Strategic alignment of the integrated library system at Makerere university as A critical success factor in achieving the university strategy

MINI-DISSERTATION

BY

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DECLARATION

I, Francis Ssekitto declare that this mini-dissertation is my original work and to the best of my knowledge has not been submitted for any academic award to any institution.

Signed…….. Date:

…….

Francis Ssekitto

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LIST OF ABBREVIATIONS AND ACRONYMS

ACRL: Association of Canadian Research Libraries

ARIS: Academic Records Information System

DICTS: Directorate of Information and Communication Technology Support

DVDs: Digital Versatile Discs

EASLIS: East African School of Library and Information Science

FINIS: Financial Information Institution

HURIS: Human Resource Information System

ICT: Information and Communication Technology

ILS: Integrated Library System

ISDN: Integrated Services Digital Network

IT: Information Technology

ITS: Integrated Tertiary Software

KM: Kilometres

LAN: Local Area Network

MAKLIBIS: Makerere University Library and Information System

MAN: Metropolitan Area Network

MUK: Makerere University

NOC: Network Operating Center

OSI: Open System Interconnection

OSLMS: Open Source Library Management Software

RFID: Radio Frequency Item Description

SAM: Strategic Alignment Model

SCIT: School of Computing and Informatics Technology

SIDA/SAREC: Swedish International Development Agency

UNISA: University of South Africa

VPN: Virtual Private Network

VTLS: Visionary Technology Library Solutions Incorporated

WAN: Wide Area Network

ABSTRACT

Samuel Wilson has said, "……. One of the biggest challenges to medicine is the incorporation of Information Technology in our practices." This statement encapsulates the need for systematic and "useful" deployment of IT systems and solutions in any organization.

There is a general trend in libraries today is towards the use of computerized systems integrated with mobile technology systems in the growing expectation of Ubiquitous library services to the 21st Century clients. All these systems seek to do what librarians have been doing from ages ago. The service improvements in Information Technology development requires of Academic libraries simply cannot be ignored. However, simply accumulating new technologies and related services as the opportunities arise may in the end be impractical, and may present intractable difficulties in terms of workload, security, authentication and intellectual property management.

This study therefore attempted to assess the strategic alignment of ICTs in achieving the institutional strategy. The study specifically focuses on the alignment of the Integrated Library Systems (ILS) in Makerere University Library to achieve strategic fit within the corporate environment of the University and achieve the institutional strategy.

CHAPTER ONE
INTRODUCTION AND THE AIM OF THE RESEARCH

1.1 Introduction to the study

Many quotations about the impact of information technologies (IT) and the need to be systematic in the adoption of such technologies across work processes today are associated with famous people. One such person, Robert Muller, once said, "…we had to address information technology in the ways we had not before and give agents the tools that they need to do their job more efficiently and more expeditiously." Another, Samuel Wilson, is quoted to have said, "….One of the biggest challenges to medicine is the incorporation of Information Technology in our practices." Both statements encapsulate the need for systematic and "useful" deployment of IT systems and solutions in any organisation. This is also true for academic libraries.

The adoption of information and communication technologies (ICTs) has become a general trend in academic libraries. Ameen (2011) observes that many academic libraries are adopting these technologies with a view to offering the services that they have traditionally provided without these technologies as well as attaining their strategic objectives.

This study therefore attempted to assess the strategic alignment of ICTs in achieving the institutional strategy. The study specifically focuses on the alignment of the integrated library Systems (ILS) at the Makerere University Library to achieve a strategic fit within the corporate environment of the University and achieve the institutional strategy.

This chapter presents a background to the study, the problem statement, the aim of the study, the objectives of the study, research questions, and the significance of the study.

1.2 Background to the study

Science and technology has led to the transformation of humanity. From agro-procedures to manufacturing, politics, economics and the socio-cultural aspects of *Homo sapiens*, all have been impacted by technological advances on the globe (Ameen, 2011). Librarianship, information management and academia in general have not been immune to this onslaught. In all these areas there is constant change in the application of scientific and technological creations.

Academic libraries stand out as invaluable centres where academics find an integrated source of information resources that are critical to their academic work and research. Metz (2010) observes that academic libraries serve multiple communities. He classifies these communities into groups that include faculty staff, students, and members of the general community (Metz, 2010).

However, developments in information and communication technologies (ICTs) call for a change in work processes in many areas of professional life (Ameen, 2011). Villano (2010) describes the changing academic platform thus:

> The howling winds of open education are whistling through the hallways of academia everywhere, wrenching old ideas about how to identify and certify knowledge workers off their foundations. So how can knowledge workers of today ‘‘land on their feet’’ and grow into knowledge workers of 2020? (Villano, 2010, p.171)

However, Schmiede (2009) contends that despite the impact of information technologies in most of the business world, the development of ICT systems in scholarly cultures – such as scholarly education and librarianship – is lagging behind. Academia and librarianship are noted to be implementing IT-related systems retroactively and sometimes without regard to their impact on the overall organisational strategy (Schmeide, 2009). This implies that academic libraries have had to be responsive to the requirements of the ICT dominated academic market. Ani, Esin and Nkoyo (2005) contend that there is a general trend in academic libraries today towards deployment of

information systems and information technology. As such computerised systems are being embraced on a wide scale. Choy (2011) further contends that beyond computerisation is the increasing integration of mobile technology systems into library services owing to the growing expectation of the ubiquitous provision of library services to 21st century clients. This is also true of libraries at Makerere University.

Makerere University Kampala (MUK) is the oldest and largest university in East and Central Africa. Today the University hosts a student population of over 30,000, which is among the highest in the region (Makerere University, 2011). Since 2004, the University has taken up information and communication technologies (ICTs) as a strategic enabler to fulfill the Makerere University's strategic objectives (Makerere University, 2011). One of the key features of this movement was the adoption of key information systems in key functions of the University. One notable information system was the Makerere University Library and Information System (MAKLIBIS). Part of what makes the distance education approach effective is the active application of information technologies in academia and, in this case, library and information service delivery.

In 2008 Makerere University published its 10-Year Strategic Plan, intended to span 2008/09 to 2018/19 (Makerere University, 2008). The plan was meant to provide a foundation for decision-making at all levels of governance at the University. Two of the five core thematic areas in the plan include the need to boost the library infrastructure and to create an ICT-enabled environment.

The emphasis put on these two areas of decision-making in the university library service directly affected not only the decisions made but also the procedures and routines of the library and of Makerere University as a whole.

In view of the fact that there is evidence of implementation of an integrated library system (ILS), the study will attempt to assess the strategic alignment of the said ILS so as

to attain a strategic fit with the corporate environment of the University and achieve the institutional strategy.

1.3 Statement of the problem

An effective and elegant library can be said to be one of the core marks of quality in a university or academic unit (National Council for Higher Education, 2005). The role of a library in academia cannot be overstated. However, as noted above, libraries and the services they offer are facing enormous changes as a result of the new developments in science and technology. Today, technology has rapidly become one of the cornerstones of library services. According to the Research Planning and Review Committee of the Association of Canadian Research Libraries (ACRL) (2010), Information technology, especially computer technologies, continues to impact the collections and the modes of service delivery and points in academic libraries.

Morgan (2009) observes that, whereas the core functions of librarians, including collecting, organising, preserving and disseminating information materials are still important, the tasks and duties of library and information professionals have gone through – and are still going through – evolution, all driven by information technologies. It can be asserted that that if a library does not actively embrace and implement information technologies in the conduct of its routines and the execution of future strategy, its future is, beyond doubt, in jeopardy.

However, as Joint (2009) observes, simply accumulating new technologies and related services as the opportunities arise may, in the end, be impractical and may present intractable difficulties in terms of workload, security, authentication, intellectual property management and, most critically, the strategic alignment of systems.

Since the adoption of ILS at Makerere, there has been a notable lack of coherence between the library information systems with the rest of the university information systems and business needs (Nabende, Ahimbisibwe and Lubega, 2007). Currently there are a number of ICT systems used for different purposes, i.e. for human resources (Human Resource Information System – HURIS), student academic resources (Academic

Records Information System – ARIS), library resources (Makerere Library Information System – MAKLIBIS) and financial resources (Financial Information System – FINIS). All these systems have existed as standalone systems, with each requiring independent management. Since 2007, efforts have been made to integrate part of the Academic Records Information System and Financial Information System (Makerere University, 2011). Through this students are able to view their fees statements when they log onto the Academic Records Information System. There is also evidence of plans to create a seamless Enterprise Resource Platform by which all these systems will be able to interact since they normally serve the same clients. However, all these do not have coherence with the Library Information System and this remains a challenge.

It is on this basis that the study was conducted to examine how the Integrated Library System is aligned to attain a strategic fit within the corporate environment of Makerere University and to achieve the corporate strategy.

1.4 Aim of the study

Considering the possible impact associated with the misalignment of integrated library systems within academic environments, as well as the ever-increasing cost of acquiring and maintaining such systems, this study endeavours to assess how the integrated library system at Makerere University is strategically aligned with the corporate strategy of the University besides other integrated information systems within the University. It is envisaged that by assessing the alignment of the systems, misalignments would be identified and proposals made to align the integrated library system with the university strategy so as to achieve a strategic fit.

1. 5 Objectives of the study

In order to achieve the above aim, the following objectives were identified:

- To gain an understanding of the need for strategic alignment of integrated information systems within institutions.

- To identify and analyse the basic facets that comprise most integrated library systems in order to gain a better understanding of potential weak points within the Makerere University environment.
- To identify the most common causes of strategic misalignment of integrated library systems in academic institutions.
- To identify and analyse the different facets in the integrated library system at Makerere University that need to be realigned to attain a strategic fit.
- To propose changes that ought to be considered for future acquisitions and upgrades of integrated library systems at Makerere University.

1.6 Research questions

To achieve the above aims and objectives, the following research question is identified to guide the study:

What can the Makerere University Library do to attain a strategic fit of its Integrated library system to the corporate strategy of the institution?

The study is further guided by the sub-questions:

- What is the rationale behind attaining a strategic alignment of integrated information systems within institutions?
- What are the common causes of strategic misalignment of integrated library systems in academic institutions?
- What facets in the Integrated Library System at Makerere University ought to be realigned to attain a strategic fit?
- What management changes ought to be considered for future acquisitions and upgrades of integrated library systems at Makerere University?

1.7 Significance of the study

The value of the study will lie in the consolidation of the management of the integrated library systems and strategic planning in organisations. The findings of the study will be useful in the following ways:

- They will create an awareness of the implications of misalignment of the integrated library systems in academic environments.
- They will be useful to policy-makers in educational institutions in the future development, planning and implementation of integrated information systems for academic institutions.
- The study will also provide a literature review for future scholars who may be interested in understanding issues related to ILS alignment in educational institutions.
- Although this dissertation focuses on academic environments, it may prove useful to persons planning to implement or who are already implementing integrated information systems in non-academic environments

1.8 Conclusion

The above chapter has presented the background to the study. Furthermore, it has stated the problem of the study and also described its aim and objectives. The chapter has concluded by presenting the expected value of the study to the anticipated readership.

Chapter Two will attempt to present a review of literature on the importance of information technologies and the need to have these aligned to the processes and the environment of a given organisation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a brief review of the literature related to the need for the alignment of integrated library systems in academic institutions. This literature review is presented on the following themes:

- The importance of academic libraries to academic institutions.
- The application of information technologies in academic libraries.
- The evolution of integrated library systems in academic libraries.
- The importance of integrated library systems in academic libraries.
- The importance of the strategic alignment of Information technologies in organizations.
- The conclusion.

2.2 Importance of academic libraries to academic institutions

To understand the need for integrated library systems and, therefore, its effective alignment, it is important to first establish the value of academic libraries. Carey, Justh and Williams (2003) define an academic library as a library entity in a tertiary institution that provides:

- an organised collection of a combination of printed or other reading materials;
- staff trained to provide and interpret such materials as required to meet the needs of users of the institution;.
- an established programme for the delivery of the services of the library to the users of the library; and
- the physical facilities necessary to support the said collection, staff, and programmes.

The size and quality of the requirements set out in the above definition may vary from one library to another.

Academic libraries can, therefore, be said to be unique centres in which academic users find an integrated source of information resources critical to their academic work and research. Metz (2010) observes that academic libraries serve multiple communities. He classifies these communities into groups that include faculty staff, students, and members of the general community (Metz, 2010). This is also true of the Makerere University Library.

A survey of previous literature on the role of libraries in academic institutions demonstrates that such libraries play a pivotal role in ensuring the success of academic institutions and the attainment of institutional strategies. To emphasise this role Lewis (2007) notes that what academic libraries are doing today diverges from what they used to do in the past, and even what they will do in the future. This is aimed at positioning themselves so that their role in an institution can better be realised. .

Below are some of the contributions of academic libraries to their communities:

In the first instance, academic libraries play a leading role in facilitating research in their institutions. Ka (2005) observes that academic libraries play a significant role in supporting research. This they do by strategically acquiring useful information resources for their readers. These may include books, archives, journals and other digitised information. Academic libraries facilitate access to materials outside their collections that are useful to their users. Rasul and Singh (2010, p.77) emphasise this view when they posit that "…the effective academic libraries are gateways to academic knowledge through their own collection and by facilitating access to material." This may be done through subscribing to relevant online content or enabling inter-library loans support for research (Patterson, 2009). All these provide information that is invaluable for academic work.

In addition to providing reading materials, academic libraries provide space for research work and private reading. Rasul and Singh (2010) note that academic libraries tend to be

dedicated to what they perceive as the needs of students and researchers at university and, in line with this purpose, they prepare space for their users to conduct group and private study sessions. Oakleaf (2010) highlights the fact that libraries are increasingly adjusting their architectural philosophies from those that support silent private study to those that facilitate both private and group study.

Furthermore, academic libraries are useful in improving the rank of a university in comparison with other academic institutions. Rasul and Singh (2010) argue that since research is taking on increasing importance in the ranking of universities and colleges worldwide, academic libraries provide room for collecting the research output of institutions and making it available for the ranking bodies to access. Oakleaf (2010), however, notes that mere collating of output for ranking may not be useful for the quality assurance of research output. Despite the limitations to measuring the quality of the research output, the fact that ranking systems still consider research output in academic libraries as important makes the academic library a strategic partner for the parent institutions.

Academic libraries also provide invaluable user education to enable their users to benefit from their collections and services. Simmonds and Syed (2001) observe that the usefulness of academic libraries is influenced most by users' perceived familiarity with the library and its resources. Therefore, users who are more familiar with the library services usually benefit from the academic library (Simmonds and Syed, 2001). To encourage greater use of libraries, librarians conduct user education sessions that guide users to use library resources not only in the confines of the library building, but even when they access the resources online.

Last but not least, academic libraries provide a basis for the accreditation of universities and other tertiary institutions. In Uganda, an effective and elegant library can be said to be one of the core marks of quality in a university or academic unit (National Council for Higher Education, 2005). Therefore, a university or tertiary institution in Uganda may be

granted a charter to run a programme or even operate in the country partly on the basis of the quality of the library it possesses. Therefore, academic institutions whose libraries are deemed not to meet the set benchmarks are denied operating licences or permission to run particular programmes.

From the above, it can be deduced that the position of the academic library in an institution is central to the very survival and continuity of the institution. Oakleaf (2010) notes, therefore, that a deliberate effort should be made to align the academic library with the mission of its parent institution. Even the technologies adopted within the library ought to be assessed to determine whether they are aligned with the strategic mission of the library and the academic institution at large.

2.3 Application of information technologies in academic libraries

In the light of the invaluable role of academic libraries in promoting their parent institutions and assisting in achieving the strategic missions of their parent institutions, academic libraries are now strategically equipped to position them to perform better. Lewis (2007) supports this view by noting that what academic libraries are doing today diverges from what they used to do in the past, and even what they will do in the future. This is aimed at positioning themselves to more effectively achieve their role in institutions to be achieved better. Oakleaf (2010) confirms this by contending that the trend among academic libraries is to align themselves strategically with the missions of their parent institutions. One of the areas in which academic libraries are positioning themselves is in the adoption of information technologies in service delivery.

The general trend in libraries today involves the adoption of information technologies. These systems attempt to do what librarians have always done (Cholin and Karisiddappa, 2006). This includes organising information resources and making them available to suitable clientele at the right time and in the right formats. Cholin and Karisiddappa

(2006), however, note that information technologies execute the traditional functions of librarians in a more seamless way. A survey of previous literature reveals that Information technologies are applied in different forms in the libraries. Examples of such applications include the following:

2.3.1 *Development of electronic book (e-book) reader-related tablet technologies*

The origins of the libraries, which date back to the early civilisation of the Sumerians, can be traced to the need to read (Penn, Pennix and Coulson, 1994). This was given a boost by the invention of paper and scrolls. Most of the libraries today have the printed reading materials on their shelves. However, reading technology devices currently include Kindle from Amazon, I-pad from Apple, Galaxy from Samsung and a myriad of other tablets and electronic readers. Besides this array of technological marvels are innumerable smart phones and devices that can be utilised by libraries to enhance their service delivery to their targeted clients (Okon, Esin and Edem, 2005). With this technology users can send their requests, as well as borrow or return books online. There is a considerable number of library users already owning such devices in South Africa and the trend of adoption of the same in Uganda is mesmerising (Lusweti, 2010). This presents academic libraries with a wide range of data control and access options.

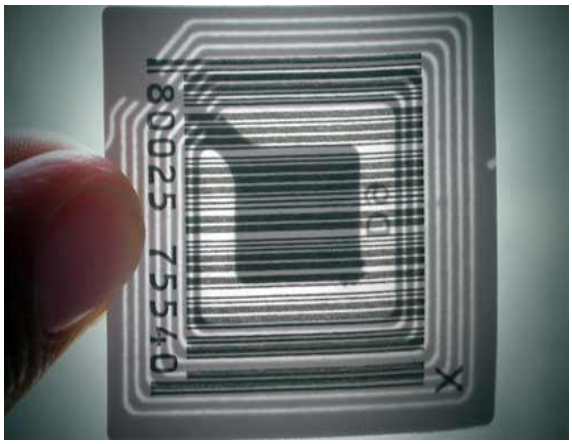
Furthermore, when clients access e-books, they are given control over the content of the book, i.e. they can decide what they want to do with the book, including reading, emailing, saving or printing it for later utilisation (Okon, Esin and Edem, 2005). This eliminates the delays caused by postage and the delivery of information material to various regions and library branches where they have been requested. This, therefore, enhances library's service delivery and reduces the costs related to delivery and postage.

2.3.2 *Development of radio frequency item description (RFID) technologies*

A key aspect of this type of technology is the self-service facility (Curran and Porter, 2007). The "ID" in RFID describes the unique identifier that is apportioned to each item

in the library. A chip similar to the one shown in Figure 1 below is inserted in the library item for identification at the point of scanning.

Figure 1: A radio frequency item description chip used in jails



(*Source*: http://5magazine.wordpress.com/2011/03/27/rfid-chip-foundation-of-the-electronic-jail/)

The chip used in libraries looks exactly like the one in the above figure and contains a unique number for each item. It also has magnetic ink which is detectable at the time of scanning. This type of technology is already available to library patrons in leading universities in Africa, especially in South Africa (Lusweti, 2010). At Makerere University this type of technology is still in its primary stages of implementation, with the machines being set up in points of service (Makerere University Library, 2012c). Figure 2 below shows a lady performing a self check-in function at a machine in the library.

Figure 2: A lady performing a self check-in function at a machine in the library

(*Source:* http://5magazine.wordpress.com/2011/03/27/rfid-chip-foundation-of-the-electronic-jail/)

The above image shows that self-help technology has changed the way libraries perform the lending and returning services for their information material. This self-help technology provides the library with an easy-to-use machine with a user-friendly interface that enables the library to allow clients to borrow and return publications without any involvement of the library staff. Clients simply scan the book through the machine and the RFID tag (a chip containing the publication's bibliographical details) automatically marks the publication as either borrowed or returned and also provides the client with a slip.

The self-help technology is more ergonomic for staff and also offers a 24-hour automatic book return (including drive-through), eliminates waiting lines, uses fewer resources for that repetitive work, and allows for stack checkout (more than one book at a time), faster and frequent inventory control by staff as well as more efficient theft control (Curran and Porter, 2007).

Another important application of RFID technology sorts books into appropriate positions in the library. An example of this is a machine at the University of South Africa Library that is shown in Figure 3 below.

Figure 3: A RFID sorting machine at the University of South Africa Library

(Photograph by Francis Ssekitto in University of South Africa Library, 19 May 2011)

The machine is used to automatically sort library publications according to class numbers and subject areas, as well as the various levels and shelves they are supposed to be housed in. This reduces the workload of the library staff by sorting the titles one by one.

The machine provides opportunities for staff to have more time to focus on other important tasks, such as improving services to clients, ie shelving reading and improving the quality of the collection, thereby increasing the library's performance standard.

The sorter also saves the library's funds since it obviates the necessity for the library to hire various subject specialists to perform the sorting of various subject areas.

2.3.3 *Bibliographical lifts (elevators)*

Another product of technological evolution is the bibliographic lifts that convey books and other bibliographical items. As library buildings grow in size and functions, the burden of carrying bibliographical items from one storey to another is becoming a

considerable time cost to the library. Bibliographic lifts offer the time-saving option of conveying the items to a particular storey. A classic example is a lift at the University of South Africa (UNISA) Library that is shown in Figure 4 below.

Figure 4: An illustration of the bibliographic elevator at UNISA Library

(Photograph by Francis Ssekitto in University of South Africa Library, 19 May 2011)

Figure 4 shows cabins (in red) in which the items are placed. This machine can also be computer-operated to enable the tracking and monitoring of the transported material.

Other forms of hardware include:

i) a liquid crystal display for larger audiences;

ii) audio readers and recorders for accessing and digitising audio collections;

iii) large-scale scanners for digitisation projects;

iv) digital cameras for capturing photographic records critical to libraries; and

v) closed circuit television (CCTV) for monitoring security in and around the library premises.

2.3.4 *Software*

Alongside the development of hardware has been an equally impressive development of more robust and functionally astounding software. Harris (2010) notes that library technologies first adopted customised software upon its entry in the technology world. Such software deployment involved academic libraries using software that was not primarily meant to work in library environments but that would be tailored to meet their needs (Harris, 2010). However, today library management software has become more specialised. Software is now more specialised in that there is software that is designed to manage specific resources, particularly for libraries. An interesting facet of this specialisation is that it also takes into account the size of libraries (Husain, 2011). The concept of size in this context extends beyond the physical space of the library to include both the size of the collection as well as the service range of the library (Husain, 2011).

Library management software comes in different categories, i.e.:

- open source software and proprietary software; and
- single functional software and integrated library software.

Open source software is software that comes without licensing limitations while proprietary software refers to software that comes with licensing (ACRL Research Planning and Review Committee, 2010). The adoption of open source library management software (OSLMS) is said to be gaining a lot of popularity among academic libraries. A case in point is the Dar-es-Salaam University College of Education (DUCE) Library which, owing to the licensing issues that it has faced as a result of using the Microsoft server platform, coupled with the limited funds available for the library, is planning to use Linux as the operating system together with an open source library management system such as Koha (DUCE, 2005). Though DUCE has not to this date proceeded with the adoption of the said system, the listing of the system in the strategic plan is a sign of commitment towards an open source system. The Makerere University

Library, on the other hand, uses Virtua integrated library, management software, a proprietary software system for which licensing rights have to be paid for periodically.

One other aspect of the categorisation of software in academic libraries is based on the functionality of the software. In specific terms, this relates to the number of functions that software can execute. Past software deployed in academic library environments could only execute single functions or a selected range of functions in a library (Husain, 2011). Husain (2011) further contends that there are a considerable number of libraries which still deploy single-function software. However, there is a considerable range of software being produced which is able to conduct numerous functions in libraries. Such software is referred to as integrated library software (Husain, 2011). Integrated software exists either in open source form or as proprietary packages. The use of the Koha software by DUCE and VTLS/Virtua by Makerere University is testimony to this. With the adoption of integrated library systems, academic libraries have completed a metamorphic cycle from being storehouses of knowledge to 'intermediary' roles in a hybrid environment in which their reading materials are either traditional or in electronic formats (Cholin and Karisiddappa, 2006).

Another aspect is the integration of software into the mainstream enterprise resource software of the parent academic institutions. A classic example is Makerere University's library management software, which is in the early stages of integration with the University Academic Records Information System (ARIS) and the Financial Information Institution (FINIS) (Makerere University, 2012). At the end of the integration process, it is envisaged that users will be able to use the same cards for gaining access to the Makerere University Library as well as meeting their financial obligations to the library, such as fines and subscriptions (Makerere University Library, 2012).

2.3.5 *Networking technologies*

Improvements in science and technology have led to the emergence of revolutionary approaches in the way information is produced, processed, stored and shared. Perhaps no area has been impacted as much as communication (Mitchell, 2011). Through computer

networks information of all media can be shared over a vast geographical area (Mitchell, 2011). Organisations today massively invest their time, money and personnel in building and maintaining networks to enable the sharing of information and facilitating of communication.

In libraries, telecommunication consists of a range of communication systems that include transmission media and devices, switching systems, bandwidth, broadband, multiplexing, modulation, protocols, wireless communication, facsimiles, email, teleconferencing, a bulletin board service, videotext and voicemail (Kroski, 2010). Networking in libraries comprises a variety of concepts, such as topological communication networks (local area networks, wide area networks, and metropolitan area networks), library networks, hypertext, hypermedia, multimedia, Integrated Services Digital Network (ISDN), and Open System Interconnection (OSI). All these are deployed to enable libraries to conduct their business in a more seamless fashion across geographical boundaries.

In their service delivery, libraries engage largely in communication and the sharing of information among clients and other libraries. As such developments in communication technologies, especially telecommunication, are particularly of interest to libraries. Some of the developments that have had notable implications for academic libraries include developments in broadband services and cloud computing (Dempsey, 2005). Though the efficacy of cloud computing and related services is still marked in academic libraries in Africa, its attractiveness seems to predict that it will be more widely deployed as the continent gets faster internet speeds and reliable electricity.

The area of networking has influenced the academic library environment so much that libraries today even base their software and hardware planning partly on the capacity of the selected systems to work in a networked environment (Husain, 2011).

From the above presentation, it becomes evident that the service improvements that information technology development requires of academic libraries simply cannot be ignored. However, as Joint (2009) observes, simply accumulating new technologies and

related services as the opportunities arise may in the end be impractical, and may present intractable difficulties in terms of workload, security, authentication and intellectual property management. It can be asserted that it is largely true that if a library does not actively embrace and implement information technologies in the conduct of its routines and the execution of its future strategy, its future is, beyond doubt, in jeopardy.

2.4 The evolution of integrated library systems in academic libraries

From 2.2 and 2.3 above, it is evident that the academic library is an integral part of any academic institution that is worth its name. It is also evident that developments in information technology are gaining more prominence in the 'life' of academic libraries. One such technology is the integrated library system (ILS).

The concept of integration in this case relates to the fact that, whereas most of the earlier software deployed in work situations could only execute single functions, integrated software is designed to execute a series of related functions in a given environment (Ho, 1996). Ho further contends that such integration goes beyond the simplistic deployment of software to execute simple transaction in a series of uncoordinated fashions to a more systemic approach which considers the organisation as a system. This considers the various operations and processes the software is meant to execute in the particular environment. As such the software is integrated to work in the organisation as a system. Perhaps this is the reason why in most literature integrated software is also referred to as an integrated system. The secret to this nomenclature may lie in the fact that the software at this stage is developed with a system approach in mind. Likewise, integrated library systems can be said to have the capacity to execute a series of functions in a given library as a system.

The use of integrated library systems in academic libraries has existed for approximately 30 years. Deddens (2002) observes that integrated library systems were first used in colleges and universities at the beginning of the last quarter of the 20th century. This should, however, not lead to the view that ILS technology is archaic (Deddens, 2002). On the other hand, the technology used in the deployment of ILS has evolved over time to

incorporate more of the needs of librarians (Cholin and Karisiddappa, 2006). Therefore, it can be asserted that the evolution of ILS can be partly linked to the responsiveness of information technology developers to the changing tastes, preferences and demands of the academic library environment.

Deddens (2002) further notes that the biggest development of the technology that underpins the ILS was realised in the 1990s. This development involved the linkage between bibliographical citations and the content that they represent. Prior to this, most ILS systems were grounded in the presentation of bibliographical citations of materials contained in particular libraries where the system had been deployed.

Egunjobi and Awoyemi (2012) further confirm the evolution of ILS technology through their observation that the current generation of integrated library systems attempts to move beyond the Machine-Readable Cataloguing (MARC) fields for text information resources to include metadata descriptions for multimedia library collections. Beyond the developments of the 1990s, ILS today has been fully developed to support multifunction Web-based multimedia content information management systems, and is built with high-capacity relational database structures. Whereas core system architecture remains based on bibliographical citations presented via structured indexes, as it was in the early editions of ILS, the basis of these indexes is currently moving beyond the MARC fields designed for text information to include metadata descriptions for multiple digital file formats and content (Deddens, 2002). Furthermore, as noted in 2.3 above, ILS systems are getting more integrated with other systems that are deployed in the parent organisation. An example of this is the Makerere University Library management software, which is in the early stages of integration with the University Academic Records Information System (ARIS) and the Financial Information Institution System (FINIS) (Makerere University, 2012).

In addition, more ILS is beginning to be deployed as digital asset management systems (DAMS) in some academic libraries. Deddens (2002) contends that with this development ILS technology does not only point out the bibliographical details of library

materials but also enables the acquisition of the actual content, which can be managed through the system itself.

All the above demonstrates the technological metamorphosis of ILS in the academic library environment. One concern that remains, however, is the efficacy of the ILS systems in the academic library. Joint (2009) observes that information technologies should not be deployed for the sake of accumulating technology. Such an approach would be cosmetic and would waste the resources of the library. It would, therefore, be of greater value if the ILS was strategically deployed to fit in the needs profile of the academy or university. The study, therefore, attempted to assess the ILS in Makerere University to establish avenues of attaining a strategic fit of the system.

2.5 The importance of integrated library systems in academic libraries

As has been noted in 2.4, integrated library systems have gone through a period of evolution. It is further confirmed that integrated library systems have become an irreversible trend in any academic library that is worth its name. The apparent attractiveness of integrated library systems can be attributed to a number of factors. These factors are summarised by Cholin and Karisiddappa (2006) thus:

1. The establishment of integrated library systems enables the improvement of the capacity of the existing library facilities and also increases accessibility by more potential clients to library resources and services.
2. The deployment of integrated library systems promotes collaboration and cooperation among libraries for resources and their technical abilities.
3. Integrated library systems have the capacity to increase access to electronic information sources by the users of the academic library.
4. Integrated library systems enhance the compliance of the libraries with recommended library standards such as MARC standards.
5. Integrated library systems have the potential to address more users' needs and thus improve user satisfaction in an academic library.

Cholin and Karisiddappa (2006) contend that in the era of the internet, electronic documents, growing client expectations, an information explosion and the attractions of virtual library technologies, an academic library cannot be maintained solely through using the older, manual approaches. In fact, they refer to the maintenance of the older manual approaches as being "out of order". Therefore, integrated library systems provide an avenue to span and control the vast amounts of information available in the library system as well as promoting inter-library collaboration.

Though integrated library systems may share similar advantages, the extent to which they achieve these may vary from one system to another. Deddens (2002) observes that there are many vendors of integrated library systems that are applicable in an academic library environment. However, no two integrated library systems can be said to be one and the same. Each integrated library system may be produced with an edge in one respect or another. The differences lie in the capacity of their developers to comprehend the current and future needs of the academic library environment. Perhaps this explains the differences in the pricing of the different systems. Therefore, academic library managers ought to engage a sense of judgement to select the best system for their specific environment.

2.6 Importance of strategic alignment of information technology alignment in organisations

The above presentation confirms that information technologies have revolutionised the work in organisations of different sizes, operations and creeds, including academic libraries. However, accumulating technology for the sake of having technology is foolhardy in an era of financial austerity and increased user awareness (Joint, 2009). Nabende, Ahimbisibwe and Lubega (2007) confirm this in their analysis of the causes of the failure of information systems in organisations to align the deployed information systems with their business environment. This view reveals a very important aspect of deployment of information technologies, i.e. the importance of matching technology and the business environment to achieve the right mix.

Luftman (2000) states that the need for alignment has persisted as one of the core concerns for business executives. This concern seems to have grown over the years as businesses and service organisations have come to rely more and more on technology to conduct their activities. This opinion is also confirmed by Papp and Luftman (1995), who state that the case for information technology alignment seems to become important as an organisation strives to link technology and business, especially in an era of ever-changing technologies.

Luftman (2000) describes information technology alignment as the deliberative application of information technology in an appropriate and timely way, in harmony with institutional strategies, goals and the needs of the users of such technology in the organisation. Luftman (2000) further summarises the two major concepts that IT alignment describes as "[d]oing the right things and doing things right". This encapsulates the notion that not only is the right technology adopted in the entity (say a library) but also that the adoption of the said technology is done in the right way.

Somarajan, Weber and Surendran (2008) observe that in the deployment of technology one has to consider the hard and soft issues. Hard issues in this case relate to the standard technological architecture and whether the said technology works the same way as its peers in the same technological market. Soft issues, on the other hand, relate to the organisation's design and internal operating mechanism. Soft issues may involve the technological philosophy of the organisation, its business activities and processes, and its internal structures. It should, therefore, be the goal of every organisation to ensure that the technology deployed takes into consideration the hard and soft issues to ensure that the technology is aligned with the organisational environment.

2.6.1. The strategic alignment model

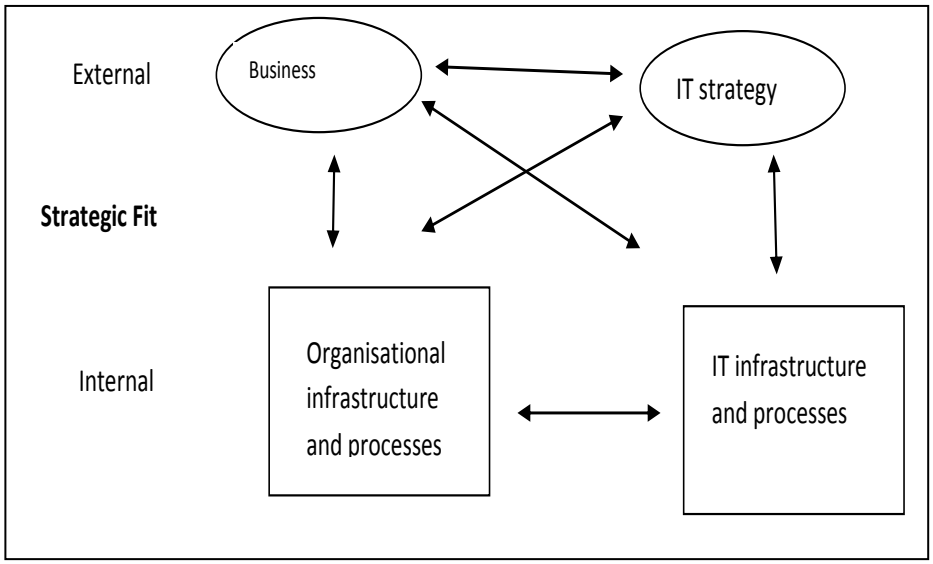
Smaczny (2001) observes that a revolutionary approach to the management of IT-related issues in organisations is the Strategic Alignment Model (SAM) approach. This approach

is termed revolutionary because it describes the position of information technology systems in a changing business environment. The model was first presented by Henderson and Venkantraman in 1991. According to Smaczny (2001), the SAM approach replaced a traditional approach that concentrated on the situational application of an IT system with one that takes into consideration the possible future and the futuristic position of technology in the organisation. He further contends that the approach is the best roadmap to achieving a strategic fit in an organisation.

Strategic fit in this context may be defined as the ability of an organisation to position itself based on its ability to accurately interpret its current positioning both internally and externally (Smaczny, 2001). The concept of strategic fit relates to strategic management. Strategic fit and strategic management both consider that when managing the organisational position one ought to look at the positioning of the organisation in its market environment. Therefore, strategic fit, just like strategic management, represents interplay between the business strategy of the organisation and its infrastructure and processes (Smaczny, 2001).

The SAM approach developed by Henderson and Venkantraman in 1991 is depicted by Smaczny (2001) as shown below.

Figure 5: An illustration of the strategic alignment model (SAM)



(Adapted from Henderson and Venkantraman (1991) in Smaczny (2001))

Figure 5 above demonstrate that for an organisation to attain a strategic fit, there is need for simultaneous thought to be given to both business strategy and IT strategy. In addition to this is the need for the simultaneous planning of the business and IT infrastructure and processes.

Smaczny (2001), however, questions the model for being too elaborate and as such requiring 'excessive' management skills yet such skills are not readily available. Besides, IT strategies tend to be more short-term compared to other organisational strategies. As such, it becomes extremely challenging to get the right fit as the IT strategy changes too fast. Consequently many organisations still deploy top-notch management approaches for other strategies, leaving the IT strategy out of the mix.

Despite the weakness of the model, it presents a unique outlook on IT management in organisations. Since academic libraries are increasingly deploying IT systems such as ILS, it is only prudent that they give this approach some thought.

2.6.2 Integrated library system strategic alignment in academic libraries

Strategic alignment in this context can be described as the situation in which the IT infrastructure of the organisation is positioned in relation to the strategy of the organisation. Semiawan and Middleton (1999) argue that for any organisation to achieve strategic alignment of its IT systems, the IT systems are aligned with the strategic and operational plans and processes of the organisation.

Semiawan and Middleton (1999) further contend that to achieve these, the organisation should have a strong and well-developed strategic information system plan (SISP) that consists of a strategy for both information planning and management, including the use of functions and features of information technology (IT). They conclude that it is only through this that the users of the deployed systems would perceive the value of the system and the information delivered.

The alignment of ILS is also necessary for academic libraries. Remenyi (1990) observes that what makes ILS "strategic" is that it directly supports and shapes the competitive strategy of the library. Despite the apparent attractiveness of an integrated library system alignment, very few academic libraries give it the attention that it deserves. Semiawan and Middleton (1999) note that integrated library systems in many countries are in most cases established in an uncoordinated manner, reflecting interests in isolated functional areas, thus resulting in issues of redundancy, waste and, ultimately, inefficiency.

In the light of this, it is important that academic library managers make deliberate efforts to align their systems to ultimately justify their deployment.

Semiawan and Middleton (1999) recommend that an integrated library system that would be considered to be well-aligned can be attained through a carefully thought out process of planning of the system that suits the academy that hosts the academic library. This process should consider the following issues:

- That the policy and guidelines for the management, creation, maintenance, control and accessibility of the ILS is determined.
- That the ILS functions central to the library environment are determined and repositioned.
- That the architecture on which the ILS can run efficiently is built and maintained.
- That the portfolio of skills required for administering the ILS over its lifetime is acquired or its acquisition is planned.
- That a suitable organisational structure of the library that positions the ILS management team strategically in the whole library is determined and developed.
- That the aims of the ILS are clearly determined and widely communicated within the whole library environment and the academy in which the library operates.
- That the roles and responsibilities related to the maintenance of the ILS are determined across the whole library and academy so that there is shared ownership of the ILS.

When this is done, a library will achieve a level of alignment of its ILS and other IT deployments.

As noted by Smaczny (2001) above, not all organisations attain strategic alignment of their IT systems. In the same vein, not all academic libraries attain strategic alignment of their ILS systems. This results in incompatibility in the system, costly maintenance, redundancy and, ultimately, inefficiency in the operations of the whole library. Nutefall and Chadwell (2012), however, note that even in the absence of a properly aligned system, efforts can still be made through which the ILS may be realigned to attain the required strategic fit. Realignment in this case can be prompted proactively by the management of the academic library or reactively to respond to the effects of the misaligned systems.

Nutefall and Chadwell (2012) outline three major reasons why ILS systems may need to be realigned. These include the following:

- The need to match the tremendous technological change in the field of library technology.
- The need to meet budget requirements and financial austerity.
- The evolution of management to manage change.

All these requirements are especially valid when careful planning is undertaken so the realignment is responsive rather than reactive to the present and perceived future needs of users (Nutefall and Chadwell, 2012).

The success of the realignment process is not assured for every ILS system. Kurien (2004) observes that even when efforts are made to realign ILS, sometimes the systems still fail the alignment test. Kurien (2004) summarised six major reasons why this scenario occurs:

- Failure by ILS vendors to provide reliable long-term costs of the ILS systems.
- Unrealistic expectations, thus the setting of overly ambitious targets for ILS.
- Failure to apportion responsibility across the whole academy with regard to ILS, thus breeding confusion.
- Poor planning across the whole organisation and the library in particular.
- Failure by the ILS team to justify particular costs.
- Failure to define success with regard to ILS alignment.

2.7 Research gap

Kurien (2004) states that whereas information technologies have benefited many organisations as they have increased efficiency and increased user satisfaction, these benefits risk being eroded if the marriage of IT and business processes and environment is not properly handled. Therefore, there is need for managers to vigorously undertake the strategic alignment of their technologies with the current and strategic progress of the entire organisation. Kurien further notes than most of the organisations that have IT budgets spend approximately 70% of the budgets on maintaining the system. This may not be a strategic advantage to the organizations, especially in the era of financial

austerity. The same can be said of academic libraries which, like many other departments, are facing increasingly dwindling financial endowments. As such they cannot afford to maintain technologies that are considered money-siphoning ventures.

Since the adoption of ILS by Makerere University, there has been a notable lack of coherence between the library information systems with the rest of the university information systems and business needs (Nabende, Ahimbisibwe and Lubega, 2007). Currently there are a number of ICT systems used for human resources (Human Resource Information System – HURIS), student academic resources (Academic Records Information System – ARIS), library resources (Makerere Library Information System – MAKLIBIS) and financial resources (Financial Information System – FINIS). All these have existed as standalone systems, with each requiring independent management. However, all these do not have coherence with the library information system and this represents a challenge.

This study attempts to assess the strategic alignment of the ILS so as to attain a strategic fit with the corporate environment of the University and achieve its institutional strategy.

2.8 Conclusion

The above presentation has provided a literature review for this study. It has confirmed the need for the strategic alignment of IT systems in corporations and, in more specific terms, the need for the alignment of ILS in academic institutions. Chapter Three will present the methodology that was used to conduct the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research design and methods for this study. It specifically identifies the processes of gathering, analysing and interpreting data that were used in this study. This chapter begins with the research design, which is a description of the research approach. It further attempts to describe the population of this study. It also looks at the data collection tools that were used in the course of the research. It also presents the data collection instruments that were used in the process of data collection and the methods that were used to maintain the validity of the research instruments.

3.2. Research design

Katebire (2007) describes the concept of research design as a general strategy adopted for answering the research questions. Bell (1997) observes that the research design outlines the basis for making an interpretation of data and establishes the format for detailed steps to follow when conducting a study. Bell (1997) further contends that the "research universe" is guided by two major research design paradigms, ie the quantitative research and qualitative research paradigms. Each of these paradigms is further conducted using relevant data collection and analysis approaches as the need may arise (Enon, 1998).

This study was conducted using the qualitative research paradigm. Easterby-Smith et al. (1991) note that qualitative researchers use words and meanings from studies as opposed to numbers and quantifiable units to draw meanings, which is the focus of quantitative research.

In adopting the qualitative research paradigm, this study used two approaches, ie literature survey and case study design.

3.2.1 *Literature survey*

The literature survey was adopted to enable the establishment of terms and aspects applicable in this study of IT alignment in organisations. The literature surveyed included secondary and tertiary resources such as research studies carried out by other people, related studies published in journals and textbooks, and online databases. Information used in this method was acquired from official documents in the Makerere University Library such as manuals, reports, and statistics that relate to the use of ILS in the library. This was blended with web documents and text books relating to the subject of adoption of IT in library settings and management of IT alignment. It should be noted that the selection of the literature was not limited to geographical location. The researcher blended literature from as early as 1960's to 2012. This was considered important since it allowed for comparison of ideas on the subject over a longer period of time before deductions could be drawn.

The literature survey further provided a useful background for comparing the alignment of ILS at Makerere University with IT alignment in selected ideal situations in other academic institutions.

Finally, the literature review also provided invaluable secondary data that supplemented the empirical data collected through the case study methodologies.

3.2.2 *The case study design*

Yin (2009) states that the case study design is mostly used when conducting research in the social sciences and not the natural sciences. This is in addition to other methodological approaches which include, but are not limited to, experiments, histories, surveys, and epidemiologic research. Yin (2009), however, notes that the use of case studies stands out as the most challenging compared to other approaches. There are a variety of definitions for the term "case study" but for the purpose of this study, Yin's definition was adopted.

The case study design in this case may refer to "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real life context" (Yin, 2009). This study, therefore, focused on investigating the contemporary adoption of ILS technology and how this is aligned to the Makerere University strategy. The core theme here is that the data collected in the methods is acquired using empirical methods.

Olivier (2009) notes that case studies may be adopted using single case approaches or multiple case approaches. This study was conducted using a single case study approach. This view is also confirmed by Yin (2009), who states that single case studies may be used if the researcher has no interest in generalising their findings to other cases. Indeed, this study does not intend to generalise the findings beyond its relevance to Makerere University.

3.3 Scope of this study

The scope of this study is divided into three major elements: geographical scope, time scope and conceptual scope.

3.3.1 *Geographical scope*

This study was conducted at Makerere University. This is the oldest university in Uganda and is located in Kawempe division in Kampala City. Specifically, this study was conducted in the Main Library of Makerere University and the Directorate of Information Technology (DICTS).

3.3.2. *Time scope*

This study was conducted from February to November 2012.

3.3.3 *Conceptual scope*

Conceptually this study was focused on two major areas, ie the integrated library system and its alignment to the strategy of the academic institution. The two concepts are examined in the previous two chapters of this mini-dissertation.

3.4 Population

Epsteil (1997) defines a population as a complete set of elements (individuals and objects) with some common observable characteristics on the basis of which they are included in a study. Enon (1998) notes that it is critical to distinguish between the populations for which the results are required. For the purpose of this study, the population included the systems administrator of the integrated library system at Makerere University, a librarian from the University Library and the manager of the Directorate of Information and Communication Technologies (DICTS) of Makerere University. These were selected because of their roles in the establishment and management of IT systems in the library and the University respectively.

The research population of this study also included the IT systems adopted at Makerere University, including the ILS in the University Library.

The size of the population in this study is consistent with the application of the qualitative research design. Enon (1998) confirms that in the conduct of qualitative research, there is little influence of the size of the population since this study seeks more to establish meanings than draw quantitative conclusions.

3.5 Sampling

Enon (1998) defines sampling as a deliberate process of selecting a part of a population for study with the intention of generalising the findings to the whole population. As such a part of the population (sample) is selected with the results generalised to the whole population. Sampling in a research undertaking can be random, non-random, or a combination of both (Bell, 1997).

For the purposes of this study, no sampling was conducted. All the members of the population were selected for empirical data collection.

However, in the case of the literature review, the sources were selected on the basis of their perceived relevance to this study.

3.6. Description of data collection methods

In 3.2 above it is stated that this study considered the use of both secondary data and primary data.

For the purposes of this study, secondary data was collected through the use of a literature survey. In this method both published and non-peer-reviewed materials such as books, reports, journals and internet resources were used. The literature survey further provided a useful background for comparing the alignment of ILS at Makerere University with IT alignment in selected ideal situations in other academic institutions.

Primary data was collected using two methods, ie the interview method and the observation method. However, care and thought was given to the application of these methods since this study had taken a case study dimension.

3.6.1 *Interview method*

Bell (1997) describes an interview as a dialogue between the interviewer and the respondent with the purpose of eliciting certain information from the respondent. Interviews take different forms, ranging from face-to-face interviews to technology-mediated interviews.

In this study face-to-face interviews were conducted to obtain primary data. This type of method is credited with allowing the interviewer room for probing and gathering more information depending on the knowledge, ability and experience of the respondent (Epsteil, 1997).

Through the use of this method, interviews were conducted with the systems administrator to establish the performance of the ILS used in the Makerere University

Library, the usability of the system across the library services range and the challenges faced in the use of the system.

An interview was also conducted with a librarian from the University Library to establish the strategy of the library and the University as a whole, and the place of the ILS in achieving these strategies. The interview with the librarian also provided information on the history of the University Library and its adoption of technologies.

The third interview was conducted with the manager of DICTS to establish the place of ILS in the university-wide IT strategy and the university strategy.

3.6.2 *Observation*

Observation can be defined as a purposeful examination of research phenomena for purposes of gathering data. It involves the use of sensory organs to make sense of the study phenomena (Katebire, 2007). This method was chosen because it has the advantage of eliminating bias that may inadvertently be introduced by respondents, particularly through other methods such as questionnaires and interviews (Katebire, 2007).

Observation was a good technique, especially for activities that could not be measured, for example the time the users spent using the computer; the number of users in the library; the time the users spent in searching for documents; the condition of the equipment, especially the computers; and the guidelines and rules on the use of electronic resources, such as passwords on noticeboards and display stands.

3.7 Data collection instruments

Below are the instruments that were used for collecting data. The selection of these tools was guided by the nature of the data to be collected, the time available as well as by the objectives of this study.

3.7.1 *Interview guide*

According to Ritchie and Lewis (2003), an interview guide lists questions, topics and issues to cover while collecting data, especially in qualitative studies. However, since this study is based on the case study paradigm, the interview guides had to abide by the best practices of interview guide construction. Yin (2009) states that case study interview guides are deliberately constructed to collect in-depth data from the interviewees devoid of any biases. Such guides are, therefore, recommended to contain open-ended questions and should be semi-structured in nature. The semi-structured component in this case implies that the questions set for the interviews are alterable and do not have to be followed verbatim as the need may arise in the course of the interviewed (Ritchie and Lewis, 2008). Open-ended questions, on the other hand, imply that the questions are framed in such a way that they can elicit both facts and opinions from the respondents (Yin, 2009).

In this study, three semi-structured interview guides were used to guide the researcher in order to collect the necessary data from the University Librarian, the systems administrator in the library and the manager of DICTS (see Appendices B, C and D).

Although the interviews were conducted in a semi-structured form, the data elicited was carefully recorded, coded and made ready for analysis and presentation.

3.7.2 *Literature review guide*

A literature review guide was used to collect secondary data obtained in the literature survey. This instrument guided the researcher to remain focused on the area of study; it enabled the researcher to obtain wider knowledge of the subject and to get to provide a more organised approach to the background information that relates to the topic of IT alignment in organisations and thus establish the research gap. The researcher was able to analyse official documents in the Makerere University Library such as manuals, reports, and statistics that relate to the use of ILS in the library. A Literature review guide was used to select particular data that could be provided from the above documents. Appendix E provides a sample copy of the literature review guide.

3.7.3 *Observation guide*

This instrument contained several aspects that the researcher took into consideration while observing this study phenomenon in the Makerere University Library. The guide was particularly useful for activities that could not be measured, for example the time the users spent using the computer; the number of users in the library; the time the users spent searching for documents; and the condition of the equipment, especially the computers. Results from this instrument were of much help to the researcher as they helped to complement results from the interview method and the literature survey.

An observation guide was developed and used for setting expressions that could not be obtained using other instruments (Appendix A).

3.8 Data quality control

Epsteil (1997) states that the quality of research reports depends to a large degree on the quality of the data used to compile the report. Epsteil further states that such quality is ensured by three elements of the data: accuracy, reliability and validity of the data. To ensure data quality control and internal validity of this study, the researcher conducted pilot studies to pretest the data collection instruments used in this study.

3.8.1 *The purpose of the pilot testing*

Pilot testing was conducted and the necessary adjustments made to the data collection instruments. Yin (2009) notes that pilot studies enable one to refine the data collection tools and the procedures to be followed.

The participants were selected purposively basing on their perceived knowledge of the subject under study, their accessibility and their proximity to the geographical area of study.

The pilot studies were conducted with individuals who were serving in the units where the population of this study was based. These included:

- a member of the IT unit of the library;

- a member from the Directorate of Information and Communication Technology Support (DICTS) of Makerere University; and
- a member of the management team of the University Library.

The pilot study revealed the adjustments required; for example, it helped in eliminating unnecessary questions and adjusting the length of the interviews that were to be conducted.

3.9 Data analysis

Yin (2009) rightly observes that analysing qualitative data in case studies is one of the most challenging stages in a research process. Yin (2009) further recommends that data analysis in case studies should be done by categorising, tabulating, and testing both quantitative and qualitative evidence to address the initial proposals of the study.

Since this study was based on a single case study dimension, the researcher conducted qualitative analysis of data obtained in the data collection process. This involved refining data during and after collection to sort out mistakes, coding the data by building themes and sub-themes, and systematic description of the contents of the data in a reduced form. Finally, meanings were explained, interpretations were made in relation to research objectives, discussions were done, and conclusions were drawn on the basis of the emerging information and presented thematically in line with the propositions of this study.

3.10 Ethical considerations

In order to abide by the general best practices that guide empirical studies at the University of Pretoria, the following process was adhered to ensure that this study was ethically done:

- Ethical clearance for this study was obtained from the Faculty Research Committee, under the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria

- The participants were asked to sign a sign-off sheet to confirm that they had consented to take part in this study. On the sign-off sheet the researcher provided contacts for the participants to enable them to request any further information that they might need regarding this study.
- The researcher assured the participants about confidentiality and that the information given to him would be used for purposes of this study only.
- The researcher ensured that the research process was devoid of any strenuous psychological or physical risks.

3.11 Conclusion

The above presentation has described the research methodology used in this study. This is consistent with the research guidelines provided by the University of Pretoria. The methodology involved the use of case study analysis of the alignment of an integrated library system.

Chapter Four will attempt to present the findings obtained using the various methods discussed in this chapter.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents and discusses key findings of the study. This being a qualitative study, these findings were attained using methodologies and tools that are considered suitable for qualitative data collection. These included face-to-face interviews, observation and literature search. The findings are presented in relation to the aim and objectives of the study that were established in Chapter One (1.4 and 1.5). The findings are presented under the following themes:

- Description of the respondents of the study.
- Description of service units concerned with the deployment of IT systems in the library:
    - Description of the position of the Directorate of ICT at Makerere University;
    - Description of the position of the University Library at Makerere University; and
    - Description of the position of the the Information and Communication Technology (ICT) section of the library in relation the University Library.
- Description of IT systems adopted at Makerere University.
- Description of the IT systems adopted in the Makerere University Library.
- Description of the integrated library system adopted by the Makerere University Library.
- Rationale for the choice of the integrated library system adopted by the Makerere University Library.
- Relationship between the integrated library system and the rest of the IT systems adopted at Makerere University.

- Challenges to the alignment of the integrated library system with the rest of the university strategy.
- Strategies to achieve strategic alignment of the Integrated Library System in the Makerere University Library.
- Conclusion.

4.2 Description of the respondents of the study

It was indicated in Chapter Three that the study used both primary and secondary data. Secondary data was obtained from an array of literature sources. Primary data, on the other hand, was obtained using observation techniques and through interviewing selected key respondents.

The respondents of the study included the systems administrator of the integrated library system at Makerere University, a librarian from the University Library and the manager of the Directorate of Information and Communication Technologies (DICTS) of Makerere University. These were selected on the basis of their roles in the establishment and management of the IT systems in the library and the University respectively.

The librarian: For purposes of this study a Senior Librarian was chosen. The librarian was selected because she was perceived to be using the ILS on a routine basis. Besides this, seniority was considered important owing to the influence that the librarian at this level is perceived to have in the selection of systems in the library and in steering the overall strategic direction of the library.

The manager at DICTS: This was selected owing to the fact that DICTS has influence over all IT deployments in all units at Makerere University. Therefore, a person managing this unit would have a direct influence in the selection of the IT systems even for the University Library.

The systems administrator in the University Library: This was selected owing to the established role that this person has in the daily administration of IT systems in the Makerere University Library.

As noted in Chapter Three, this study adopted a qualitative approach and, as such, the size of the population in the study is consistent with the application of the qualitative research design. This is in line with Enon's (1998) viewpoint that the size of the population has little influence in the conduct of qualitative research; and this study sought more to establish meanings than to draw quantitative conclusions. Since, as can be observed above, the respondents were from different service units of the University, it is important to establish the position of each of these units and how they relate to one another to achieve the overall university strategy. These are described in 4.3 below.

4.3 Description of service units concerned with the deployment of IT systems in the library

These units include:

i) The Directorate of Information and Communication Technology Support (DICTS)
ii) The University Library
iii) The Systems Unit of the University Library

4.3.1 The position of the Directorate of Information and Communication Technology Support (DICTS) at Makerere University

It was established that the Directorate of Information and Communication Technology Support (DICTS) is the coordinating service unit that was set up to provide specialised expert services and guidance on ICT to all academic and administrative units at Makerere University.

This unit was established at the turn of the 21st century after the realisation that ICT was gaining a lot of importance in the attainment of the overall university strategy. A survey of the University Strategic Plan 2008/09-2018/2019 revealed that ICT was identified as a

strategic enabler to achieve the overall university strategy. Despite the growing importance of ICT to Makerere University, the University had to rely on expensive ICT support from outsourced options. Owing to challenges associated with the sustainability of outsourced options, the Makerere University administration deemed it necessary to establish an in-house unit that would provide the much-needed ICT support, thus the establishment of DICTS.

The unit is charged with the responsibility of providing all the necessary ICT support to all the academic units (including colleges and schools) and administrative units of the University. This support is required in the following areas:

- Software acquisition and maintenance
- Webpage publishing
- IT infrastructure development
- IT system acquisition and maintenance
- Development and enforcement of ICT policies
- Provision of mail certificates
- Provision of voice over internet protocol services
- Maintenance of networks, including wireless and remote access
- Provision of internet services over the whole university

The ICT support is provided to both the main university campus and off-campus locations. Some of the off-campus locations are as distant as 250km from the main campus, for instance the Fort Portal campus of Makerere University.

Owing to its relevance to all the units of the University, DICTS was established as an independent unit whose leadership reports directly only to the leadership of the University. This arrangement implies that no single academic or administrative unit monopolises or gets special treatment from DICTS. It also implies that decision-making in DICTS is devoid of unfair coercion from any unit of the University.

DICTS, however, still has to compete for budget financing for its activities like any other units at the University.

DICTS is currently divided into five units. These units are given names that relate to the type of ICT support that they provide to the units in the university. These include:

- The Database Unit (charged with support in the area of database management across the University)
- The End-user Support Unit (charged with support in the establishment of end-user solutions)
- The Networks Unit (charged with the establishment and maintenance of the university-wide network)
- Planning and Maintenance Unit (charged with the establishment and maintenance of the ICT infrastructure at the University)
- The Systems Unit (charged with the coordination of the acquisition and maintenance of various information systems at the University)

All these units are coordinated by a leadership team headed by a director. The director directly reports to the vice chancellor. At the time of this study, DICTS did not have a substantive head. However, there were plans to recruit one in the near future.

Despite DICTS' appointed role to provide ICT support functions to the University, there is a considerable number of units in the University that still hire their own experts to provide routine support. This is partly due to the fact that DICTS has a small staff who are unable to reach out to all units of the University.

Besides that, there are units that procure IT solutions without consulting DICTS. This is more characteristic of IT solutions that are accessed using funds acquired from development partners (donors). An example is Virtua integrated library system which

was first acquired using donor funds. As such, there was limited input from DICTS. However, since the deployment of the systems within it, the library has involved the DICTS team, as new versions have been adopted and upgrades made.

4.3.2. Description of the position of the University Library at Makerere University

The University Library is at the heart of all academic activities at Makerere University. However, despite Makerere University having been set up in 1922, the library was not constructed until 1959 (Makerere University, 2012). Since its establishment, Makerere University has been evolving in terms of academic structures and size of the student population. To meet this expansion and evolution, the library has been expanded time and again, with major expansions being executed in 1962, 1972, 2006 and 2012.

In addition to the expansion of the central library complex, different branches have been opened up in the different academic units. This has created a complex library system, with the Main Library complex forming the central coordinating centre and the different branches providing the different subject-specific information services to the clients of the different academic units. Currently,, the library system compromises the Main Library complex, which is approximately 12,000 square metres with a seating capacity of over 2,800 (Makerere University Library, 2012). In addition to the Main Library complex, the library system at Makerere University also comprises nine college libraries and one school library. These serve the respective academic units which at Makerere University are referred to as colleges and schools. Seven of the colleges are on the Makerere University main campus and these include:

- the College of Business and Management Sciences;
- the College of Computing and Information Sciences;
- the College of Education and External Studies;
- the College of Engineering, Design, Art and Technology;
- the College of Humanities and Social Sciences;
- the College of Natural Sciences; and

- the College of Veterinary Medicine, Animal Resources and Bio-Security.

Two of these colleges are situated in off-campus locations and these include the College of Agriculture and Environmental Sciences at Kabanyolo (approximately 20 kilometres from the main campus) and the College of Health Sciences at Albert Cook Medical Library at Mulago (approximately two kilometres from the main campus).

Furthermore, there are colleges which operate smaller "book banks" which are operated as sub-branch libraries. A case in point is the College of Computing and Information Sciences which operates a branch library at the School of Computing and Informatics Technology (SCIT) and another at the East African School of Library and Information Science (EASLIS).

All the above units are manned by librarians who are deployed by the University Library management team. However, the librarians are too few to effectively undertake the tasks that they are required to. This has compelled some academic units to hire their own library assistants to provide additional services. These individuals are remunerated by the individual academic units. This state of affairs implies that the University Library management team does not have complete control over the quality of services offered by the staff hired by the academic units. A case in point was a book bank in the College of Business and Management Studies where two of the people deployed to provide support to the librarian were not even professional librarians.

As mentioned above, all the above units are coordinated by the University Library management team. This team is made up of the University Librarian and two deputies. The University Librarian sits on the university management team and the University Senate. In fact the University Librarian reports to the University Vice Chancellor through the Deputy Vice Chancellor in charge of Academic Affairs. This is significant because it implies that the library is recognised as central to the overall University, hence the reservation of a seat for it on the university management team. It also implies that the

library is positioned to meet the specific needs of each of the academic units at the University. Besides that the inclusion of the University Librarian on the university management team is also significant in that it enables the library strategy be aligned with the the overall university strategy. There is evidence of such an occurrence. A survey of the University Strategic Plan 2008/09-2018/2019 revealed that the library is highly esteemed and as such deemed to be central to the achievement of the overall university strategy. However, for the library to live up to its pivotal role at management level, it depends to a great extent on the shrewdness and "management tactical awareness" of the University Librarian of the day.

Below the deputies to the University Librarian are heads of sections. As of 2012, the Makerere University Library had eight sections. These included:

- the Technical Services section;
- the Periodicals/Serials section;
- the Reference and Circulation Section;
- the Africana Section;
- the Information and Communication Technology (ICT) section;
- the Microfilming and Digitisation section;
- the Book Bank section; and
- the Bindery section.

From the above list it is evident that ICT is viewed as a strategic enabler to achieve the library's strategy; hence its being accorded an independent section. The strategic position of the ICT sections is further discussed in 4.3.3 below.

Makerere University Library is, clearly then, fundamental to the achievement of the overall university strategy and in improving public perception about the University. Indeed, the library continues to constitute an integrated source of information resources that are critical to academic work and research at Makerere University. Metz (2010)

observes that academic libraries serve multiple communities. Metz classifies these communities into groups that include faculty staff, students, and members of the general community. This is also true of Makerere University Library, which serves faculty staff and students, and even members of the public and foreign researchers.

Besides that, the quality of the library is central to the public perception and professional accreditation of the whole university. The National Council for Higher Education (NCHE) (2005) holds the same view and thus partly bases accreditation of universities in Uganda on the quality of library services available at the universities. Makerere University is ranked above all its peers in Uganda and, indeed, it can be said to have the largest library in the country.

4.3.3 The position of the Information and Communication Technology (ICT) section in the Makerere University Library

As noted in 4.3.2 above, the Information and Communication Technology (ICT) section is one of the eight sections that make up the Makerere University Library. The establishment of this section came much later compared to most of the other seven sections. It was established as a result of the realisation that the library was adopting a lot of ICT in its range of services. It was concluded that it was, therefore, imperative to establish a unit that would coordinate the newly adopted information technologies. The unit was thus first established as a sub-unit of the Technical Services Unit. However, owing to growth in the use of ICT, the unit has since then been elevated to the level of a section. At the time of data collection, however, the system was still under the head of the Technical Services section of the library. This was attributed to failure to identify a person who was able to combine both the skills of the librarian and an understanding of IT for libraries.

However, the section is manned by staff who graduated with IT-related qualifications and is charged with the provision of routine IT support to the different sections of the library.

This section is also a conduit between the University Library and DICTS. However, some of the high-level IT support is still sourced from DICTS. This indicates that the IT deployments are not done without involving the rest of the University. It further indicates a commitment by the University to align IT deployments to achieve an IT strategic fit across the whole University.

It can, therefore, be deduced that, though this section is still quite small compared to the other sections, its establishment is a "wise" realisation of the need for specialised ICT support for any "forward thinking" library. This view is supported by Joint (2009) in his assertion that the future of a library that does not actively embrace IT is in jeopardy.

The positioning of the Information and Communication Technology (ICT) section is a sign that the Makerere University Library is committed to the adoption of ICT in providing services to its clients. 4.4 below will further discuss the IT systems deployed in the library.

4.4 Description of IT systems at Makerere University

In 2008 Makerere University published its 10-Year Strategic Plan covering 2008/09 to 2018/19 (Makerere University, 2008). The plan was meant to provide a foundation for decision-making at all levels of governance at the University. One of the five core thematic areas in the plan was the creation of an ICT-enabled environment.

Highlighting ICT as a strategic enabler implied that there was commitment to adopt modern ICT solutions in the various units of the University.

An interview held with a manager at DICTS and observation made at selected university units revealed that indeed the University has deployed a number of IT systems. These systems can be put in four major categories:

- Hardware
- Software (including operating systems and application software)

- Integrated information systems
- Networks

4.4.1 *Hardware*

Hardware is considered to include the physical components that make up a computer system. Hardware includes input devices as well as output and storage devices that are used with computing systems. It was observed that Makerere University units used mostly hardware that relates to desk top computers. These are shown in the Table 1 below.

Table 1: Categories of IT deployments at Makerere University

Categories of hardware	Examples of the hardware
Input devices	Mice, keyboards, digital cameras, microphones, scanners
Output devices	Speakers, monitors (mostly flat screen monitors), liquid crystal display projectors, overhead projectors and printers
Storage devices	Computer hard disks, microfilm, external portable hard disks, flash disks, compact discs and DVDs

(*Source*: Field data, 2012)

The distribution of the hardware and the general computing facilities is not even. It was revealed that some academic units possessed the latest versions of the said hardware compared to others. This was attributed to the ability of those units to attract project funding as compared to others. A case in point was the College of Computing and Information Sciences which had numerous computer laboratories equipped with much computer equipment yet there were colleges which had very small computer laboratory space.

In addition, there are staff members who purchased their own computers which they use in the course of conducting university routines. Through this mode of acquisition, some staff have come to possess even tough screen tablets.

Despite this state of affairs, the University, through DICTS, provides access to modern computing equipment in some selected cases. Furthermore, DICTS provides advice on the procurement of computing equipment. This is aimed at the standardisation of hardware across the University.

The above presentation also reveals that the University has not adopted methods to create online storage options provided by proponents of cloud computing. Dempsey (2005) notes economy and unlimited availability as the fundamental advantages associated with cloud storage. Makerere University still heavily relies on the acquisition of "traditional" storage hardware. For example, even information that is meant to be provided online is kept on institutional servers as opposed to hiring online storage.

4.4.2 *Software*

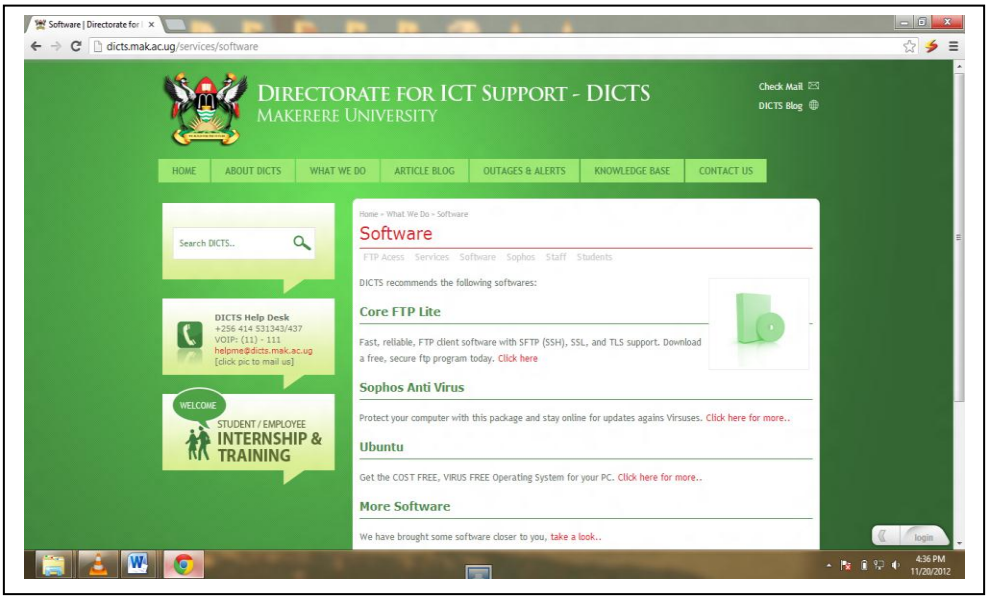
For the purposes of this study, software was considered as the various computer programs adopted at Makerere University. Respondents revealed that there are two major forms of software, namely operating systems and application software.

Operating systems: It was observed that most of the computers at Makerere University run on Microsoft Windows-related software. These range from Windows XP (service packs 2 and 3), Windows Vista, to Windows 7. Further observation revealed that even in the same office different computers had different operating systems.

Further observation also indicated that there is also significant adoption of Linux operating systems. The respondents revealed that the choice of operating systems has not been highly regulated at the University. Individual units have the freedom to make

choices that suit their unique situations. Even within individual units, people who have personal computers are allowed to have their own operating systems. However, since 2010 DICTS has been encouraging the various units at the university to use Linux operating systems. Figure 6 below shows a snapshot of the DICTS website indicating to the readers the recommended type of software. Among these are the Linux operating systems.

Figure 6: A snapshot of DICTS website indicating recommended software



(*Source*: http://dicts.mak.ac.ug/services/software)

This is because of reports that indicated that Microsoft was coming to test University computers to verify whether all software was genuine of counterfeit. DICTS, however, has since failed to have all the units adopt their recommended software owing to lack of manpower and reluctance of staff to adopt Linux. DICTS noted that most of the people at the University had grown so accustomed to the Windows environment that they found venturing into the use of Linux quite intimidating.

Application software

The respondents indicated that the popularity of the Microsoft Windows operating system was matched by an equally impressive level of popularity of Microsoft Office applications. This was revealed in most of the offices and computer laboratories visited during data collection. These systems were adopted in the course of basic document production. The respondents indicated that the popularity of these applications could mainly be attributed to the fact that they are the most widely taught computer applications in computer training institutions, both at Makerere University and across the country. As such most people are more inclined to use these even in the course of their work.

DICTS indicated that there was little influence over the sourcing of these applications. This implied that the individuals and individual university units could get their own Microsoft Office applications without consulting DICTS.

In addition to the Microsoft applications, some specialised applications were adopted to conduct specialised tasks. The respondents indicated that these were sometimes configured with the help of DICTS. Examples of these included Moodle for conducting e-learning across all the university academic units and Koha integrated library system used by EASLIS to conduct the training of librarians. Both these are configured at the request of the individual units.

It is evident that although the University seems to have the desire to adopt ICT in its service range, its investment in the adoption of these systems is still meagre. Besides, DICTS still has very limited control over the acquisition of software. This has an impact on the alignment of ICT across the whole University. The "freedom" extended to units and individuals to adopt their own software puts the University at risk of software and information systems misalignment.

4.4.3 *Integrated information systems*

Since 2004, the University has taken up Information and Communication Technologies (ICT) as a strategic enabler to fulfil Makerere University's strategic objectives (Makerere University, 2011). One of the key features of this movement was the adoption of key information systems in key functions of the University. The respondents indicated that there are various forms of such systems and that they include the following:

- The Human Resource Information System (HURIS) for the management of information related to the human resources at the University.
- The Financial Information Systems (FINIS) for the management of information related to the financial resources at the University.
- The Academic Records Information Systems (ARIS) for the management of information related to students' academic records at the University.
- The Makerere Library Information System (MAKLIBIS) for the management of information related to the library resources at the University.

All the above information systems were acquired from commercial vendors. This implies that these had to be configured and aligned with the environment at Makerere University.

The respondents indicated that HURIS, FINIS and ARIS were all acquired from Integrated Tertiary Software (ITS), a company based in the Republic of South Africa. All the ITS systems are on-line systems. This implies that users interact directly with the database via internet connections. Therefore, information is input and updated directly into the database by certified users via computer terminals connected to the internet.
On the other hand, MAKLIBIS is based on an integrated system called Virtua integrated library system. This system was acquired from an American company called Visionary Technology Library Solutions Incorporated (VTLS).

Furthermore, efforts were being made to achieve the integration of some of the information systems. For example, ARIS and FINIS have been integrated to the extent

that one can get the academic and financial records of a given student from the same interface. It was also reported that MAKLIBIS was in the early stages of integration with the University Academic Records Information System (ARIS) and the Financial Information Institution (FINIS). At the end of the integration process, it is envisaged that users will be able to use the same cards for using the Makerere University Library as well as meet their financial obligations to the library, such as fines and subscriptions. However, the software for the library is still not integrated with the rest of the university information systems.

The fact that HURIS, FINIS and ARIS are all acquired from the same vendor and yet MAKLIBIS is supported by a different vendor implies that alignment of all the information systems in the university will continue to be problematic. However, the adoption of professionally designed information systems is a sign of commitment by the University to achieve the University strategy using modern tools.

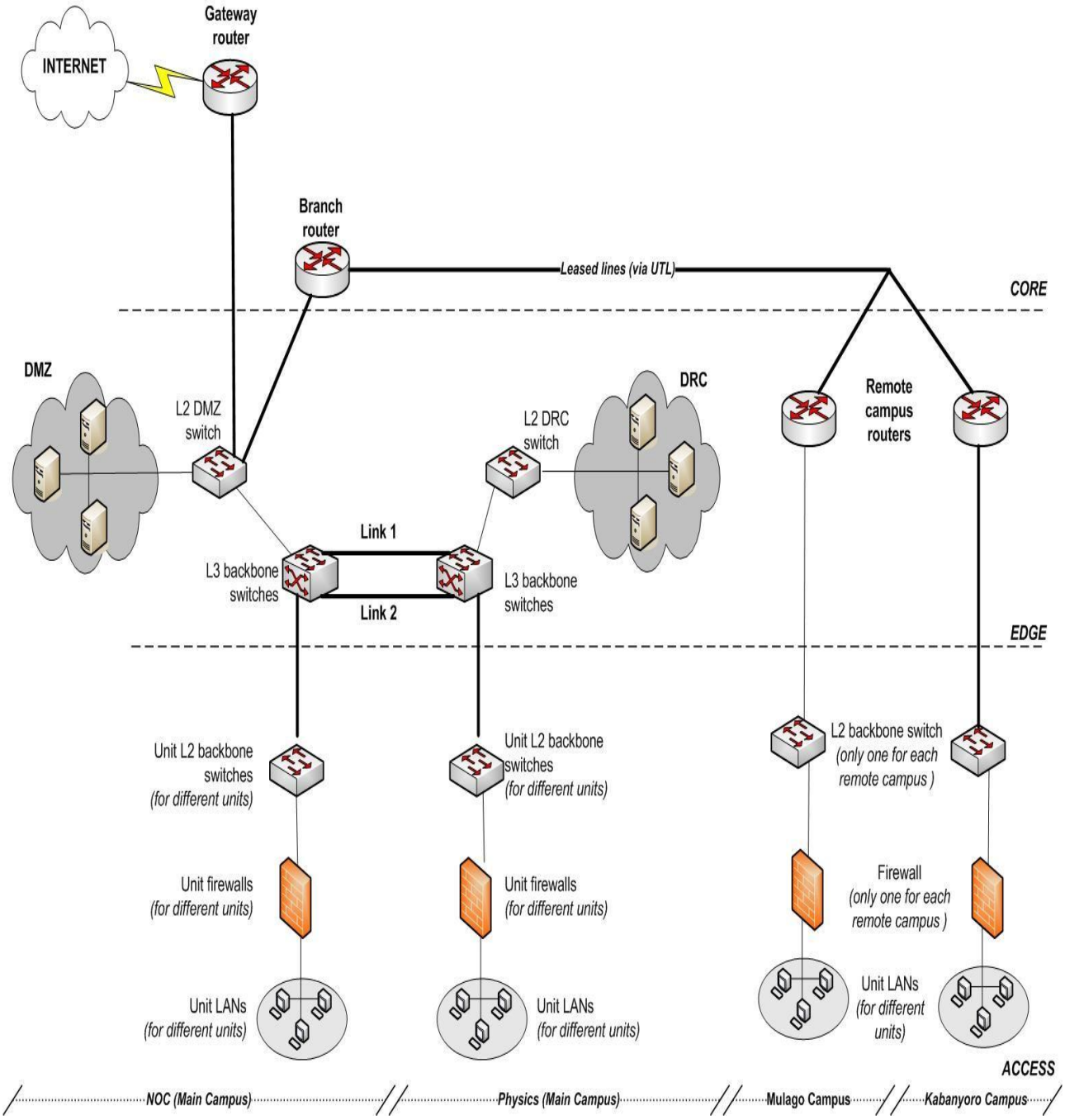
4.4.4 *Network*

For the purposes of this study the term "network" is used to describe an interconnection between two or more computers for the purpose of communication. It should be noted that computer networks vary in coverage and in levels of sophistication. With regard to coverage, computer networks may be classified into four major categories, namely: local area network (LAN), metropolitan area network (MAN), wide area network (WAN), and internet (international network) (Mitchell, 2011).

However, a number of authors have come up with more nomenclatures, all in the name of network classification. Today descriptions such as small area network, campus area networks, global area network and home area network are rather popular. Still, all these describe one or more forms of the 'major four' categories mentioned above. In addition, no matter the form of network an organisation chooses, it has to be either a wired or a wireless form of technology.

Makerere University operates a wide area network which is controlled by the Network Operating Centre (NOC) hosted by DICTS. Each college or administrative unit operates a semi-autonomous local area network and common servers are maintained at the network operating server. The Network Operating Centre controls the main servers in the network as wells as managing internet distribution across the university main campus and the remote campuses. Figure 7 below illustrates the current network structure at Makerere University.

Figure 7: The structure of the Makerere University network



(*Source*: DICTS 2010)

At the local area network level, the different academic and administrative units are connected through a combination of both wired and wireless technology using ethernet cables and fibre optics. Through computer networks, the information from all media can be shared over a vast geographical area (Mitchell, 2011).

From this section, it can be deduced that Makerere University is making a lot of effort to achieve its mission through the adoption of ICT. However, it is also evident that the history of ICT adoption at Makerere University has been rather short and yet so fast. The University is learning from its mistakes and the future of ICT adoption is bright. The current state of ICT adoption can only be said to be a work in progress.

4.5 Description of the IT systems adopted in the Makerere University Library

Ani, Esin and Nkoyo (2005) contend that there is a general trend in academic libraries today towards embracing information systems and information technology. This is also true of the Makerere University Library. As noted above, in 2008 the University published its 10-Year Strategic Plan covering 2008/09 to 2018/19 (Makerere University, 2008). The plan was meant to provide a foundation for decision -making at all levels of governance at the University. Two of the five core thematic areas in the plan include the need to boost the library infrastructure and to create an ICT-enabled environment.

Highlighting these two areas of decision-making affected the activities in the University Library and Makerere University as a whole in one way or another. These included the decisions as well as the procedures and routines.

All this attests to two undeniable facts:

- First, the library is viewed as a strategic point in the delivery of higher education. This is borne out by the policy direction of the National Council for Higher Education (NCHE) (2005) whose accreditation of universities in Uganda is partly based on the quality of library services in the universities.

- Second, the fact that the adoption of information technologies is strategic in the delivery of services to patrons in the academic libraries of the 21st century.

The researcher's observation and interviews he conducted with the respondents from the library revealed that the nature of IT systems deployed in the Makerere University Library is very similar to the rest of the systems at the rest of the University. This is mostly with regard to the hardware and general office-related software. Table 2 below shows a summary of the hardware and software adopted in the Makerere University Library.

Table 2: Summary of hardware and software adopted in Makerere University Library

Categories of IT deployments adopted in the library	Examples of the IT category
A. Hardware	
Input devices	Mice, keyboards, digital cameras, microphones, scanners
Output devices	Speakers, monitors (mostly flat screen monitors), overhead projectors and printers
Storage devices	Computer hard disks, microfilm, external portable hard disks, flash disks, compact discs and DVDs
B. Software	
Operating systems	Windows operating systems (XP and Windows 7), Linux
Application software	Microsoft Office (2003, 2007 and 2010)

(*Source*: Field data, 2012)

Other forms of hardware that were observed include the following:

i) Liquid crystal display for display to larger audiences.

ii) Audio readers and recorders for accessing and digitisation of audio collections.

iii) Large-scale scanners for digitisation projects.

iv) Digital cameras for capturing photographic records critical to libraries.

v) Closed circuit television (CCTV) for monitoring security in and around library premises.

The above table shows that there are notable similarities between the Makerere University Library and the rest of the University. This is significant with regard to the alignment of Makerere University library deployments with those at the rest of the University.

There has also been a significant adoption of telecommunication technology in the Makerere University Library. This technology consists of a range of communication systems, including transmission media and devices, a switching system, bandwidth, broadband, multiplexing, modulation, protocols, wireless communication, facsimiles, email, teleconferencing, a bulletin board service, videotext and voicemail (Ding, 2010). Networking in libraries comprises a variety of concepts, such as topological communication networks (LANs, WANs, MANs, and VPNs), library networks, hypertext, hypermedia, multimedia, Integrated Services Digital Network (ISDN), and Open System Interconnection (OSI) (Ding, 2010).

The Makerere University Library has a number of local area networks for its different sections and computer laboratories. However, the library accesses the internet through DICTS distribution channels, just like the rest of the other units at the University (Figure 7). The library possesses a number of wireless hot spots for wireless users.

The University Library has, however, adopted some unique IT systems. Examples of these include:

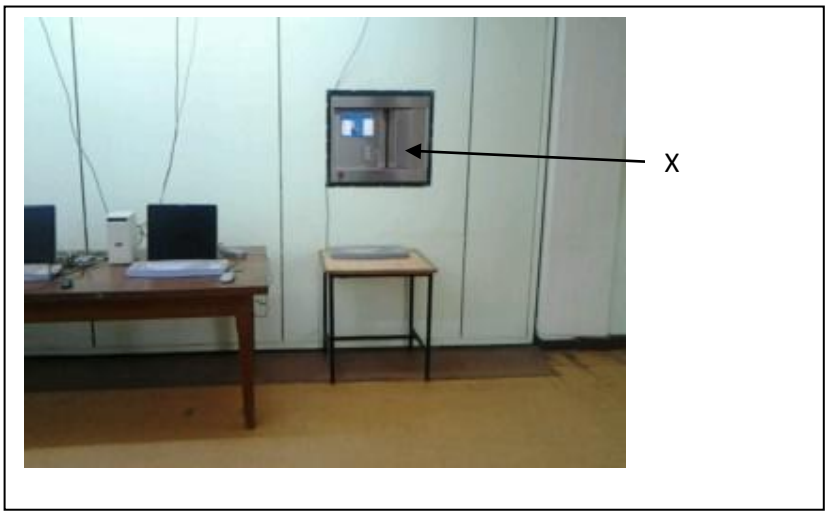
i) Radio frequency item description (RFID) technologies

As noted in Chapter Two, this type of technology is fundamental in providing self-help services in the library. The "ID" in RFID describes the unique identifier that is apportioned to each item in the library. A chip is inserted in the library item for identification at the point of scanning so that books are secured and are not taken out without library staff noticing. In case a user is tempted to take the book without authorisation the chip causes an alarm to go off in the security system at the library exit. This IT solution is mostly used for books that are held in closed access in the Main Library complex. The branch libraries in the colleges do not have this solution.

ii) Bibliographical sorting machines

This is another important application of RFID technology that sorts books into appropriate positions in the library. When books are returned by clients who are interested in self checking-in, the machine is used to automatically sort library publications according to class numbers and subject areas, as well as the various levels and shelves they are supposed to be housed in. This reduces the workload of the library staff since they are relieved from sorting the titles one by one. Figure 8 shows a slot at the Makerere University Library in which books are checked in for sorting according to their appropriate classification.

Figure 8: A bibliographical sorting machine in Makerere University Library



(Photo by Francis Ssekitto, 20 October 2012)

Letter X in Figure 8 points to the machine in which books are slotted for sorting upon return by library users. This technology is, however, used by very few clients of the library since many of them do not know how to use it.

iii) Integrated library system

This was recognised as one IT deployment that Makerere University has and it is quite different from the rest of the university units. The Makerere University Library has since 2004 been using Virtua integrated library system from VTLS Incorporated in the USA. Further description of this system is provided in 4.6 below.

From the above presentation it is evident that computerised systems are being adopted on a wide scale in the Makerere University Library. All these systems seek to do what librarians have been doing for a long time. The respondents indicated that these IT deployments have modified and improved the way librarians do their work, including the acquisition of information resources, the organisation for storage (even storage itself if

one considers e-resources) and later retrieval, and facilitating the borrowing and returning of these valuable information resources to the library (including the self-help issue systems). All these provide a very effective and efficient business model for the Makerere University Library and introduce a new feature of independence, with clients serving themselves without the librarian as the intermediary.

All this implies that the service improvements in information technology simply cannot be ignored by academic libraries. However, as Joint (2009) observes, simply accumulating new technologies and related services as opportunities arise may in the end be impractical, and may present intractable difficulties in terms of workload, security, authentication and intellectual property management. As such the adoption of information systems should be done in support of the library and institutional strategy.

4.6 Description of the integrated library system deployed in the Makerere University Library

As noted in 4.4.3 above, Makerere University has since 2004 adopted strategic information systems as an initiative to fulfil its vision and mission. Among these is the integrated library system (ILS). Below is a description of the ILS adopted in the Makerere University Library.

The respondents from the Makerere University Library indicated that the library has since 2004 adopted Virtua integrated library system from Vital Technology Library Solutions (VTLS), USA.

The respondents further revealed that since Virtua ILS is integrated, it has the capacity to provide a platform to conduct most of the library routines and functions in the Makerere University Library. The system is designed to provide support in the following areas:

- Library circulations management
- Library cataloguing and document processing
- Client registration
- Management of clients and staff records

- Providing catalogue information on an Online Public Access Catalogue (OPAC) platform
- Acquisitions management
- Administration of fines for overdue reading materials
- Management of special collections such as archives
- Bibliographical data importation from other libraries

From the above array of services that Virtua ILS supports, it can be deduced that the system seeks to do what librarians at Makerere University have done for decades, ie the acquisition of information resources, organisation for storage (even storage itself if one considers e-resources) and later retrieval, and facilitating the borrowing and returning of these valuable information resources to the library (including the self-help issue systems).

The system is not, however, used to its full capacity. The respondents from the library and DICTS revealed that since its first adoption in 2004, Virtua ILS has not been utilised fully. Only a few of its functions are utilised. A case in point is the circulations function which is not utilised fully to benefit from its full capabilities. It was further revealed that there are some components that are not utilised at all. A case in point is the component for managing special collections such as archives. This was noted not to be utilised at all.

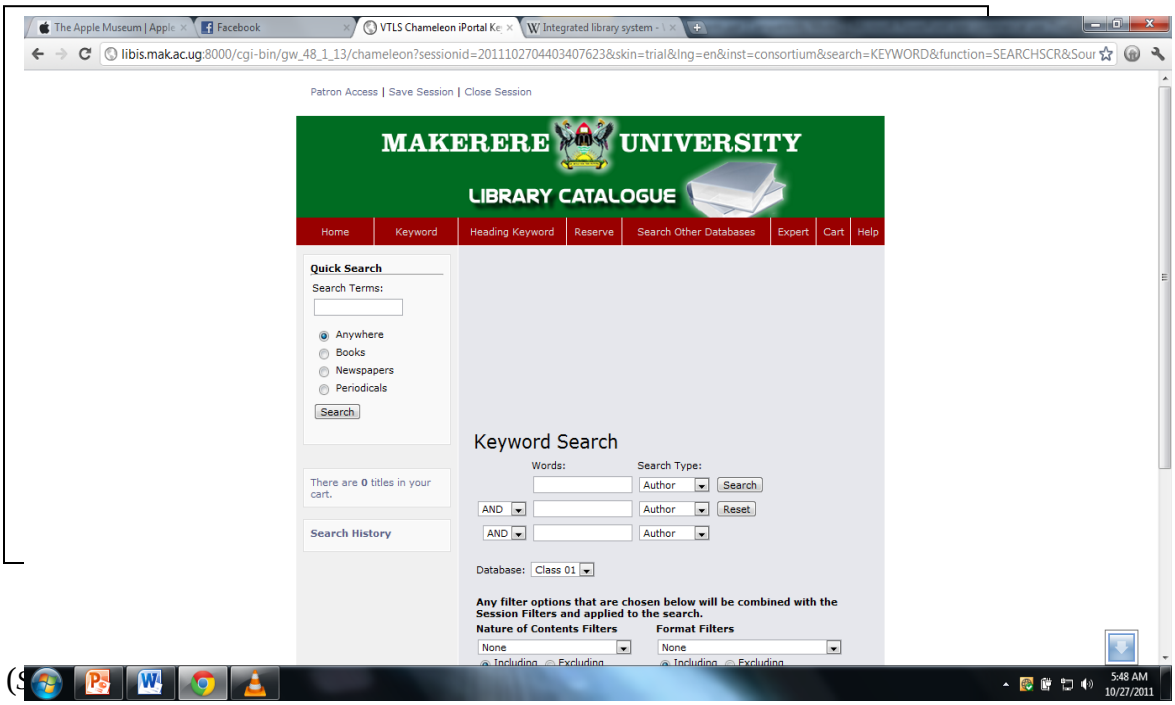
To achieve the capacity to provide the abovementioned support Virtua ILS is designed as a three-tier system. VTLS (2004) observes that the three-tier nature of Virtua ILS incorporates a client platform, a server platform and a database platform. The client platform supports the user interfaces for both the library staff and the library users; the server platform supports the networking functions of the system; while the database platform supports the data storage capabilities of the system (VTLS, 2004).

The above platforms require the library to run Windows operating systems, a UNIX-based server and an Oracle 10g database respectively. The system itself consists of a Virtua server, an Oracle 10g database, a Virtua Client, a Virtua Profiler, an InfoStation, a Virtua's Web-reporting subsystem, a Virtua Language Editor, a Chameleon Portal, and a

Virtua Web OPAC (VTLS, 2004). All the above components are intertwined, with each depending on the others for its proper functioning.

Virtua ILS is, therefore, a robust system that requires input from both the client (Makerere University Library) and the vendor (VTLS) for successful implementation. The respondents further indicated that though VTLS provides the guidelines and manuals for the installation of the system, it is the responsibility of the library to install and configure applications on the client platform. Figure 9 below is a snapshot from the Makerere University Library website illustrating the OPAC interface which has been configured for use in the Makerere University Library.

Figure 9: A snapshot of the OPAC for Makerere University Library provided using Virtua ILS



(S
03407623&askin=trial&clng=en&cicnst=consortium&search=KEYWORD&function=SEARCHSCR&Sour)

Figure 8 illustrates the OPAC used in the Makerere University Library. The Virtua ILS OPAC interface has been configured to reflect the image and colours of Makerere University.

Another important element of Virtua ILS is that VTLS has produced different versions of the system. However, it was revealed that Makerere University had not been able to upgrade to every latest available version over the years. However, by the time of data collection Makerere had just acquired the latest release of Virtua ILS 2012. This is an upgrade from the release of 2007 when the University Library had last upgraded the Virtua ILS. The failure of the University Library to get the latest releases as they are offered by the vendor is largely attributed to the high costs related to the acquisition of every released version of the Virtua ILS. The acquisition of the latest version of Virtua ILS was attributed to the fact that VTLS was no longer providing support for earlier versions of the system. The Makerere University Library was, therefore, compelled to upgrade lest the library fell prone to system failure and insecurities.

This section has described the basic composition and functionality of Virtua ILS, an integrated library system. Section 4.7 illustrates the rationale for the selection of Virtua as the preferred ILS at Makerere University. This will help in understanding the alignment of the system with the overall strategy of Makerere University.

4.7 Rationale for the choice of the integrated library system adopted by Makerere University Library

Section 4.6 revealed that Makerere University adopted Virtua ILS and that the adoption of this system was part of the university-wide strategic adoption of IT systems to fulfil its corporate mission. This section presents the reasons why Virtua was selected over all the other systems available on the market. From the interviews conducted with the staff of Makerere University, the following reasons emerged:

First, the system was being provided by a company that was considered to have a good track record in providing robust library automation systems. It was revealed that before Virtua ILS was selected, there were other vendors that provided proposals but the VTLS proved it had a better track record regarding the provision of robust library systems.

Second, it was noted that the system was easy to learn. This was attributed to the fact that it has good documentation that makes it easy for the people that are installing, configuring and using it to do so. The respondents revealed that such documentation made it easy to install, configure and customise the system by the technical staff it as well easy to use by the clients.

Third, the system was designed using the English language. This is significant in navigating the system parameters for the staff and clients of the Makerere University Library. Since Uganda is part of the Commonwealth system, English is considered an official language there and is used as the language of instruction at Makerere University. This implies that for a system to be chosen it had to have its components labelled and its documentation written in English and Virtua ILS met this requirement.

Fourth, Virtua ILS was built basing on the core standards used in an academic library setting. There was evidence that the system designers considered the needs of an academic librarian. This was further confirmed by respondents in the library. Examples of such standards include Machine Readable Cataloguing (MARC) standards, and the Z39.50 standard for the importation of bibliographical data.

Fifth, Virtua ILS runs on computer operating systems that were already in common use at Makerere University. These included Microsoft Windows software and UNIX server software. Furthermore, the use of Oracle database was already prevalent at the University, especially with other information systems. All this implies that the adoption of Virtua did not require movement from the common platforms that were used all over the University. Besides, even if some issues that arose in relation to the configuration of such systems, there would be ready local support.

Sixth, the system met the technical requirements of the donors who were sponsoring the initial acquisition of the system. Makerere University has in recent years been a recipient of support from some notable international donors. Among these are Swedish

International Development Agency (SIDA/SAREC) and Carnegie Corporation of New York. SIDA/SAREC sponsored the initial acquisition of the system. Therefore the technical conditionality of SIDA/SAREC had to be met by the system. Some of the subsequent upgrades have, however, been financed by the University Library. It can, therefore, be deduced that the fact that the system has been maintained and even upgraded beyond the period of initial donor support. Perhaps the reason why the decision-makers in the library have continued with the system is that has given value for money.

Seventh, the willingness of the vendor to provide technical support has partly contributed to the continuous selection of Virtua ILS. The respondents indicated that after Makerere chose Virtua ILS, the vendor provided support for a long time after the purchase of the system. This support was in the form of training of selected members of the library staff who were equipped with the ability to train other staff. In addition to the initial training, the vendor also supports users of the system to form user communities. The respondents further indicated that since at the time of the first deployment there were few universities in Africa that had deployed Virtua ILS, Makerere University was linked up with the European user group.

Eighth, the vendor provided the clearest platform for users to give their views on the development of future versions of the system. The respondents from the library indicated that through their user groups or even individual customers, libraries were given the opportunity to offer their views.

From the above presentation, it is evident that the rationale for the selection of Virtua ILS consisted of a combination of both the market ingenuity of the vendor and the technical advancement of the system compared to the systems that were presented by alternative vendors. However, from the opinions expressed by the respondents it can be deduced that the Virtua system will continuously be used as the ILS system of choice in the Makerere University Library for the foreseeable future.

4.8. Relationship between the integrated library system and the rest of the IT systems adopted at Makerere University

To further understand how the ILS is aligned with the rest of the university strategy, it is imperative to establish the relationship between the system and other IT systems in the University.

It was noted in section 4.4 it that the University has taken up information and communication technologies (ICT) as a strategic enabler to fulfil Makerere University's strategic objectives. One of the key features of this movement was the adoption of key information systems in key functions of the University. The respondents indicated that the forms of such systems include the following:

- The Human Resource Information System (HURIS) for the management of information related to the human resources at the University.
- The Financial Information Systems (FINIS) for the management of information related to the financial resources at the University.
- The Academic Records Information Systems (ARIS) for the management of information related to the students' academic records at the University.
- The Makerere Library Information System (MAKLIBIS) for the management of information related to the library resources at the University.

All the above information systems were acquired from commercial vendors but efforts were made to have them configured and aligned with the environment at Makerere University.

HURIS, FINIS and ARIS were all acquired from Integrated Tertiary Software (ITS), a company based in the Republic of South Africa, while the ILS was acquired from an American company called VTLS.

The respondents indicated that although all the systems were adopted as part of the university-wide IT strategy, their early adoption was marked by a perpetual lack of

systems integration. Some of the systems existed as standalone platforms that required users to utilise them separately from each other.

However, efforts have been made to achieve the integration of some of the information systems. For example, ARIS and FINIS have been integrated to the extent that one can obtain the academic and financial records of a given student from the same interface. It was also reported that the latest version of the ILS was in the early stages of integration with the University Academic Records Information System (ARIS). At the end of the integration process, it is envisaged that ILS will be able to import user data from the ARIS system and users will even be able to use the same cards for gaining access to the Makerere University Library. However, the software for the library still remains largely non-integrated with the rest of the university information systems.

Since HURIS, FINIS and ARIS are all acquired from the same vendor and yet MAKLIBIS is supported by a different vendor, there are difficulties with the alignment of all the information systems at the University. Despite the fact that the integration of the ILS with other systems is limited, the adoption of professionally designed information systems is a sign of commitment by the University to achieve its strategy using IT systems.

The respondents further expressed optimism that further efforts will be made to realign and integrate all information systems to achieve more system alignment across the University.

4.9 Challenges to alignment of the integrated library system with the rest of the university strategy

Smaczny (2001) observes that the concept of strategic alignment management is interplay among business strategy of the organisation and its infrastructure and processes. He further argues that if there is equilibrium among these forces, then an organisation achieves a strategic fit. An analysis of the university strategy, the technological

infrastructure (especially IT) and the processes in the library reveals that the University has not yet achieved a strategic fit with all its IT systems. Section 4.8 has revealed that the ILS system is yet to achieve significant integration with the rest of the university IT infrastructure. This section, therefore, discusses the challenges to alignment of the ILS system at Makerere University.

First is the lack of coherence between the library information systems with the rest of the university information systems. As noted above, the ILS and the other systems were sourced from different vendors. As a result there are significant components in the system which cannot interact or share information. In more specific terms, the major IT systems came from the same vendor while the ILS came from a different vendor. As such the ILS appears to be isolated from the rest of the system. It was, however, noted that the latest version of the ILS is able to import data on admitted students from ARIS. However, this has been achieved with high-level configuration and has taken a significant amount of time since the first deployment of the two systems.

The respondents also indicated a lack of technical skills at Makerere University to effectively use the system. Virtua ILS is an imported IT solution, with Makerere University being the first user in the East and Central African region. As such there are limited skills are available on the market to effectively navigate all facets of the system. In fact, the respondents indicated that in the region there is no other place outside Makerere University where one could get the relevant technical skills. As such, apart from the initial training given by the VTLS, it is quite hard to get the skills required to effectively use the system. In the face of limited technical skills, it is not possible for the ILS to be used to its full capacity.

In addition, there is lack of ready local support in case of system failure. Since, as noted above, Makerere University is the first user of the ILS in the East and Central African region, VTLS has not found it economically viable to open up a technical support centre in the region. The respondents indicated that the nearest centre that can provide the

much-needed technical support is the VTLS office in Spain. Therefore, in case of a technical failure that requires high-level technical intervention, personnel have to be flown into the country, which costs a significant amount of time and money.

The respondents also indicated that the loss of technical staff was derailing the effective use of the system and the subsequent alignment. As noted above, there are limited skilled personnel in the market. In fact, most of these have been trained on the job at the University. However, the respondents expressed dismay that after being trained, some of the staff resign to take up other job opportunities outside the University. This relates to librarians and technical staff sent from DICTS to provide support for the system.

Furthermore, the ILS is quite expensive to upgrade. The respondents indicated that Virtua ILS had been acquired using donor funds but some of the subsequent upgrades have had to be funded by the University. Such upgrades are quite expensive and constitute a significant drain on the library's financial resources. In fact, before 2012, the system had last been upgraded in 2007. It was revealed that since then the University Library has not been able to afford another system upgrade even when it was needed. The respondents further revealed that the upgrade done in 2012 was compelled by an ultimatum given by VTLS that no more support would be given to lower versions. The Makerere University Library risked losing all support from VTLS, thus the compulsion to upgrade. Therefore, it can be deduced that the 2012 upgrade of Virtua ILS was done owing to pressure and not because it was affordable.

The respondents also revealed that the security of the data in the system was under scrutiny. By the time of data collection, the library website had been suspended owing to a security breach. This breach made the ILS vulnerable and thus some of its components accessed through the web portal had to be suspended. It can, therefore, be asserted that as the University looks to the use of IT systems to achieve its strategic objectives, there are significant risks to this vision, especially if the security of information held in the systems is breached and the information made unavailable.

The respondents also indicated that the funds available to conduct a number of IT-related developments across the University were limited. The respondents from DICTS noted that, even though they had developed an IT strategy for the University in which the library had also been catered for, the University was apportioning very little money to the directorate. As such, most units, such as the library, were resorting to soliciting donor funding to conduct their IT developments. Those that manage to get their own funds establish an array of systems, some of which are not coordinated with the overall university-wide IT strategy.

Other challenges observed include:

- The lack of a steady supply of electricity to maintain the availability of servers for library service, especially where technology has to be used. It was noted that the library suffered from load-shedding and had to resort to using a generator, which is an expensive alternative.

- The misuse of information systems and related technologies in the service of personal projects as opposed to providing professional library service. It was indicated that some staff load personal entertainment files on the computers instead of conducting exclusive library service for which the computers were intended.

- Pressure from the donors in the library projects as opposed to the University Mission and objective. This may be particularly challenging with regard to decisions to acquire particular technologies. For instance, the University Library adopted a proprietary library management software in preference for an affordable open source option even when there were calls for an open source option. The system has since turned out to be expensive to maintain. The choice of the proprietary option was partly due to pressure by donors who were funding the acquisition of the system.

- Considerable resistance to change, especially from some employees, when it comes to organisational reform of the library and other units in the use of IT systems. Some employees of the University saw IT deployments as a threat to their jobs and as such stuck to old ways of doing things, for instance, some academic staff who still preferred physical books from the libraries even when soft copies were available.

From the above presentation, it can be deduced that the challenge of aligning the ILS with the overall university strategy is multifaceted. Challenges range from the technical inabilities of individuals to costs and electricity. As such, in order to solve the problem of strategic alignment of ILS with the overall university strategy, one ought to take a multipronged approach. Such an approach would be one that considers both the technical capacity of the system and the business environment of the University.

4.10 Strategies to achieve strategic alignment of the integrated library system in the Makerere University Library

As mentioned in 4.9 above, the challenge of aligning the ILS with the overall university strategy is multifaceted. As such, in order to solve the problem of the strategic alignment of ILS with the overall university strategy, one ought to take a multipronged approach. This section presents the strategies that the respondents suggested that the university, through its administrative units, should undertake to achieve the strategic alignment of the ILS.

First,, the respondents indicated that there is a need for the university budgeting team to change its methods of budget allocation to give preferential treatment to the University Library and DICTS. As noted above, IT and the library are viewed as strategic enablers to achieve the overall university strategy. This is the reason why, according to the respondents, students are charged library and technology fees. They revealed, however, that after these fees are collected, they are not channelled in their entirety to the appropriate units. The respondents expressed the need for the budgeting committee to

redirect the retained funds to the library and DICTS so that these can perform their mandated functions.

In addition, the respondents expressed the need for the library to hire more computer science graduates. This arose out of the need to have librarians who could navigate the technical aspects of the ILS with ease. In the current scenario, most of the librarians are reported to lack the requisite skills when it comes to navigating IT infrastructure.

Furthermore, the respondents suggested the need for more rigorous training of current staff in all departments of the library so that they can relate the system to their roles and job functions. The respondents from the library indicated that the initial training was offered only to personnel that work in document processing, especially cataloguing. They assert that there is need to apply the same rigour to staff in all the other departments of the library.

The respondents also expressed the need for DICTS to be empowered to conduct its role of coordinating all ICT implementation at the University. It had been noted that DICTS was assigned a belated role in aligning the ILS in the library. This was partly due to the fact that DICTS is inadequately staffed to effectively monitor all ICT implementation. As such, empowering DICTS was recommended as a means for the University to achieve an overall IT systems alignment.

The respondents also suggested that the East African School of Library and Information Science (EASLIS) and the Main Library should work more closely together to equip students with skills in working with robust systems such as Virtua ILS. Since EASLIS is the principal Library and Information Science (LIS) school at Makerere University it, therefore, is the main supplier of human resources to the University Library. However, EASLIS does not train students in the use of Virtua ILS since it holds no licence to access the system. What is more baffling is the fact that the Makerere University Library and EASLIS are in close proximity and, as such, can share experiences with students

from EASLIS in conducting practical training in the library. It was further noted that there are students from EASLIS who undertake their internship in the library but that not all may prefer to work at the University Library.

The respondents indicated that some initiatives were already in place to improve ILS alignment at Makerere University. These initiatives, however, required more empowerment for the goal of alignment to be fully achieved. Some of these include the following:

- The respondents indicated that the library conducts user education for all first-year undergraduate and postgraduate students. This is designed to introduce them to the services of the library, including the ILS. However, not all students attending the user education programme find difficulties in navigating the system when they come into contact with it.
- The University Library has also joined the Virtua ILS user group for Africa. This is an initiative intended to keep librarians at Makerere University abreast with developments in the use of Virtua ILS. It was, however, noted that not all librarians at Makerere University were actively involved in the user group. Perhaps efforts can be made to interest the librarians so that they actively take part in this arrangement.
- The university administration has negotiated with the electricity distribution company, UMEME, so that Makerere University is given preferential treatment with regard to power rationing and billing. As such the University suffers from load-shedding less frequently than many parts of Uganda and is charged less per unit.
- In addition, the University has procured generators to provide power to sensitive units in case of power failure by the distribution company. Among these is the Main Library complex and DICTS. However, branch libraries based in units that lack generators still suffer power blackouts and services are intermittent when electricity is off.

- Last but not least, the library has made a deliberate effort to co-opt staff form DICTS so that they can help with the configuration of the ILS system and match it to the needs of the Makerere University Library and the University as a whole. However, this initiative was reported to have suffered some setbacks when some of the co-opted staff left their positions at the University.

From the above presentation it is evident that staff at Makerere University have an idea of what it takes to align ILS with the university environment and the corporate strategy. These staff have constant interaction with the system on a daily basis. It can, therefore, be asserted that these need to be given audience by the administrators of the University so that the highest benefit can be accrued from the ILS and other IT systems at the University.

4.11. Conclusion

This chapter has presented the findings obtained during the data collection process. The findings have been presented thematically in line with the objectives of the study.

The findings reveal that Makerere University has identified ICT as a strategic enabler to achieve its corporate strategy. This is also true with regard to the achievement of the University Library strategy. As such, a number of ICT systems have been deployed, including integrated information systems such as Virtua ILS.

However, in deploying the ILS, Makerere University has met a number of challenges, ranging from technical challenges to costs and staffing. The chapter ends by presenting solutions suggested by the respondents that will be useful in making recommendations for the academic libraries under study.

Chapter Five will present a summary of the mini-dissertation and the recommendations of the study.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, the conclusion and the recommendations of the study. It draws conclusions from the findings and makes recommendations for addressing the issues of ILS systems alignment at Makerere University.

The study endeavoured to assess how the integrated library system at Makerere University is strategically aligned with the corporate strategy of the University as well as other integrated information systems within the University. It was envisaged that by assessing the alignment of the systems, misalignments would be identified and proposals made to align the integrated library system with the University strategy so as to achieve a strategic fit.

The study was conducted using a qualitative study approach. This being a qualitative study, these findings were obtained using methodologies and tools that are considered suitable for qualitative data collection. These included face-to-face interviews, observation and literature search. The interviews were conducted with staff from the Main Library and DICTS. Section 5.2 presents the summary of the major findings of the study.

5.2 Summary of findings

The major findings of the study included the following:

5.2.1 *Service units concerned with the alignment of IT in the University Library*

The findings revealed that the University has identified ICT and the library as strategic enablers to achieve the university corporate strategy. To achieve this, the University positioned three units to enable the alignment of ICT and the library systems. These include the Directorate of ICT Support, the University Library and the Information and

Communication Technology (ICT) section of the library in relation the University Library.

5.2.2 *Types IT systems deployed at the University*

The highlighting of ICT as a strategic enabler implied that there was commitment to adopt modern ICT solutions in the various units of the University.

The findings revealed that indeed the University has deployed a number of IT systems. The said systems can be put into four major categories, including:

- Hardware
- Software (including operating systems and application software)
- Integrated information systems
- Networks

The findings further revealed that Makerere University still heavily relies on the acquisition of "traditional" storage hardware. For example, even information that is meant to be provided online is kept on institutional servers as opposed to hiring online storage.

It was further noted that Makerere University is making a lot of effort to achieve its mission through the adoption of ICT. The history of ICT adoption at Makerere University has been rather short and yet fast. The University is learning from its mistakes and the future of ICT adoption is bright.

5.2.3 *Types of IT deployments in the Makerere University Library*

Considerable similarities were noted between the Makerere University Library and the rest of the University. This was significant for the alignment of the Makerere University Library deployments with those in the rest of the University.

Some unique IT systems have, however, been adopted by the University Library. Examples of these include RFID deployment, the bibliographical sorting equipment and the integrated library system.

5.2.4 *Type of ILS used in the Makerere University Library*

The findings revealed that the library has since 2004 adopted Virtua integrated library system from Vital Technology Library Solutions (VTLS), USA.

The findings further revealed that since Virtua ILS is integrated, it has the capacity to provide a platform to conduct most of the library routines and functions in the Makerere University Library.

Virtual ILS seeks to do what librarians at Makerere University have done for decades, ie the acquisition of information resources, organisation for storage (even storage itself if one considers e-resources) and later retrieval, and facilitating the borrowing and returning of these valuable information resources to the library (including the self-help issue systems).

It should, however, be noted that the system is not used to its full capacity, with many components left unutilised.

5.2.5 *Rationale for the selection of Virtua ILS*

The findings revealed that the rationale for the selection of Virtua ILS was a combination of both the market ingenuity of the vendor and the technical advancement of the system compared to the systems that were offered by alternative vendors. The opinions expressed by the respondents further indicated that Virtua ILS will continuously be used as the ILS system of choice in the Makerere University Library for the foreseeable future.

5.3 Challenges to ILS alignment at Makerere University

The following were some of the notable challenges to aligning the ILS with the overall University strategy:

- Lack of coherence between the library information systems with the rest of the university information systems poses another critical challenge. Currently each system requires independent logging in by clients. Since 2007, there have been efforts to integrate part of the Academic Records Information System and the Financial Information System (Makerere University, 2011). Through this the students would be able to view their fees statements when they log into the Academic Records Information System (ARIS). There is also evidence of plans to create a seamless Enterprise Resource Platform through which all these systems will be able to interact since they normally serve the same clients. However, all these do not have coherence with the library information system and this remains a challenge.

- There was considerable resistance to change, especially from older employees when it came to organisational reform of the library. However, this resistance may be minimised by holding sensitisation seminars for staff to familiarise them with the benefits of organisational change and the new procedures ushered in with the information systems.

- Besides, there is a possible lack of "political" support from the management of the University to reward new innovative ways of service delivery.

- Another challenge is the inadequate funding for the implementation of newer technologies and for staff development to prepare staff for the ICT revolution in the library.

- Lack of steady supply of electricity to maintain the availability of servers for library service, especially where technology has to be used.

- Misuse of information systems and related technologies in the service of personal projects as opposed to the performance of professional library service.

- Pressure from the donors in the library projects as opposed to the University Mission and objective may be particularly challenging with regard to decisions to

acquire particular technologies. For instance, the University Library adopted proprietary library management software in preference to an affordable open source option even when there were calls for this option.

From the above challenges, it can be asserted that the causes of IT misalignment are multifaceted. However, it can also be asserted that the challenges are mostly related to institutional frameworks such as funding, attitudes, planning and staff deficiencies and not necessarily relating to the technology itself.

5.4 Recommendations

The adoption of information systems in Makerere University and related adjacent information technologies imply a change in the psychological contract for librarians and ICT decision-makers at the University.

First is the requirement for newer skills for librarians to offer new services in the academic library.

Bell and Shark (2004, in Sinclair, 2009) note that the new academic librarian is one who combines the traditional skill set of librarianship with the information technologist's hardware and software skills and the institutional or educational designer's ability to apply technology appropriately in the teaching-learning process. This Sinclair calls the "blended librarian".

The view that more training is required is supported by the ACRL Research Planning and Review Committee (2010), which maintains that, as technological changes continue to impact the library routines and procedures, librarians ought to "proactively" broaden their skill portfolio to remain relevant. This implies hiring skilled personnel and continuous formal training for academic librarians at Makerere University.

Furthermore, there is need to effect changes in the financial appropriation and budgeting process. The ACRL Research Planning and Review Committee (2010) contend that new

technologies bring along new media in the library collections. However, financial allocations to academic libraries have generally remained stagnant and, in some cases, are reducing.

As such, managers in academic libraries ought to adopt greater budgeting discipline and adopt cheaper IT options that require limited maintenance costs.

Another critical implication of the new developments is the immediate digitisation of retrospective collections held in the Makerere University Library. Digitisation projects make "hidden", less used and underused special collections available to researchers worldwide (ACRL Research Planning and Review Committee, 2010). Though there is evidence of some digitisation projects taking place in the Makerere University Library, the scope is still small compared to the perceived need to belatedly preserve and provide access to these unique collections, which can only be referred to as historical gems. It should, however, be mentioned that the current efforts at digitisation attest to the acknowledgement of new data curation opportunities and requirements for data preservation in the 21st century.

The adoption of ILS and related adjacent technologies also implies a paradigm adjustment (paradigm shift) in the Makerere University Library. A paradigm shift can be described as a change in the pattern of thinking or behaviour. Kuhn (1962) observes that paradigm shifts imply change in a fundamental model of events. For the Makerere University Library this implies that things are no longer going to be the same and as such there is a need to change the way librarians and libraries "think". The many areas in which a paradigm shift should occur include the following:

i. The mission and the vision of the library, which ought to be altered to include elements of modern technology. Today the mission of the Makerere University Library is **"To meet the study, teaching, research and outreach information needs for sustainable development"**(Makerere University Library, 2011)**.** Although this may be interpreted to imply a willingness to embrace technology, a

more deliberate mission statement highlighting technology ought to be devised to influence the thinking and planning processes of the library.

ii. The library strategic plans, which ought to be altered to explicitly include elements of technology and related technologies as core planning areas.

iii. The user education programmes and procedures, which should be planned and conducted in such a way that the use of information technologies and related end-user applications become core training platforms.

iv. Fulltime information technology personnel, who should become part of the library planning and implementation teams to champion research and implementation of information systems.

One more implication is the requirement for new management skills. The term "management", according to Hislop (2009), implies the ability to get things done using available resources. Traditional librarianship focuses more on books and the traditional librarians. Developments in information technology are revolutionising the resources to a more electronic outlook with a new array of skilled personnel serving a "new" clientele. As such the staff, resources and clients are all "new" and they continue to evolve in form, quantity and expectations. All this implies a new leadership and management agenda, an agenda that can blend skills of the past and the present with an eye to the future.

Harris (2010) affirms this view as he contends that new management skills in a "Technology Fluent World" would be fundamental to the creation of an appropriate environment. It is this "appropriate environment" that would guarantee the creation of a space for the learning, skill development, comfort level and change management that needs to happen lest we witnessed the demise of the relevance of the academic library in the 21st century.

5.5 Conclusion

As argued above, the general trend in libraries today is towards the adoption of computerised systems which, of late, are increasingly integrated with mobile technology

systems amidst the growing expectation that library services will become ubiquitous in the 21st century. All these systems seek to do what librarians have been doing down the ages ago.

Halverson (2010) observes that there is a shift in what counts as literacy artifacts. Therefore, literacy in the 21st century involves understanding and competent control of the representational forms in the overall communications environment. Furthermore, it is clear that there is no single literacy that is appropriate for all people or for one person throughout their lifetime (Koltay, 2011). As such, academics must reinvent themselves and embrace technology to boost their delivery of training experiences.

From the above presentation, it is also evident that the service improvements in information technology development required of academic libraries simply cannot be ignored. However, as Joint (2009) observes, simply accumulating new technologies and related services as the opportunities arise may in the end be impractical, and may present intractable difficulties in terms of workload, security, authentication and intellectual property management. This answers the research the question that sought to establish the rationale of IT alignment. It is clearly evident that without proper alignment all that is left an accumulation of uncoordinated IT solutions. With careful alignment therefore, IT solutions are carefully deployed with the consideration of the overall environment.

It is further evident that the main causes of IT misalignment are mostly related to institutional frameworks such as funding, attitudes, planning and staff deficiencies and not necessarily relating to the technology itself.

Despite the presence of misaligned facets of technology it is largely true that if a library does not actively embrace and implement information technologies in the conduct of its routines and the execution of its future strategy, its future is beyond doubt in jeopardy. Indeed the adoption of information systems can be said to be greatly influencing the library strategy.

In the light of all these mixed fortunes the Makerere University Library can only be described informally as a ‘new kid on the block’ when it comes to the establishment of information systems. Almost all the technologies required and that have so far been implemented are imported and are quite expensive. The library – and the University as a whole – still grapples with dire challenges in the areas staff numbers; electricity and finances to pay existing staff a respectable living wage. Adopting information systems in a library may as such be viewed as a preserve for the affluent universities of the world. Despite this, evidence exists that there is active investment in the University Library as it marches towards the attainment of its strategy. Perhaps ILS in the Makerere University Library and the University as a whole can only be described as a work in progress.

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APPENDIX A

OBSERVATION GUIDE

The guide was useful especially for activities that could not be measured; for example the time the users spent using the computer, the number of users in the library, the time the users spent in searching for documents, the condition of the equipment especially the computers.

1. The physical environment and facilities.
2. Availability of computer facilities.
3. Availability of electronic reading resources.
4. Access and use of the electronic information resources by users.
5. Instruction guidelines or rules on use of the electronic resources.
6. Use and display of any form of communication for users for example password on notice board, display stands etc.
7. Version of the ILS used
8. The functions supported by the ILS
9. Interaction between staff and users of the ILS.
10. Support services for the use ILS by the staff
11. Support services for the use ILS by the library clientele
12. The quality of the interface of the ILS
13. Interaction of the ILS with library systems
14. Interaction of the ILS with other University systems

APPENDIX B

INTERVIEW WITH THE LIBRARIAN

I am Francis Ssekitto, a student at the University of Pretoria pursuing a Master's Degree in Information Technology. As part of the programme, I am conducting a study on the topic, "**Strategic alignment of the Integrated Library System (ILS) at Makerere University as a critical success factor in achieving the University strategy"**. This is a kind request to have an interview with you. Your responses will be used only for this academic excursion and not for any other purpose.

Thank you and God bless you.

Link to the Research question	Interview Question
(Understanding the Role of the stake holder) Understanding about the role of the University Librarian	Describe briefly the structure of the library in line with its Human resources and departments
	Describe briefly the nature of the collection of Makerere University Library
	What is the position of the University Library in the whole University?
	Describe briefly the role of the library in achieving the overall University strategy?
	What is your role of as the head of the library (University Librarian)?
Rationale for strategic alignment of the ILS **(Research Question 1)**	What types of ILS systems has the library used in the past and what system is used currently?
	Describe briefly why the library chose the current Integrated Library System.
	How is the ILS working with the rest of the Information technologies deployed in the library?
	As the manager of the library, can you conclude that the ILS being utilized to its full capabilities by the library clients and the library staff; If not why?

(Causes of ILS misalignment) (Research Question 2 and 3) Challenges in alignment of the ILS in the University Library	What level of understanding do the library staff and managers of the library have with regards to alignment of the ILS to the library environment in Makerere university?
	What areas of the ILS are not well aligned to Makerere University Library environment?
	What other challenges is the library facing with the current ILS?
	Are there any other areas that be improved to ensure the current ILS is more aligned to the library and the University at large?
Suggesting pathways to attaining strategic fit of the ILS (**Research Question 4)**	What is needed from a manager's to be able to meet challenges surrounding ILS alignment?
	What plans do you have to make the ILS more useful to the library and the university at large?
	Is there a workable support framework that one can adopt to address the current problems experienced with aligning the ILS?

Thank you for participating in the interview

APPENDIX C

INTERVIEW WITH THE LIBRARY SYSTEMS ADMINISTRATOR

I am Francis Ssekitto, a student at the University of Pretoria pursuing a Master's Degree in Information Technology. As part of the programme, I am conducting a study on the topic, "**Strategic alignment of the Integrated Library System (ILS) at Makerere University as a critical success factor in achieving the University strategy"**. This is a kind request to have an interview with you. Your responses will be used only for this academic excursion and not for any other purpose.

Thank you and God bless you.

Scope of the interview:

The focus of this interview is to establish the technical issues associated with the adoption of the ILS in Makerere University Library

Area One: Information Technology department in the Library

1.1The structure of Information Systems department of the University Library

1.2 Functions of the Information systems department of the University Library

1.3 Do you think the department is well positioned to perform its functions? Explain your answer

Area Two: Adoption of Information technologies

This attempts to establish the Information technologies used by the University Library

2.1 What types of Information technologies are adopted in the University Library?

2.1.1. Software used adopted in the library (Software philosophy of the library)

- Application systems (E.g. Office application software, Library management software)

2.1.2 Hardware (Input devices, Output and Storage devices deployed in the library)

2.1.3 Networks

- For example LANS, WAN, WIFI

2.1.4 (Any other)

2.2 What Information technologies is the library likely to acquire and deploy in the foreseeable future?

2.3 Describe briefly the extent to which the Information technologies are adopted across the library services.

2.5 In your opinion do you think the library has the latest technological deployments that the market has to offer?

Area Three: The Integrated Library System (ILS)

This area attempts to establish the type of ILS used in the library and how its alignment to the library and university systems

3.1 What types of ILS systems has the library used in the past and what system is used currently?

3.2 Why did library choose the current system (What is unique with the current ILS)?

3.3 How is the ILS working with the rest of the Information technologies deployed in the library?

3.4 How is the ILS working with the rest of the Information technologies deployed in the University?

3.5 Is the ILS being utilized to its full capabilities by the library clients and the library staff; If not why?

3.6 What capabilities are not fully utilized?

3.7 How often do you update the ILS system?

3.8 Is the system aligned with the rest of the University Integrated Information Systems? If not, why?

3.9 Do you hope to keep the current ILS in the Library? (Please give reasons for your answer)

Area Four: Challenges faced in the use and alignment of the ILS

This area aims at establishing the challenges faced in using the ILS and how management of the library is dealing with the challenges.

4.1 What challenges is the library facing with the current ILS?

4.2 What plans do you have to make the ILS more useful to the library and the university at large?

4.3 What do you think the library management and staff do to make the ILS more relevant to needs of the library staff and clients?

Thank you for participating in the interview

APPENDIX D

INTERVIEW WITH THE MANAGER OF THE DIRECTORATE OF ICT, MAKERERE UNIVERSITY

I am Francis Ssekitto, a student at the University of Pretoria pursuing a Master's Degree in Information Technology. As part of the programme, am conducting a study on the topic, "**Strategic alignment of the Integrated Library System at Makerere University as a critical success factor in achieving the University strategy"**. This is a kind request to have an interview with you. Your responses will be used only for this academic excursion and not for any other purpose.

Thank you and God bless you.

Scope of the interview:

The focus of this interview is to establish the strategic issues associated with the adoption of the ILS in Makerere University Library in relation to the rest of the University IT environment

Area One: General Information about DICTS

1.1 The position of the DICTS in the whole University

1.2 What is your role in the Directorate of ICT?

1.3 What connection does the DICTS strategy have with the rest of the University strategy?

1.4 How does DICTS relate to the rest of the University structures such as the library?

Area Two: Adoption of Information technologies in Makerere University

This attempts to establish the Information technologies used by the University

2.1 What types of Information technologies are adopted in the University?

2.1.1. Software used adopted in the University (Software philosophy of the University)

- Operating Systems (E.g. LINUX, UNIX or Windows)
- Application systems (E.g. Office application software)

2.1.2 Hardware (Input devices, Output and Storage devices deployed in the University)

2.1.3 Networks

- For example LANS, WAN, WIFI

2.1.4 (Any other)

2.2 What Information technologies is the University likely to acquire and deploy in the foreseeable future?

2.3 Describe briefly the extent to which the Information technologies are adopted across the University

2.4 How are the Information technologies from the different departments (or units) linked to one another?

2.5 How do you decide to adopt a particular type of information technology solution in the University?

2.6 How is Information Technology assisting to achieve the goals of the University?

Area Four: The Integrated Library System

This area attempts to establish the type of ILS used in the library and how its alignment to the library and university systems

4.1 To what extent is the Library system in the University aligned to the rest of the University Information Systems?

4.2 Do you think the library has the most appropriate ILS in relation to the IT strategy of the University?

4.3 How is the ILS working with the rest of the Information technologies with the rest of the technologies deployed in the University?

4.5 Is the ILS being utilized to its full capabilities by the library clients and the library staff; If not why?

Area Five: Challenges faced in the aligning of the ILS

This area aims at establishing the challenges faced in aligning the ILS and how management of the library is dealing with the challenges.

5.1 What challenges is the library facing with the alignment of the current ILS?

5.2 What plans do you have to make to get the ILS aligned to the library and the university at large to attain strategic fit?

5.3 What immediate plans do you have to make the ILS aligned better with the rest of the University Information Technologies?

5.4 How frequently is the ICT strategy reviewed (e.g. Yearly, twice a year etc.)?

5.5 What is the frequency of review of the overarching (Umbrella) strategy of the University?

Thank you for participating in the interview

APPENDIX E

LITERATURE REVIEW GUIDE

This chapter presents a brief review of the literature related to the need for the alignment of Integrated Library Systems in academic institutions. This literature review is presented on the following themes;

- Importance of academic libraries to academic institutions
- Application of Information Technologies in Academic libraries
- The evolution of Integrated Library Systems in academic libraries
- The importance of Integrated Library Systems in academic libraries
- Importance of strategic alignment of Technology alignment in organisations
- Gaps in literature and Conclusion