for IT staff

INTERVIEW GUIDE FOR IT STAFF AT MAKERERE UNIVERSITY LIBRARY

Munafu Sylvia Martha

Makerere University Library

Box 7062, Kampala.

4th August 2016

Dear Participant,

My name is Sylvia Martha Munafu, a student at the University of Pretoria, South Africa pursuing a Master in Information Technology (M.IT). In partial fulfilment of the M.IT programme, I am undertaking research for my mini-dissertation titled "The design and implementation of knowledge management systems in academic libraries: A case study of Makerere University Library."

As an IT staff member at Makerere University Library, you have particularly been chosen to take part in the above-mentioned study. Your responses to the interview questions are to be used for academic purposes only and will be treated with confidentiality. You are hereby kindly requested to respond to the interview questions provided in the guide below in an interview which will be scheduled at a time convenient to you in a period of one week after receiving the interview guide via email. Your suggestions towards the study are also welcome at the end of the interview.

Thank you.

Yours sincerely,

Sylvia Martha Munafu

Researcher

Section A: Demographic information
1. In which of the library's sections and branch libraries are you working presently?

2. What is your job rank or position within the library?

3. What kind of work does this position involve?

4. How long have you been working in the library?

Section B: Knowledge and knowledge management (KM)

1. What is your idea of knowledge and how would you define knowledge?

2. What knowledge resources exist in the library and in what format are these resources? (reports, policies, minutes etc.)

3. How important in knowledge to you and to your job position (Making decisions, innovation, lessons learned, expertise…etc.)

4. What do think of when you hear the term "knowledge management" and what does knowledge management entail?

5. Which knowledge management processes take place in the library? (Creation, sharing, application etc). Please name them and briefly elaborate on each.

6. What IT strategies has the library put in place to ensure proper management of knowledge?

7. a) What challenges do you face in participating in KM practices as IT staff in the library?
   b) In reference to question 7a), what do you think the library can do to address the identified challenges?

Section C: Tools and techniques used for KM in the library

1. What information technologies and IT systems in the library do you use for various activities and functions? (Software, hardware, web 2.0, the intranet etc.)

2. a) Of the IT tools and systems mentioned above, which ones are you using for KM activities such as creation, sharing and application of knowledge?
    b) What challenges do you face in using these tools for KM (mentioned at 2a)?

3. Do you think the library has the necessary infrastructure to support KM processes? Why or why not?

4. What infrastructure is available or what is needed to support KM processes?

Section D: Factors to consider in designing and implementing a KMS for the library

1. What do you understand by the term knowledge management system (KMS)?

2. Do you think the library should design and implement a formal KMS? Why or why not?

3. What factors would influence the design of a suitable KMS for the library and why?

4. What factors would influence the implementation of a suitable KMS for the library and why?

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

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UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

5. What are the essential requirements for a KMS in the library?

6. What features would you like to see in the library's KMS?

7. What technological capabilities should the library have in place to enable the successful implementation of a KMS?

8. How would you as IT personnel support the library in the implementation of a KMS?

Section E: Benefits and challenges of KMS to the academic libraries

1. What are the benefits you foresee for the library with a formal KMS in place?

2. What are the challenges you think the library will face in implementing a KMS?

3. How do you think the library can address these challenges to make sure that the KMS is implemented successfully?

4. Do you have any suggestions or additional ideas not included above that may be relevant to the study?

We have come to the end of this interview, thank you for participating!

Appendix IV: Document content analysis guide

The library and university documents that the researcher used to get additional information relevant for the study are listed below:

1. Makerere University Library strategic plan 2013 – 2018/19

2. Library sections and branch libraries annual reports 2015

3. University ICT policy framework 2016-2021