

**AN ASSESSMENT OF ICT ADOPTION IN KENYAN ACADEMIC  
LIBRARIES: A CASE STUDY OF UNIVERSITY OF NAIROBI LIBRARIES**

**BY**

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**Declaration**

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the University of Nairobi for academic credit.

Signed: \_\_\_\_\_

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This project has been presented for examination with my approval as the appointed supervisor.

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Date: \_\_\_\_\_

*Dr. Kate Litondo*

## **Acknowledgement**

To almighty God for the grace all through my studies, lord you promised to give rain to every seed that I saw (Isaiah 30:23). With you Lord, I will walk through the valley of the shadow of death without fear. With you Lord, goodness and mercy will follow me all the days in my life (Psalm 23).

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## **Dedication**

This project is dedicated to my mother Magdalene Awuor for your selflessness in ensuring that I get quality education through my education.

## Table of Contents

Declaration .....	i
Acknowledgement.....	ii
Dedication .....	iii
List of Tables.....	vii
List of Figures .....	viii
Abstract .....	ix
<b>CHAPTER ONE: INTRODUCTION .....</b>	<b>1</b>
1.1 Background of the Study.....	1
1.1.1 University Libraries in Kenya.....	2
1.1.2 University of Nairobi Libraries .....	4
1.2 Problem Statement .....	5
1.3 Objective of the Study .....	6
1.4 Value of the Study .....	6
<b>CHAPTER TWO: LITERATURE REVIEW .....</b>	<b>8</b>
2.1 ICTs in Higher Education .....	8
2.2 Utilization of ICTs in Libraries .....	9
2.3 Utilization of ICTs in Academic Libraries.....	10
2.4 Challenges Libraries Face in Utilizing ICTs.....	11
2.4.1 Financial Factors .....	11
2.4.2 Technological Factors .....	12
2.4.3 Human Factors .....	12
2.4.4 Cultural Factors .....	13
2.5 Conceptual Framework for the Study .....	14
2.5.1 Perceived Benefits.....	15
2.5.2 Perceived Cost.....	15
2.5.3 ICT Knowledge and Skill.....	16

2.5.4 External Pressure.....	16
<b>CHAPTER THREE: RESEARCH METHODOLOGY.....</b>	<b>17</b>
3.1 Research Design.....	17
3.2 Population.....	17
3.3 Sample Design.....	17
3.4 Data Collection.....	18
3.5 Data Analysis .....	19
<b>CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION.....</b>	<b>20</b>
4.1 Introduction .....	20
4.2 Data Evaluation .....	20
4.2.1 Demographic Characteristics of Respondents .....	20
4.3 Status of Computerization at the University of Nairobi Libraries .....	21
4.4 ICT Capacity Building .....	22
4.5 Library Management System .....	23
4.6 ICT Facilities Available in the Library .....	24
4.3 ICT Services Provided by the Libraries .....	25
4.4 Source of Pressure for ICT Adoption.....	28
4.5 Benefits of Using ICT .....	29
4.6 Barriers to Adopting ICTs.....	30
4.7 Determinants of ICT Adoption .....	32
4.8 Conclusion.....	36
<b>CHAPTER FIVE: SUMMARY, CONCLUSSION AND RECOMMENDATIONS .....</b>	<b>37</b>
5.1 Introduction .....	37
5.2 Summary of the Key Findings .....	37
5.2.1 ICT Tools Available.....	37
5.2.2 ICT Services Available in Libraries.....	38

5.2.3 Factors Hindering ICT Adoption .....	38
5.3 Conclusion.....	38
5.4 Recommendations .....	39
5.5 Future Research.....	40
5.6 Limitations .....	40
<b>REFERENCES.....</b>	<b>41</b>
Appendix: Questionnaire.....	47

## **List of Tables**

Table 3.1: Number of library staff to be interviewed.....	18
Table 4.1: Demographic Characteristics of Respondents .....	21
Table 4.2: ICT Facilities Available in the Library .....	24
Table 4.3: ICT Services Provided by the Library .....	26
Table 4.4: Benefits of Using ICTs .....	29
Table 4.5: Determinants of ICT Adoption in the UoN libraries .....	34



## **List of Figures**

Figure 2.1: Conceptual Framework.....	14
Figure 4.1: Library in Terms of Computerization.....	22
Figure 4.2: How Often do you Use Library Software.....	23
Figure 4.3: Electronic Resources Available in the Library.....	27
Figure 4.4: Source of Pressure for ICT Adoption.....	28
Figure 4.5: Benefits of Using ICTs.....	30
Figure 4.6: Factors Hindering ICT Adoption.....	31
Figure 4.7: Challenges in ICT Adoption.....	32

## **Abstract**

The environment in which libraries operate has changed significantly with the advent of information age. Technological advancement has compelled libraries to adopt interactive online media for their survival mainly because of its profound influence to the functions of libraries and the information seeking behavior of the readers. However, the proliferation of new technologies opens a number of challenges for libraries in institutions of higher learning which include; inadequate infrastructure, inadequate skills, inadequate funding among other factors. In an effort to ensure that libraries remain forecast in their objective in this era of ICT, the Commission for Higher Education (CHE) recommended that academic libraries in Kenya shall adopt and maintain new ICTs as they develop.

Research design for this study is descriptive in nature. The data was collected from the 11 libraries of the University of Nairobi that are located in Nairobi (UoN) and its surrounding. The respondents were library professionals working at the UoN libraries. Data was collected in form of questionnaires. The questionnaire covered 4 sections with section A focusing of demographics of the respondents, section B dealt with ICT adoption, Section C focused on adoption challenges while section D focused on adoption benefits. Data was analyzed using SPSS, Excel and STATA.

Results of the study show that most of the libraries surveyed are computerized. Already the computerized library services such as circulation, electronic books and journals, internet services, OPAC services among others. High cost of computer hardware and software were some of the major factors identified as barriers to ICT adoption. Despite the challenges, respondents strongly agreed that ICTs improves the accessibility and provision of current information. The linear regression model showed that improving the ICT skills of the librarians improves the adoption process. The findings of the assessment reveal a high level of awareness among the UoN librarians about the benefits that could be derived from utilizing ICTs. It is recommended that librarians be engaged in continuous professional development and digitization facilities and services be provided.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the Study

For centuries, social and technological changes have been affecting every profession and during the last two decades rapid technological development has also affected library services (Arif and Mahood, 2010). Gwynn and Rosenberg (2009) in their foreword asserted that there have clearly been significant moves from paper-based to electronic access to information and knowledge for higher education. Although the traditional functions and objectives of the library remain primarily the same, the method of information dissemination and the format are changing. The environment in which libraries operate has changed significantly with the advent of the Information Age, especially the Internet (Okojie, 2010). Abels et al, (1996) have indicated that the academic library environment is in a state of transition in terms of resources and users; many information resources once available in print are now available in print, CD-ROM, online and other sources available in electronic form.

The phrase “our library is the heart of the university” has become hollow as it does not carry much weight as it did in the past. Moropa (2010) argues that although academic libraries have and are still being referred to as the heart of the university it does not appear so, the reality is that they have been dislodged from that position. If libraries are to function well in the present age the manual process will have to give way to the Information and Communication Technologies (ICTs) and a computer driven environment (Adekele and Olorunsola, 2010), those libraries that cannot adjust to these new information technologies will not survive (Choukhande, 2003).

Technological advancement has compelled libraries to adopt interactive online media for their survival (Maxymuk, 2007). Kavulya (2004) argues that although the ICT is being incorporated in the management of university libraries in Kenya, there is need for adoption of strategic planning in all areas of library management in order for them to remain viable sources of information. University libraries in Kenya have to make use of modern ICTs so as to facilitate better access to local and global information.

To meet the growing needs of their users, Heinrichs and Lim (2009) suggested that libraries needed to hire skilled librarians that can create and disseminate knowledge in the digital age. Abdelrahman (2009) adds that Continuous Professional Development (CPD) is a must for information professionals in academic libraries so as to be able to maintain up to-date levels of expertise that would enable them to cope with the evolving ICTs. Similarly, a study by Keralapura (2009) found out that information technology influenced the functions of libraries and changed the information seeking behavior of readers. With ICT, such things as electronic cataloguing, electronic online public access catalogues (OPACs), electronic acquisition and serials control, electronic circulation functions, electronic distribution of commercial publications, electronic availability of raw data, multimedia information delivery systems, digitized collections and online textbooks are all now practicable with a higher degree of user satisfaction (Ajayi, 2002; Abels et al., 1996).

However, the proliferation of new technologies opens a number of challenges for libraries in higher institutions of learning. A major area of concern to libraries includes the problem of inadequate ICT infrastructural facilities, low bandwidth and Internet downtime (Adekele, 2009). Kamba (2011) also noted that ICT is not very well spread and utilized in African institutions of higher learning, mainly because of poor communication network, limited access to ICT hardware and software and government's ineptitude to provide adequate funds to run the libraries. Inadequacy of competent staff, lack of theoretical knowledge, lack of computer culture, lack of knowledge on the importance of ICT, inadequate funds among other factors have been site by several authors (Siddike et al, 2011; Kamba, 2011; Moropa, 2010; Okojie, 2010) as impediments for ICT adoption in academic libraries.

### **1.1.1 University Libraries in Kenya**

The recent past has seen many universities in Kenya constructing/refurbishing their libraries. The trend has been going on in both public and private universities starting with the United States International University (USIU), Catholic University of Eastern Africa (CUEA), KCA University and Kenyatta University which is awaiting the official

opening. The observed trend in these new library buildings is the provision of ICT facilities including computer section, internet ports, online public access catalogue (OPAC) section among others.

The Commission for Higher Education (CHE) which was established in 1995 under the provisions of the Universities Act has played a crucial role in ensuring that academic libraries adhere to the changing nature of information environment. In 2007 CHE published the “Standards and guidelines for University libraries in Kenya”. In developing the Standards and guidelines, the committee acknowledged the central role that libraries play in institution of higher learning alongside the large increase in electronic publications. The observed increase in electronic publication is necessitated by the emergence of the modern ICT (Ani et al, 2005).

In an effort to ensure that libraries remain forecast in their objectives in this era of ICT development, CHE recommended that library shall adopt and maintain new information communication technologies as they develop and that every University Library shall embrace the new opportunities created by Information and Communication Technology (ICT) used in teaching, learning and research. It was also recommended that libraries shall facilitate the provision of virtual services, such as web pages, internet searching and using technology for electronic connectivity. The library building must provide space adequate for print and IT based resources and that it shall incorporate ICT needs as an integral part of the design concept including trunking and cabling and wireless connectivity. The recommendation was summed by the emphasis that all librarians, para-professional and other library staff shall be trained so as to be able to use ICT products and services available in the library.

Technological innovation is not well grounded in academic libraries in Kenya but few academic libraries have integrated the necessary technology such as: USIU Library, CUEA Library among others (Makori, 2009). Therefore there is need for academic libraries in Kenya to integrate ICT solutions into their mainstream information products and services. These solutions include integrated information systems, digital information systems, computing, radio frequency identification (RFID), local area and wide area

networks. Although traditionally libraries have been the most important of the university facilities in supporting advanced scholarship, today, perhaps as never before fundamental questions are being raised concerning their nature and purpose as institutions (Kavulya, 2004). In spite of the recognition that libraries play a key role in development and success of higher education, in many parts of the developing world there is a near total collapse of university library and information services.

### **1.1.2 University of Nairobi Libraries**

The history of University of Nairobi (UoN) dates back in 1953 when the Royal technical college was established. Later in 1963, Royal Technical College became the University College, Nairobi following the establishment of the university of East Africa with three constituent colleges in Nairobi, Dar es Salaam and Kampala (Nyaigoti-Chacha, 2004). Throughout the 1970s, the government strengthened and expanded the University of Nairobi, the only one as a conscious effort to provide university education to all qualified Kenyans.

Alongside the establishment of UoN was a library to support its programmes. The main library is Jomo Kenyatta Memorial Library (JKML) located at its main campus. In view of its rapid expansion, 10 other libraries were started all spread across its seven campuses. These libraries include: - Institute for Development Studies Library, Population Studies Research Institute Library, Institute for African Studies, Upper Kabete Library, Lower Kabete Library, Parklands Library, Kikuyu Library, Chiromo Library, Architecture, Design & Development (ADD) Library and Medical Library.

In the early 1980s, automation of the University of Nairobi Library was started however, according to Mathangani (2005) the idea materialized in 1999 when an agreement was signed between the Free University of Brussels (VUB) and UoN and the project subsequently took off in April 2001 with the installation of the cataloguing module, the retrospective conversion of the catalogue records, the bar-coding of library materials, and the launching of the OPAC. Mathangani further noted that although the project mainly focused on the automation of library functions, a more embracing concept would have

recognized that the real challenge entailed moving the library from a hard-copy setting to electronic environment.

In its 5 years strategic plan (2005–2010), JKML library was to keep abreast of global ICT initiatives and to create electronic content to meet user needs. The plan was also to acquire new skill through training of both staff and users. Currently the JKML library is playing a leading role towards capacity building among the library professional in the country. With the assistance of International Network for the Availability of Scientific Publication (INASP), JKML has organized ICTs related workshops and training for the library professionals in both public and private institutions in Kenya. Makori (2009) has noted that JKML has already embarked on the process of creating and developing its Institutional Repository (IR).

## **1.2 Problem Statement**

The proliferation of new technologies opens a number of challenges for higher institutions of learning and notable among these are those associated with the adoption and institutionalization of these emerging technologies (Odero-Musakali and Mutula, 2007). Moropa (2010) indicates that the situation is further worsened by the information divide which has resulted in the computer/information skills of users being a major complicating challenge; those skills range from non-existent to highly developed – with the poorly developed group forming the bigger proportion – and academic libraries in Africa have to cater for the entire spectrum.

Various donors and institutions have pumped resources into institutions of higher learning and their libraries to facilitate implementation of ICT. For instance Kenya Education Network (KENET) provides Universities with affordable and efficient bandwidth thereby setting up a cost effective and sustainable private network with high-speed access to the global Internet (Kashorda, 2010). The International Network for the Availability of Scientific Publication (INASP), Kenya Libraries and Information Service Consortium (KLISC) as well as Electronic Information for Libraries (EIFL) have for many years been supporting librarians from institutions of higher learning to boost their capacity in the provision of information in the digital age. The support has mainly been in

the form of training in the use of new library technologies, workshops, exchange visits as well as financial support for acquiring new library technologies.

However, Makori (2009) indicated that academic libraries in Kenya seem to be facing daunting challenges in regard to their primary role of delivering information to their users and the reason as to why they are losing their supremacy in carrying out this fundamental role is due to the changing information environment and media landscape, technological innovations, user expectations, and various economic issues. A study by Odero-Musakali and Mutula (2007) found out that while most academic libraries in Kenya have access to the internet very few appear to have integrated the technology into their routine operations.

Various studies (Ani et-al, 2005; Odero-Musakali and Mutula, 2007; Adekele and Olorunsona, 2009; Makori, 2009; Moropa, 2010) have been done on academic libraries in relation to ICTs both in Kenya, Nigeria, South Africa as well as other African countries. Given that ICTs evolve everyday, this study will focus on UoN libraries and will seek to investigate if the heavy investment they have had over the years has resulted in more automation. The key questions this study seeks to answer are:

- a) How much are ICTs being utilized in UoN libraries?
- b) What factors hinder these libraries in adopting new technologies?
- c) What factors affect ICT adoption?

### **1.3 Objective of the Study**

- a) Establish the extent to which ICTs are used in UoN libraries
- b) Determine the challenges faced by UoN libraries in adopting ICTs
- c) Analyse the effects of ICT determinants of adoption on ICT adoption at the University of Nairobi libraries

### **1.4 Value of the Study**

This study is likely to provide policy makers and educational planners in Kenya with an outline on which to have ICTs incorporated in their library functions in order to improve the quality and management of academic information in academic libraries. Also the



result of this study will be useful to information professionals in institutions of higher learning especially the library heads as they will be able to know where they stand, the challenges they are facing and the way forward. Lastly, this study will contribute to the existing knowledge pertaining to the adoption of ICTs in academic libraries.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 ICTs in Higher Education

Information and communication technologies (ICTs) enhance the quality of teaching and learning, research productivity of faculty and students, as well as the management and effectiveness of universities (KENET, 2008). ICT use in education is at a particularly dynamic stage in Africa; new developments and announcements happening on a daily basis somewhere on the continent (Farrell, 2007). During the last two decades higher education institutions have invested heavily in ICT which has had a major impact in the university context, in organization and in teaching and learning methods (Youssef et-al 2008). But, according to a World Bank Institute survey, the state of ICT infrastructure in African universities can be summed up as “too little, too expensive, and poorly managed.” Oliver (2002) adds that the impact of ICTs in higher education has not yet been felt.

There has recently been intense interest in the ways in which technology can be used to support students in Higher Education (Issroff and Scanlon, 2002)). It should be noted that with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important (Nadira et-al, 2010). In higher education and human capacity building, there are significant patterns of change because ICTs are impetus for change in traditional concepts of teaching and learning, as well as prime motivation behind the change in scholarly and professional activities. (Minishi-Majanja, 2007).

Although a study by Farrell (2007) placed Kenya and South Africa higher among other sub-Saharan countries in ICT up-take in higher education, Nyaigotti-Chacha (2004), noted that higher education institutions the world over are facing new challenges which require reforms in their management and governance styles. Jowi (2003) adds that while higher education institutions have responded rather slowly in the past to changing circumstances, there is now an urgent need for them to adjust rapidly in order to fulfill their missions and the needs of other stakeholders. Business-like approaches in information management ought to be adopted by libraries in institutions of higher

learning. Relevant, timely and accurate information products and services are imperative if academic libraries are to meet the needs and demands of the current generation of information audience (Makori, 2009).

## **2.2 Utilization of ICTs in Libraries**

Libraries are caught midstream between print versus a digital setup. Future libraries will evolve from present libraries through specific corrections and improvements introduced into the existing structure and framework (Swanson 1979). The library of the future is unlikely to be a physical entity as we know it but would probably be a Web portal providing access to information (Smith 2005). Due to inappropriate resources and integration of ICTs, libraries are not utilized fully by the users and if the services being offered are not what users need, then, not surprisingly, users will ignore these offerings but with the integration of ICTs both at the back and front end would enhance users potential and more young people could turn their attention to libraries (Gould and Gomez, 2010).

To improve libraries, we should begin by trying to identify and understand the problems intended to be solved. Different types of libraries have evolved in response to different kinds of problems. The evolution of libraries is likely to last for a long period of time. According to Banerjee (1996), libraries will be in ceaseless transition, and the library environment will be perpetually changing and that this situation will place considerable demands on staff, requiring a vast range of knowledge as well as a high degree of flexibility.

The advent and use of ICT has made it possible for remote libraries to access the huge databases of big libraries in developed countries for the purpose of adopting or adapting their bibliographic data for their own library use; and indeed the online catalogues have transformed the landscape of cataloguing and classification (Adekele, 2010).

### **2.3 Utilization of ICTs in Academic Libraries**

Academic libraries are those libraries located in institutions of higher learning mainly universities and colleges and are primarily intended to serve the students and the faculty. The main objective of such libraries is to assist its users in the process of transforming information to knowledge (CHE 2007). As fountains of knowledge, academic libraries provide services to support learning and research.

In one of his many papers, Swanson (1980) stated that libraries are not designed-at least not in the sense that one might design a computer or a factory, rather; they have evolved in response to certain problem situations and have been shaped by countless, relatively independent, individual decisions. Several authors (Hellen, 2007 and Makori, 2009) have indicated that academic libraries are currently operating in a new technological environment and that they need to adapt to it. Otike (2004) adds that one of the major challenges that libraries and the library profession will face in the new millennium is how to cope with electronic and paperless literature however, academic libraries in Kenya need to integrate technological solutions into mainstream information products and services.

Odero-Musakali and Mutula (2007) stated that the future of universities greatly hinges on their ability to embrace and leverage the potentials of these emerging technologies at all levels of their business activities and strategies. Academic libraries have no choice but utilize ICT in their functions as Omoniwa (2001) hypothesized that in the twenty-first century, globalization of information and the adoption of information technology will be the hallmark of great libraries. If libraries are to function effectively in the present age, the manual processes or methods will have to give way to information and communication technologies (ICT) and a computer driven environment (Orolunsola, 2009).

ICTs have had a far reaching impact on library and information institutions and services worldwide (Abdelrahman. 2009). A study by Haneefa (2007) indicated that libraries and Information Centres have been employing ICT and electronic information resources and services to satisfy the diverse information needs of their users. Intense efforts have been

made by various libraries in employing ICTs in their various operations with information retrieval systems are being designed to suit the needs of end users as well as to simplify the process. The ICTs as used in academic libraries attempts to deliver numerous applications such as wide-area network applications, local area networks, online information services (the Internet), online databases, library databases, CD-ROMs, online access catalogues, retrieval networks, digital online archives, mainframe computers, microcomputer labs, and other digital content services (Ghuloum and Ahmed, 2011).

## **2.4 Challenges Libraries Face in Utilizing ICTs**

While new technologies have added value to library services by presenting new modes of collecting, storing, retrieving and providing information, they have also brought new challenges and aggravated some of the challenges that faced libraries before (Emmanuel and Sife, 2008). Ghuloum and Ahmed (2011) have indicated that several factors such as financial factors, technological factors, human factors and cultural factors may be a barrier in ensuring utilization of ICTs. These have included such factors as a lack of sufficient funds to support the purchase of the technology, lack of qualified library professionals, lack of motivation and need among librarians to adopt ICT in their daily operations (Ani, 2005; Starr, 2001).

### **2.4.1 Financial Factors**

Academic libraries just like other departments in institutions of higher learning require sufficient funds in order to acquire modern ICT facilities such as computers, servers, scanners, photocopiers, software as well as buy/subscribe to online/offline resources such as e-journals, e-books and digital books among other resources. Amutabi (2009) pointed out that with the dwindling financial donor support situation it is unlikely that things will improve much.

Kamba (2011) pointed out that libraries which became fully automated in the 1990s but could not afford to migrate, find their current software very limiting and unless one could afford to migrate onto new and updated systems, the early start could be a disadvantage.

He adds that the fully automated libraries are those that either started late with donor assistance or have secured funds to migrate to up-to-date systems.

#### **2.4.2 Technological Factors**

Inadequate technological infrastructure to support the integration of ICTs in the library functions has been cited by several authors as one of the major challenge that academic libraries face. Kamba (2011) noted that ICT is not very well spread and utilized in African institutions of higher learning, mainly because of poor communication network, limited access to ICT hardware and software. This refers to issues as poor or lack of ICT policy, low internet connectivity, inadequate supply of electricity, inadequate number of PCs, etc (Minishi-Majanja, 2007). A study by Rosenberg (2005) showed that 85 per cent of the libraries provide less than one computer for every 100 students and 36 per cent provide less than one computer for every 500 students. Despite the poor students computer ratio, Kamba (2011) added that there is a serious neglect of ICT resources acquired over a period of years, which need upgrading or are out of usage and this increases the complexity of managing the ICT resources.

The study of Chisenga on the application of ICT in libraries, found that, although most librarians had Internet connectivity, almost none were offering web-based information services to their users. Minishi-Majanja (2005) indicated that the telecommunication services are the root cause of these problems in terms of, low bandwidth, technical faults and other network configuration problem. Frequent power outage has also been identified by several authors (Siddike et al, 2011; Ani et al 2005; Magara, 2002) as an impediment towards ICT adoption and utilization.

#### **2.4.3 Human Factors**

The organization culture, library leadership and trained library personnel play a pivotal role in determining the role and status of academic libraries. Several authors (Sife, 2008; Minishi-Majanja, 2007; Odero-Musakali & Mutual, 2007) have identified that lack of trained personnel and negative attitude of university management on IT as major factors that impede effective adoption of ICT in university libraries. Kamba, (2011)

acknowledges the existence of crunch trained and experienced technical personnel who manage, control, and maintain available ICT resources in academic libraries. Emanuel and Sife (2008) add that many libraries have inadequate qualified ICT personnel with most traditional librarians having low ICT skills and sometimes have technology phobia.

Lack of trained personnel and negative attitude of university management on IT are important factors that also militate against effective adoption of ICT in university libraries (Ani, 2005). Without adequate supply of appropriately trained and skilled personnel, the ability to provide quality information services may be inhibited.

#### **2.4.4 Cultural Factors**

Socio-cultural aspects like cultural values, regional priorities, institutional relations, political dynamics, and educational background influence the perception of potential user groups, and therefore have an impact on the adoption and use of the technology (Hagenaars, 2007). Amutabi (2009) stated that the lack of computer culture in public universities impedes rapid diffusion of the new technologies. He adds that many university officials started their careers in the age of typewriter, before the wide-scale introduction of computer technology at universities and find it very hard to fathom many things in ICT.

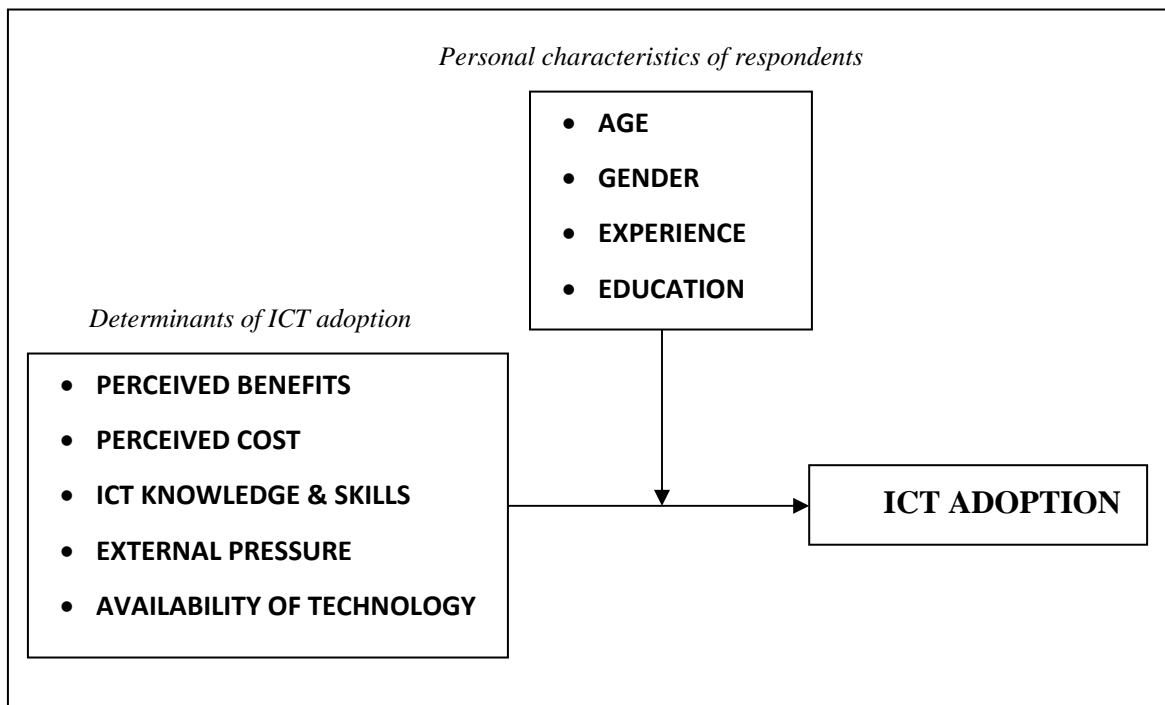
In their study, Gould and Gomez (2010) found out that in most countries, libraries are still being regarded as a place to study or store books thus many users doubt whether it is a 'cool' place to go, and whether it responds to their needs, such as providing current information. Many people still think that computers can only be found in cyber cafes and computer labs but not inside libraries. There is need for library management and library personnel to change this notion in order to encourage more users to visit the library and utilize ICT resources.

## 2.5 Conceptual Framework for the Study

The conceptual framework tested in this study contains constructs that have demonstrated theoretical support, based on a number of researches done in this area in different developing countries, particularly on the adoption of ICT and other innovation perspective. Factors used in this framework have been guided by the foregoing review of literature. This framework is ideal for this study as it provides the various parameters that characterize ICT adoption which constitutes the purpose of this study.

In this study, ICT adoption is the dependent variable. The dependent variable is analyzed in this research in order to find out the answer or solution to the problem i.e. what factors hinder libraries in adopting new technologies? In this situation, the study will tested five independent variables i.e. perceived benefit of ICT, perceived cost of adoption, ICT knowledge and skill of the librarians and external pressure that are believed to have some influences towards the dependent variable (ICT adoption).

**Figure 2.1: Conceptual Framework**



*Source: Author (2011)*



### **2.5.1 Perceived Benefits**

Perceived usefulness is defined as the prospective user's subjective probability that using a specific technology will increase job performance. The evolution, development and advances in modern ICTs have brought in a dramatic and an unprecedented revolution library profession and practice. For any library to derive maximum benefit in this information age, it has to be online (Siddike, 2011). Through ICT libraries users can have access to variety of information available on computer networks and online services across the globe.

The advent and use of ICT has made it possible for remote libraries to access the huge databases of big libraries in developed countries for the purpose of adopting or adapting their bibliographic data for their own library use; and indeed the online catalogues have transformed the landscape of cataloguing and classification (Adekele, 2009). Similarly, the availability of e-mail and internet facilities in academic libraries offers a wide range of access to information globally without geographical barrier and timely too (Akon, 2005).

### **2.5.2 Perceived Cost**

The cost of adoption is an important factor in the adoption and utilization of the Web (Ernst and Young, 2001). Generally, the higher the costs adoption of the innovation, the slower the pace of innovation expansion is likely to be (Mansfield, 1968; Davis, 1979). The cost factor was studied by various Information System (IS) researchers (Seyal and Rahim, 2006; Premkumar et al., 1997; Drury and Farhoomad, 1996; Cox and Ghoneim, 1996) and found direct and significant relationship between cost and adoption of technology.

Perceived cost is another independent variable included in this framework mainly because it plays an important role for academic libraries in determining adoption of ICT in their functions. Siddikes' (2011) study found out that Inadequate financial support has made the possibility of ICT application in the university libraries much more complex.

Most of these ICT facilities and services are very expensive and can be purchased from developed countries and that the little funds received fall far below the standard costs of ICT facilities and services (Emmanuel and Sife, 2008).

### **2.5.3 ICT Knowledge and Skill**

It is very important for organization to determine its employee's knowledge or skills of ICT because those knowledge or previous experiences may influence organization decision in adopting ICT (Alam and Noor, 2009). Emmanuel and Sife (2008) indicated that it is imperative that there are qualified technical personnel for managing and maintaining ICT facilities and networks that the library system runs. a study by Farahi and Gandhi (2011) asserted that lack of budget, manpower, skilled staff, and training were the constraints for not automating library activities. Ghuloum and Ahmed (2011) adds that there is lack of workshops and training for both staff and users to improve their ICT skills.

### **2.5.4 External Pressure**

External pressure like pressure from publishers and library users are likely to influence the adoption of ICT in academic libraries. A greater demand for library materials, an increase in the amount of material being published, new electronic formats and sources, and the development of new and cheaper computers are some of the reasons for the growing need for ICT in the African libraries (Kamba, 2011).

Increasingly larger number of publishers started using the Internet as a global way to offer their publications to the international community of scientists and technologists given the fact that technology is in a position to deliver more content to more users at a significantly lower cost per user (Arora, 2009). Most integrated library system support e-mail-based communication to library users (for circulation and acquisition related activities) and to the vendors/publishers (for placing orders, reminders, cancellation etc).

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Research Design**

This study utilized the descriptive research process. According to Mugenda and Mugenda (2003), a descriptive research process determines and reports the way things are. This study attempts to describe such things as characteristics, hardware, software, computerized services and attitude of libraries and librarians towards ICT. Descriptive research design lays a greater emphasis on sample selection because the major concern is to obtain a broad picture of the social problems prevailing in the defined universe and recommendations to bring about the desired change (Majumdar, 2005).

### **3.2 Population**

The target population comprised of all individuals, objects or things that the researcher reasonably generalizes his/her findings to (Cooper & Schindler, 2006; Mugenda, 2008). The population for this study comprised of the University of Nairobi librarians from the following libraries: - Jomo Kenyatta Memorial Library (JKML) located at its main campus, Institute for Development Studies Library, Population Studies Research Institute Library, Institute for African Studies, Upper Kabete Library, Lower Kabete Library, Parklands Library, Kikuyu Library, Chiromo Library, Architecture, Design & Development (ADD) Library and Medical Library. A total of 11 libraries were selected to take part in this study.

### **3.3 Sample Design**

In order to achieve desired representation, stratified random sampling will be used. This is because the accessible population is not homogenous in terms of the role they play in fostering ICT adoption. The two strata namely the librarians and library assistants will be formed from the accessible population. Librarians were sampled because in most cases they are directly involved the acquisition of ICTs in academic libraries. Assistant librarians will be sampled because in most cases they are the ones involved in utilization of ICT facilities in their day to day activities as well as interact with library users.

**Table 3.1: Number of library staff to be interviewed**

	<b>Library</b>	<b>No. of staff</b>
1.	Architecture, Design & Development (ADD) Library	3
2.	Chiromo Library	3
3.	Institute for African Studies	3
4.	Institute for Development Studies Library	3
5.	Jomo Kenyatta Memorial Library (JKML)	5
6.	Kikuyu Library	3
7.	Lower Kabete Library	3
8.	Medical Library	3
9.	Parklands Library	3
10.	Population Studies Research Institute Library	3
11.	Upper Kabete Library	3
	<b>Total</b>	<b>35</b>

Source: Author (2011)

### **3.4 Data Collection**

The actual data collection of this study was done for a period of one month i.e. 15<sup>th</sup> September – 15<sup>th</sup> October 2011. A letter of introduction explaining the purpose of the study was obtained from the University of Nairobi School of Business. The letter of introduction together with the questionnaires was presented to the administration of UoN library and the researcher was given a go ahead to collect data from the sampled libraries.

The questionnaire was divided into four sections. Section A which focused on the demographics of the respondents, section B focused on the extent of ICT adoption, section C focused on the impediments of ICT adoption while section D gathered data on

the benefits of ICT adoption. Some questionnaires were filled in the presence of the researcher while others were left behind and picked later after confirmation that they have been filled. In some libraries the researcher was unable to get the targeted number of respondents. This reduced the expected number of questionnaires from 35 to 30.

### 3.5 Data Analysis

The data that was collected from the field was raw thus all the collected questionnaires were cleaned, edited, coded before they were entered into the statistical software for analysis. Statistical Package for Social Sciences (SPSS), STATA and Excel were used for analyzing the collected data. SPSS was preferred because of its ability to model latent variables under both normal and non-normal conditions. Excel was also be used to generate and manipulate graphs and charts.

Regression analysis technique was used for modeling and analyzing variables in different sections of the questionnaire. Means, frequencies and percentages were computed and data presented in form of tables, graphs and charts. Qualitative data was also obtained from the open ended sections of the questionnaire and content analysis used for its analysis. Content analysis was preferred because it is suitable and appropriate for the analysis of open ended questions.

As a statistical tool for the investigation of relationship between variables, regression analysis was used to test the impact of ICT determinants on adoption. Below is a regression model showing the relationship between the dependent and independent variable.

$$\underbrace{AX}_{\text{ICT adoption}} = a_1 + a_2 X_2 + a_3 X_3 + e \quad (1)$$

*Determinant of ICT adoption*

*Personal characteristics*

## **CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION**

### **4.1 Introduction**

In this chapter, detailed results of the analyses are presented. The analysis, presentation and interpretation of findings were done with the sole purpose of answering the questions asked by the objectives of the research. The data collected was analyzed using frequencies, percentages, means and standard deviation. The information was interpreted and then presented using tables, pie charts and graphs.

### **4.2 Data Evaluation**

Respondents for this study were librarians from the eleven libraries of the University of Nairobi libraries. A total of 35 questionnaires were administered to the study samples. At the end of field work, 30 valid questionnaires had been filled and returned. This represents a response rate of 86% (30/35). Reasons for inability to collect all the 35 questionnaires include: - some libraries had less staff than anticipated and also the inability for the researcher to get back to the respondents due to various reasons such as misplacement of the questionnaire by the respondent and the distance involved to get to the sampled library.

#### **4.2.1 Demographic Characteristics of Respondents**

Out of the 30 valid responses, 16 or 53% were from females, the remaining 47% were from males. Respondents were aged between 20 years to over 50 years old with the majority lying between 30 – 49 years of age. A complete analysis of respondents' characteristics is illustrated in Table 4.1.

**Table 4.1: Demographic Characteristics of Respondents**

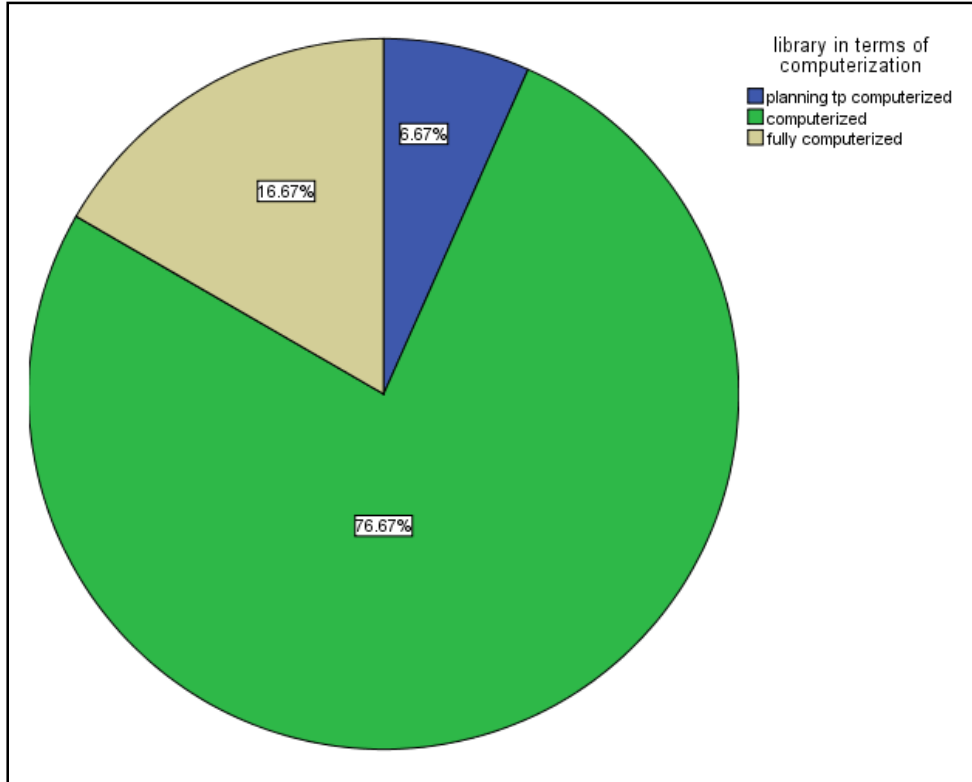
	<b>Total Response</b>		<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	30	Male	14	47
		Female	16	53
<b>Age Group</b>	30	20 – 29	3	10
		30 – 39	9	30
		40 – 49	12	40
		50 +	6	20
<b>Education Level</b>	30	Certificate	1	3
		Diploma	8	27
		Bachelors Degree	9	30
		Master Degree	12	40
<b>Experience</b>	30	Less than 1 year	2	7
		1 – 2	4	13
		3 – 8	15	50
		9 - 10	2	7
		11 +	7	23
<b>ICT Training</b>	30	Yes	25	83
		No	5	17

*Source: Author (2011)*

### **4.3 Status of Computerization at the University of Nairobi Libraries**

In an effort to establish the extent of computerization, respondents were asked to indicate the level of computerization in their libraries. About 77% of the respondents indicated that their libraries are computerized compared to 17% and 7% who indicated that their libraries are fully computerized and planning to computerize respectively. According to the responses from the respondents, all the UoN libraries are using ICTs in the provision of library services with.

**Figure 4.1: Library in Terms of Computerization**



*Source: Author (2011)*

#### **4.4 ICT Capacity Building**

Implementing ICT in the library largely depends on librarians. Finding has shown that most librarians have had the opportunity to attend workshops/seminars as well as in-house training. A big number of the respondents indicated to have undergone the necessary ICT training in the last two years with 83% having being trained of ICT and 17% not having undergone any form of ICT training in the last two years. The kind of training received by the respondents varies greatly, however trainings on electronic resource seems to be more popular as compared the other types of training. In-house systems training is the second most popular training offered to the UoN librarians. Other kinds of training received include the general ICT skills, web 2.0 technologies, web design, open access and emailing.



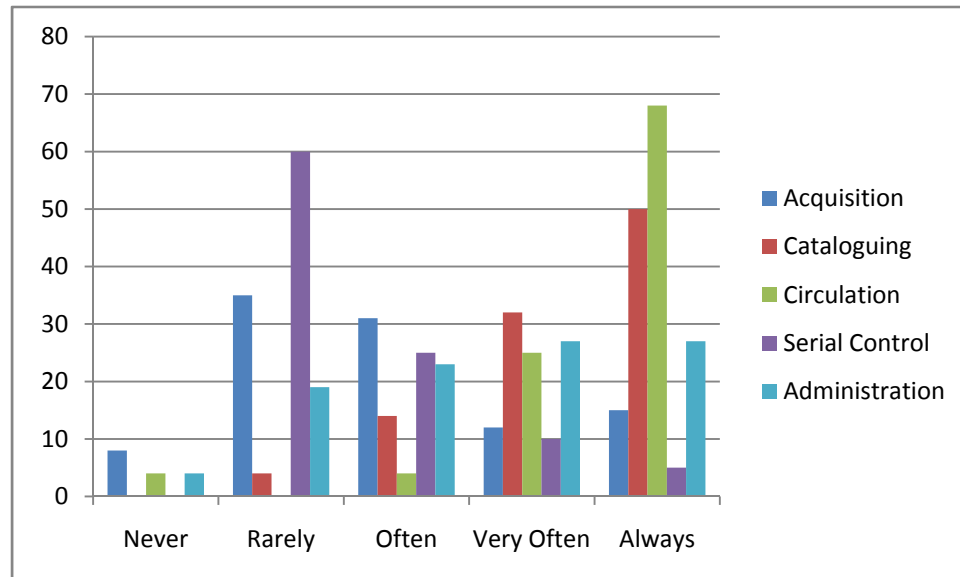
Majority of the respondents who indicated not to have received any form of ICT training did not give any valid reason however; the analyzed data shows that they are mostly new employees having worked for less than 2 years at the library.

#### 4.5 Library Management System

The library software used by all the UoN libraries is known as VUBIS Smart. The software is web based and available on the university intranet as well as internet (OPAC option). For most of the respondents, the library software is commonly used for circulation, cataloguing and administrative purposes.

Figure 4.2 shows how the various modules of VUBIS Smart are being used by the librarians with 68% of the respondents indicating that they always use the LMS for circulation services, 50% always use it for cataloguing services. The LMS is also commonly used for administrative purposes with 23%, 27% and 27% of the respondents indicating that they use it often, very often and always respectively.

**Figure 4.2: How Often do you Use Library Software**



Source: Author (2011)

However, some modules seem not to be popular with the librarians. These include the acquisition and the serial control module. As shown in Figure 4.2, 60% and 35% of the librarians rarely use serial control and acquisitions modules respectively.

#### 4.6 ICT Facilities Available in the Library

Availability of ICTs facilities is a key pre-condition towards adoption, usage and benefiting from e-library services. In an effort to establish the extent to which libraries have incorporated these ICT facilities, respondents were asked to indicate whether 18 types of ICT hardware facilities existed in their respective libraries. Majority of the respondents indicated that ICT hardware facilities were available in their respective libraries as illustrated in Table 4.2.

**Table 4.2: ICT Facilities Available in the Library**

ICT Hardware	Yes (%)	No (%)	Not Sure (%)
a. Computers	100	0	0
b. Local Area Network (LAN)	97	3	0
c. Networked Servers	90	3	7
d. Bar code readers	90	7	3
e. Printers	87	7	7
f. World Wide Area Network	86	7	7
g. Book Check Systems	77	20	3
h. Security Check Systems	73	24	3
i. CD-ROM Readers/writers	66	28	7
j. Photocopying Machines	57	40	3
k. Generator to supply electricity whenever there is load shading	50	37	13
l. Microfilm readers	38	48	14
m. Scanners	37	57	7
n. Laptops	33	67	
o. LDC Projector	33	64	3
p. Photo Cameras	13	74	13
q. Video cameras	7	83	10
r. TV Stations	0	93	7

*Source: Author (2011)*

Observation from Table 4.2 clearly shows the ICT hardware that are popular in UoN libraries. Computers ranks number one with all the libraries indicating that they have computers. Barcode readers are also very popular in most libraries and are mostly used for circulation services when librarians are issuing or returning borrowed library items. Book check systems and security check systems are also clear indications of ICT adoption.

However, it can be noted from Table 4.2 above that certain basic computer hardware's seems to be uncommon in most of the UoN. LCD projector and laptop can be very useful especially for information literacy and library orientation for the new library users and thus their presence in the library is very important. For the purpose of digitalization and information sharing, a scanner can be very useful. The absence of scanners is echoed by the low ranking of digitalization services as can be seen in Table 4.3 as well as the absence of electronic thesis/dissertations and past papers as can be seen in Figure 4.3.

#### **4.3 ICT Services Provided by the Libraries**

Table 4.3 shows the respondents' responses on the kind of services provided their respective libraries. Some services such as provision of full text journal articles, OPAC, electronic books and bar coded circulation services are very popular in all the sampled libraries. In addition all the UoN libraries share a common library website. Other services like internet web browsing, email, end user training, current awareness, bibliographic databases, electronic reference and information services are also quite popular in most libraries.

A number of research studies have been carried out to investigate the state of ICT in Africa (Omoniwa, 2001; Alema et al, 2000; Adekele and Olorunsola, 2010). Alema et al (2000) explored the ICT availability in the University of Ghana Library (UGL) and the University of Zambia Library (UNZA). Study showed the availability of email and internet services at both libraries. From this study, Internet and email services have also been rated highly by the librarians at the UoN libraries.

**Table 4.3: ICT Services Provided by the Library**

Type of Service	Yes (%)	No (%)	Not Sure (%)
a. Full text journals articles	100	0	0
b. Online Public Access Catalogue (OPAC)	100	0	0
c. Electronic Books	100	0	0
d. Library Website	100	0	0
e. Bar coded Circulation Services	100	0	0
f. Bibliographic databases	93	7	0
g. Internet web browsing services	83	17	0
h. End Users Training Programme	83	10	7
i. E-mail services	77	23	0
j. Electronic Reference and Information Services	77	13	10
k. Current Awareness services	77	13	10
l. Book Reservation and recall	77	20	3
m. CD-ROM Services	60	20	20
n. Printing Services	33	67	0
o. Document Scanning Services	20	67	13
p. Photographic services	17	83	0
q. Digitization Services	17	80	3

*Source: Author (2011)*

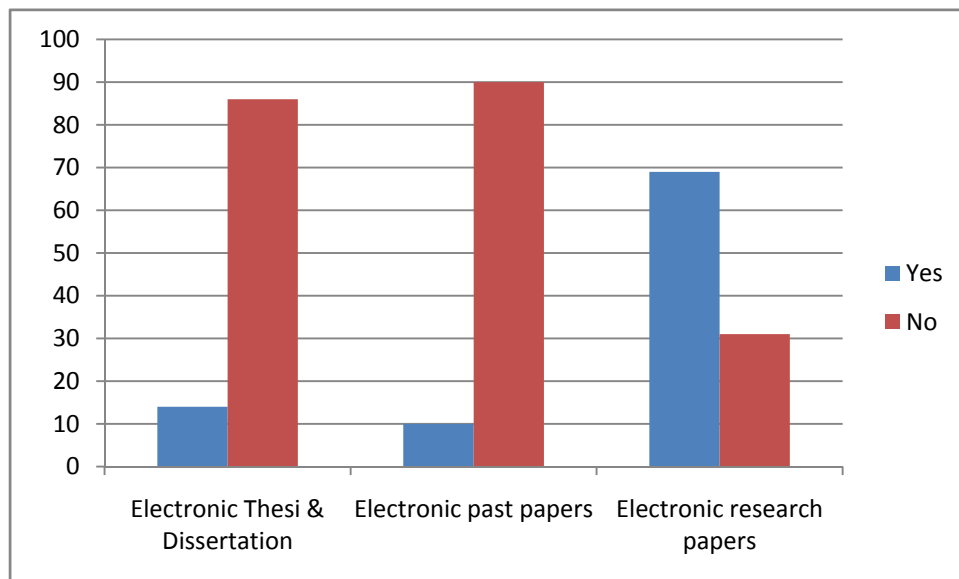
Digitalization, photographic, document scanning and printing services seems to be the least popular services at the UoN libraries. These responses have been echoed from table 4.2 which clearly shows that hardware such as scanners, photocopiers, and photo cameras are not common in the respondents' libraries probably as a result of high cost of computer hardware.

A study by Abdelrahman (2009) on the state of ICT implementation at the University of Khartoum revealed that there is lack of adequate funding for the digitalization project of rare collection and the thesis and dissertation collection. This was manifested in the poor equipment used and that there is only one small office scanner dedicated for this purpose. The study also noted training programmes does not include any course in digitalization.

Finding from Abdelrahman study concurs with the responses from the UoN libraries in which no respondent indicated to have undergone training on digitalization.

A survey by Choi and Rasmussen (2006) came up with the conclusion that library professionals need skills on two levels; one is that related to technology and the second one is library related aspects which include digital archiving and preservation. Electronic resource training featured the most followed by general ICT skills, web 2.0 technologies, web design, open access and emailing.

**Figure 1.3: Electronic Resources Available in the Library**



*Source: Author (2011)*

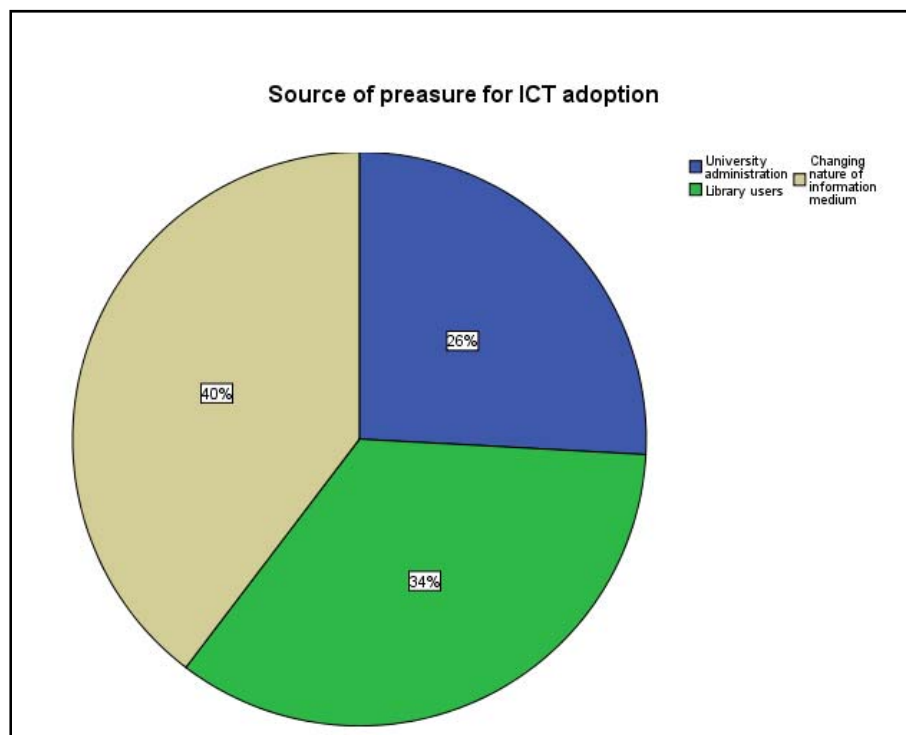
There is need to understand the role of digital collections in academic libraries as sustainable tools of information collection management and preservation. Figure 4.3 below shows low levels of digitalization at the UoN libraries. Chiware (2006) attributes this to the readiness of the university libraries in terms of skills and knowledge to implement the digital and electronic library services. None of the respondents from this study indicated to have undergone any training in digitization and this is in line with

Rosenberg (2006) who noted that skills in e-resource management, e-service development, full text digitization and teaching skills are lacking in African university libraries.

#### 4.4 Source of Pressure for ICT Adoption

In order to establish why libraries are acquiring and using ICTs in the management of library resources, respondents were asked to indicate in the order of importance what is pressurizing them to acquire their ICT facilities and services. 40% ranked changing nature of information medium as number one source of pressure with 34% indicating that library users are the ones making them adopt ICTs. University administration came third with 26% as pressure for the ICT adoption. Figure 4.4 below illustrates how the respondents responded.

**Figure 4.4: Source of Pressure for ICT Adoption**



*Source: Author (2011)*

#### 4.5 Benefits of Using ICT

In relation to the benefits of using ICTs respondents were asked to indicate to what extent they agree/disagree with a list of statements provided. From the response (Table 4.4) majority of the respondents strongly agreed that ICTs are useful in many ways. Of all the list of choices provided, respondents strongly agreed that ease of accessibility of information (83%) and provision of current information (83%) are the major benefits of ICT utilization. A bigger percentage of the respondents strongly agreed that ICTs are of great benefit in provision of linkages with various sources of information, ease of communication with library users and linkage with other libraries.

**Table 4.4: Benefits of Using ICTs**

<b>Benefits of ICT determinants</b>	<b>Strongly Agree (%)</b>	<b>Agree (%)</b>	<b>Moderate (%)</b>	<b>Disagree (%)</b>	<b>Strongly Disagree (%)</b>
Ease accessibility of information	83	17	0	0	0
Linkages with other libraries	47	47	3	0	3
Linkage with various sources of information	67	23	10	0	0
Ease of communication with library users	60	34	3	3	0
Easy to acquire, manage, store and distribute information	50	47	3	0	0
Enables provision of current information	83	14	3	0	0

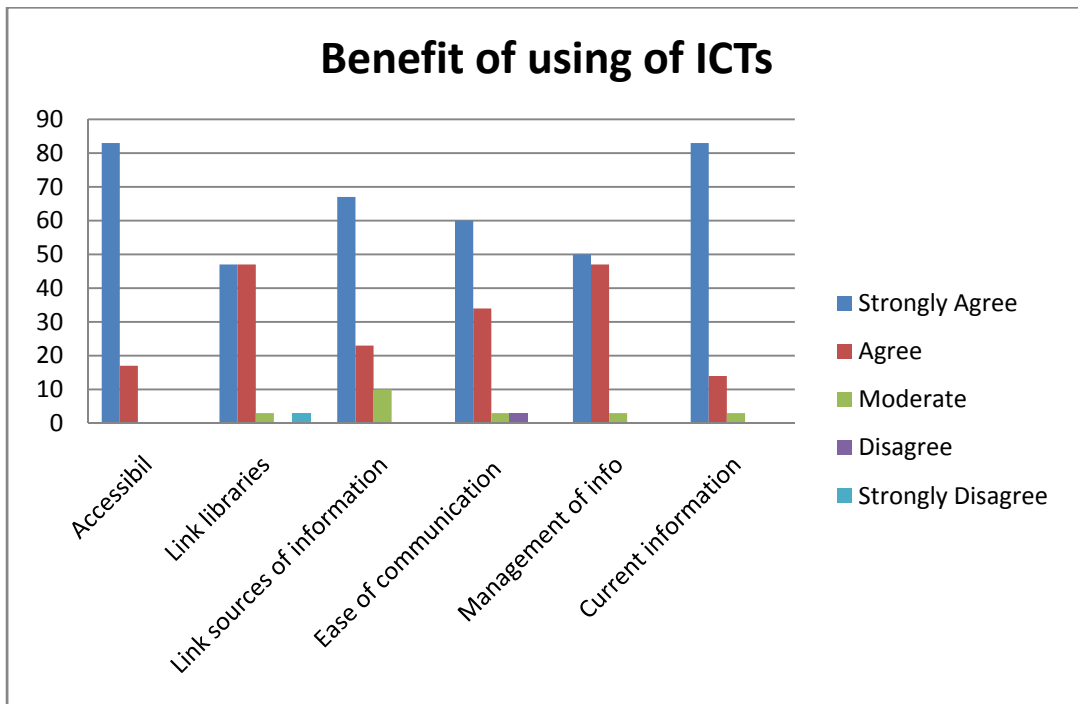
*Source: Author (2011)*

The results above results concur with that of Adekunle et-al (2007), which found out that librarians have a positive attitude towards ICT with a large majority agreeing of its usefulness. Figure 4.5 present the findings on the benefits of utilizing ICTs in UoN libraries. The results show that majority of the respondents have a positive attitude towards ICT and that they consider it to be important in the provision of library services

such as ease of accessibility of information, provision of current information, communication with library users and in the management of library information.

However, as seen in the figure 4.5 below only a few respondents disagreed (3%) and strongly disagreed (3%) that ICT eases communication with library users and linkage with other libraries respectively.

**Figure 4.5: Benefits of Using ICTs**



*Source: Author (2011)*

#### **4.6 Barriers to Adopting ICTs**

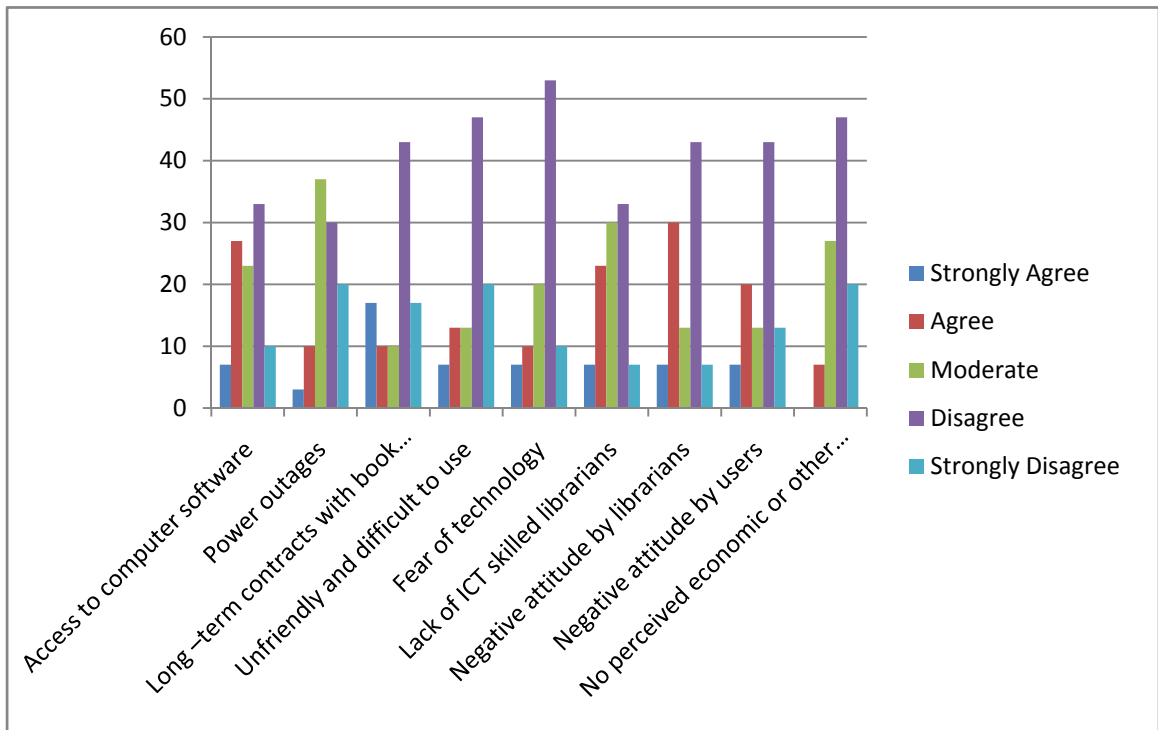
From the research, it was established that some of the major barriers UoN libraries are facing in the adoption of ICTs include the high cost of computer hardware and software, poor internet connectivity. 30% of the respondents agreed that the high cost of computer hardware limits the adoption of ICT whereas 27% agreed that the high cost of computer software limits the adoption of ICT. The problem raised here seems to be facing many libraries in developing countries. A study by Adekele and Olorunsola (2010) indicated



that the problem of inadequate infrastructure facilities, low bandwidth and Internet downtime were identified as frustrating.

Another barrier to the adoption of ICTs is poor communication networks with 10% of the respondents strongly agreeing and 33% of them agreed. Only 13% disagreed while 3% strongly disagreed. Figure 4.6 represents respondents view to the statements below as factors that hinders the adoption of ICTs in libraries.

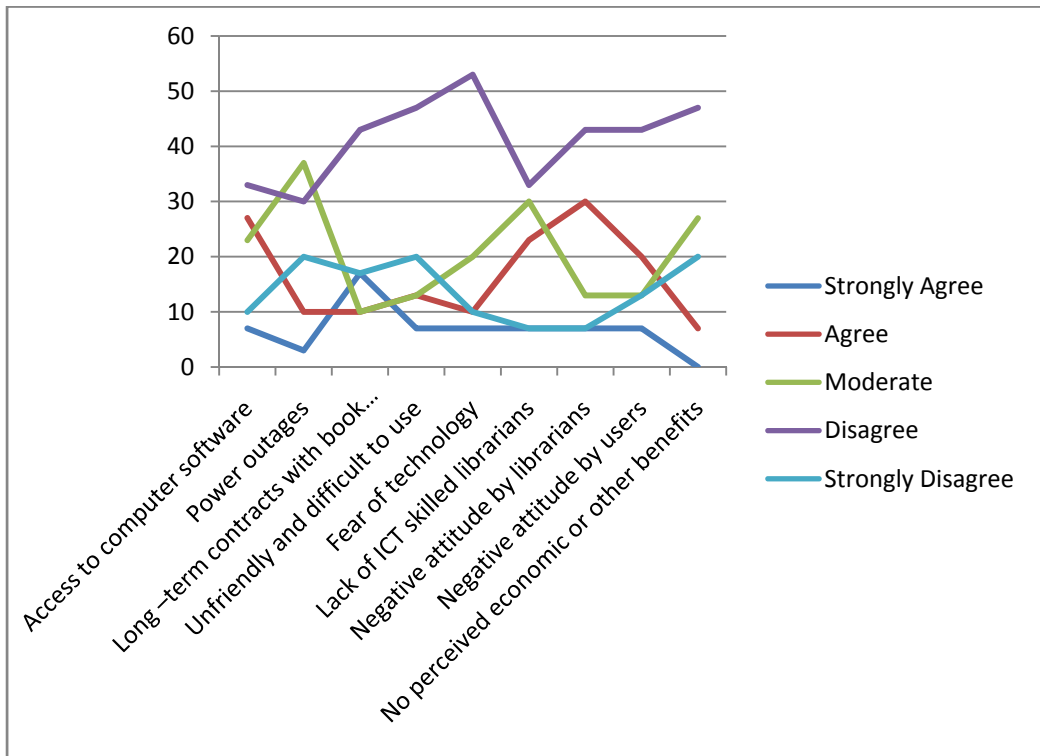
**Figure 4.6: Factors Hindering ICT Adoption**



*Source: Author (2011)*

Despite respondents agreeing that the high cost of computer hardware and software are among the factors that hinder ICT adoption they went further and disagreed that power outages, long-term contracts with book (print) publishers and fear of technology of being hinderance to ICT adoption. Figure 4.7 shows the extend to which respondents agreed/disagreed with the following staments.

**Figure 4.7: Challenges in ICT Adoption**



*Source: Author (2011)*

#### **4.7 Determinants of ICT Adoption**

This section focuses on ICT adoption and the factors that influence it. Ani et-al (2005) indicated that there are a number of factors that affect the adoption of ICT in academic libraries; some of which include lack of trained personnel, high cost of computer hardware and inadequate technological devices and equipment. Shibanda (2006) stated that the prohibitive cost of electronic journals hinder the speedy adoption of ICTs by academic libraries.

A bigger percentage of the libraries investigated have already incorporated ICTs in their services. However some technologies are still lagging behind in adoption. It is therefore important to know the determinants of ICT adoption in academic libraries in order to use

them in facilitating speedy adoption of other technologies within the academic library environment.

OLS was used to estimate the parameters of ICT adoption determinant and the model is as follows: -

$$AX = a_1 + a_2 x_2 + a_3 x_3 + e \quad (1)$$

In the above model, AX is the dependent variable representing ICT adoption; it is a dummy variable taking the value of 0 or 1. ICT adoption is measured by the acquisition module of the library management system (LMS). A LMS has 5 major modules namely, Acquisition, cataloguing, circulation, serials and administration modules. Cataloguing and circulation modules could not be used for regression because almost all the respondents indicated that they use these modules. X<sub>2</sub> are the determinants of ICT adoption which include perceived benefits, perceived cost, ICT knowledge and skills, external pressure and availability of technology. X<sub>3</sub> are the personal characteristics of the respondents which include age, gender, level of education and work experience in years.

The variables under the benefits and challenges of using ICT were originally collected in the form of likert scale but for the purpose of regression, they were converted to dummy i.e. yes = 1 and no = 0. Table 4.5 below shows the results of estimating ICT adoption model.

**Table 4.5: Determinants of ICT Adoption in the UoN libraries**

(Absolute t-Statistics in parentheses)

Variables	Model parameters estimates (marginal effects)	
	LPM	
<i>Benefits of Using ICTS in your Library</i>		
Ease of communication with libraries	-.1572 (0.31)	-.0258 (0.05)
<i>Challenges</i>		
Cost of computer software	-.2297 (0.99)	-.2329 (1.02)
E-journals & e-books	.3511 (1.73)	.3735 (1.86)
Long-term contracts with book publishers	.1477 (0.66)	.1383 (0.62)
Power outage	.3786 (1.74)	.3539 (1.64)
<i>Knowledge and skills</i>		
ICT training (yes for ICT training)	.6610 (2.67)	.6738 (2.76)
<i>Personal Attributes</i>		
Gender (1 = male)		-.2197 (1.24)
Constant	-.1598 (0.25)	-.1856 (0.30)
$R^2$	0.2240	0.2450
$F$ -Statistics ( $p$ -value)	2.20 (0.0881)	2.16 (0.0893)
Observations	26	26

*Source: Author (2011)*

The linear probability model (LPM), is estimated with ordinary least squares method (OLS) which give the marginal effects. A marginal effect is the change in probability due to a unit change in an explanatory variable.

The OLS results shows that the ICT training of librarians increases the probability of a library adopting (utilizing the acquisitions module of the LMS) ICTs by 66.10% ( $t = 2.67$ ). Similarly, the coefficients on the availability of electronic books and electronic journals increases the probability of a library adopting ICTs by 35.11% ( $t = 1.73$ ). However, estimate of the coefficients shows that all the other variables under the determinants of ICT adoption are statistically insignificant meaning that they have no effect on ICT adoption. Adekele and Olorunsola (2010) indicated that if libraries are to function effectively in the present age, library authorities need to ensure that librarians have access to ICT training.

The  $p$ -value of the  $F$ -statistic is 0.0881 meaning that the null hypothesis that all the variables in the model i.e., the determinants of ICT adoption jointly have no effect on ICT adoption is rejected. The  $p$ -value is the magnitude of the error made by saying that the effects of the explanatory variables jointly are not equal to zero. The adjusted  $R^2$  in the LPM is 0.2240, meaning that 22.40% of the variation in the probability of a library adopting ICT (utilizing the acquisitions module) can be explained by all the variables in the model.

When controlled for by gender, ICT training still remains a strong determinant of ICT adoption whereby being trained increases the probability of adoption by 67.38% ( $t = 2.76$ ). The  $p$ -value of 0.0893 also indicates that the hypothesis that all the coefficients together have no effect on ICT adoption is rejected.

#### **4.8 Conclusion**

It is encouraging that most of the UoN libraries are computerized. The results of the assessment reveal a high level of awareness among the UoN librarians about the benefits that could be derived from utilizing ICTs. As noted from the above responses, it can be concluded that the basic ICT infrastructure is available in most of the UoN libraries. Going by the response from question number 11 on the questionnaire, 17% and 77% of the respondents indicated that their library is fully computerized and computerized respectively. However, other service such as digitalization, document scanning and photographic services seems to be lagging behind.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

In this chapter we summarize the major milestones made by this study. A summary of the dissertation is presented in Section 5.2. Section 5.3 concludes the entire report and points out the implications of the findings. In the light of the study findings, Section 5.4 makes recommendations for library professionals, library users, university administrators and information systems scientists.

The study used a combination of research methods; questionnaire, informal interviews and secondary sources of literature.

The research questions mainly dwelt on the kinds of ICT tools that are available for the provision of library services, the services provided using the ICT tools, the benefits and challenges that the librarians face while using ICTs.

All the research questions below were satisfactorily answered.

- a. How much are ICTs being utilized in UoN libraries?
- b. What factors hinder these libraries in adopting new technologies?

### **5.2 Summary of the Key Findings**

#### ***5.2.1 ICT Tools Available***

The research findings identify the following as the mainly used ICT tools available in libraries; Computer is the most common ICT tool available in libraries. LAN, WAN, network servers, barcode readers and printers are also common in most libraries. Majority of respondents i.e. UoN librarians ranked the above tools high because they are the commonly used tools in the provision of library services. Furthermore they can easily be used with minimal training.

However, some ICT tools were found to be uncommon in most of the libraries. Scanners, laptops, LCD projectors and photo cameras were ranked poorly by respondents from most libraries.

### **5.2.2 ICT Services Available in Libraries**

OPAC, full text journals, e-books and barcode circulation services are available in all the libraries. Also among the most common services provided by respondents (librarians) include circulation and cataloguing services. Provision of internet and end user training services has also been rated highly by the respondents.

Some of the least common services provided by most libraries include digitization, photographic, document scanning and printing. Other than printers, the absence of scanners and photo cameras explain why some of the above services like digitization are not popular. A study by Chisenga (2004) established that the provision of digital information is very limited in African libraries.

### **5.2.3 Factors Hindering ICT Adoption**

The introduction and effective use of ICTs in academic libraries to be specific UoN is being hampered by a number of factors. In this study, respondents indicated that the cost of computer hardware, poor communication networks and negative attitude by the librarians are the major barriers to the deployment of ICTs.

## **5.3 Conclusion**

New advance in ICT have brought a great opportunities for libraries to enable them fulfill their mission of providing their users with relevant, timely and up-to-date information. Gone are the days when library's collection was its pride and determined value. Academic libraries should take the advantage of this and ensure that the relevant technologies (hardware and software), well trained and adequate skilled manpower are available to give better and value added services. For academic libraries persisting in a traditional way of doing business is a sure recipe for disaster for our future generation.

Results of this study can help librarians to better understand some of the basic ICT tools that can be used in an academic library environment to help improve efficiency and service delivery to the library users.



## **5.4 Recommendations**

The recommendations are in light of the findings of this investigation and with the view to remedying the situation in academic libraries with regards to ICT adoption.

To remain viable sources of information, academic libraries have to strategically incorporate ICTs in their day to day library services. Although ICTs are not the entire solution of academic libraries, they are indispensable in the quest for the success in the provision of quality services and scholarly information.

Given that ICT is an area of constant innovation and development, there is need for continuing professional development in academic libraries. Library staff should be encouraged and given opportunities for attending internal training programmes, workshops/seminars as well as other external training programmes offered by private firms. However, retraining should not start and end with workshops/seminars, more formal and structured training programs should be incorporated.

While computers and internet connectivity are available in abundance, there are some ICT facilities that are rarely/not available in most of the libraries. These are mainly digitization facilities such as scanners and photo cameras. Figure 4.3 in chapter 4 shows the availability of digitized electronic thesis and dissertation to be very low as compared to electronic research papers. In order for the digitization services to pick up, there is need to avail the relevant hardware and software. Also the library staff needs to undergo proper digitization training.

Most of the library services as shown in table 4.3 are computerized e.g. there is the provision of electronic full text journals and e-books, and bar coded circulation services are also available in all the UoN libraries. In order to boost the availability of digitized local content, there is need to offer more training to librarians. Provision of scanning and photographic equipment and services should be availed in all the libraries.

## **5.5 Future Research**

It should be noted that the variables in the model explain only 24.5% of the variance of ICT adoption in academic libraries. Another 75.5% of variance remains unexplained suggesting a need for more studies to incorporate additional variables and study samples in the model. The variables for age, education and experience for the attribute of the respondent should be continuous or dummy for better usage in regression model. Further research should be done to see if these variables also have effect on the dependent variable (ICT adoption).

## **5.6 Limitations**

This study primarily gathered quantitative data using questionnaire to assess the extent of ICT adoption in academic libraries. Because of the limited time and inadequate funds it was not possible to conduct interviews with the study sample so as to gather detailed qualitative data from the respondents. Thus the gathered data was not exhaustive as it would if the interviews were to be used.

The study focus was the UoN libraries which share a lot of things in common and thus the data gathered from various branch libraries seems to be the same all through. This might not be good when generalizing the study findings with other libraries.

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## Appendix: Questionnaire

### *An assessment of ICT adoption in academic libraries: a case of University of Nairobi libraries*

My name is Terence Odongo, a post-graduate student at the University of Nairobi school of Business, carrying out a research study with intention of assessing the extend of ICT adoption in academic libraries.

Please take a few minutes of your time to answer the following questions. Your assistance will be highly appreciated. Any information you provide shall be used for academic purpose and will be highly confidential.

#### Questions for Librarians

**This study seeks to assess the extent of ICT adoption in academic libraries.**

##### PLEASE NOTE:

- There is no right or wrong answers
- Your response will be treated confidentially
- Results will be made available to your library

Name \_\_\_\_\_ of \_\_\_\_\_ the \_\_\_\_\_ library

#### SECTION A: DEMOGRAPHICS

##### 1. Age category

- Less than 20 years                       20 – 29 years                       30 – 39 years  
 40 – 49 years                       50 +

##### 2. Gender

- Male                       Female

##### 3. Position \_\_\_\_\_

**4. How long have you been a librarian**

- Less than 1 year       1 – 2 years       3 – 8 years  
 9 – 10 years       More than 10 years

**5. How long have you been employed in this institution**

- Less than 1 year       1 – 2 years       3 – 8 years  
 9 – 10 years       more than 10 years

**6. How long have you held your current position?**

- Less than 1 year       1 – 2 years       3 – 8 years  
 9 – 10 years       more than 10 years

**7. What is your level of education?**

- Certificate       Diploma       Bachelors degree  
 Masters degree     PhD

**8. What is the title of your position? \_\_\_\_\_**

**SECTION B: ICT ADOPTION**

**9. Are you using ICTs for your library services? Yes [  ] No [  ]**

**10. Have you received any ICT training in the last two years? Yes [  ] No [  ]**

**a. If yes, indicate the training(s) received**

\_\_\_\_\_  
\_\_\_\_\_

**b. If No, why?**

\_\_\_\_\_  
\_\_\_\_\_

**11. How would you describe your library in terms of computerization?**

- Not computerized       Planning to computerize     Computerized  
 Fully computerized

**12. Which library Software do you use for circulation services?**

\_\_\_\_\_

i. **Is the software web based?** Yes [ ] No [ ]

ii. **Is it online?** Yes [ ] No [ ]

**13. How often do you use the library software (Indicated above) for:-**

	<b>Limiting factor</b>	<b>Never</b>	<b>Rarely</b>	<b>Often</b>	<b>Very Often</b>	<b>Always</b>
a.	Acquisition					
b.	Cataloguing					
c.	Circulation					
d.	Serials control					
e.	Administration					
f.	Other					

**14. Do you offer the following ICT services? Please, tick *Yes, no or not sure* in each row as appropriate. Do not skip any row please.**

	<b>Type of Service</b>	<b>Yes</b>	<b>No</b>	<b>Not Sure</b>
a.	Internet web browsing services			
b.	E-mail services			
c.	Full text journals articles			
d.	Online Public Access Catalogue (OPAC)			
e.	Bibliographic databases			
f.	CD-ROM Services			
g.	Electronic Books			
h.	Library Website			
i.	Document Scanning Services			
j.	Electronic Reference and Information Services			
k.	End Users Training Programme			
l.	Bar coded Circulation Services			
m.	Current Awareness services			
n.	Book Reservation and recall			
o.	Printing Services			
p.	Photographic services			
q.	Digitization Services			
r.	Others(Specify)			

**15. Is the following ICT facility available in your library? Please, tick *Yes, no or not sure* in each row as appropriate. Do not skip any row please.**

	<b>ICT Hardware</b>	<b>Yes</b>	<b>No</b>	<b>Not Sure</b>
a.	Computers			
b.	Laptops			
c.	Networked Servers			
d.	Printers			
e.	Scanners			
f.	Local Area Network (LAN)			
g.	World Wide Area Network			
h.	LDC Projector			
i.	Video cameras			
j.	TV Stations			
k.	Microfilm readers			
l.	Bar code readers			
n.	CD-ROM Readers/writers			
n.	Book Check Systems			
o.	Security Check Systems			
p.	Photocopying Machines			
q.	Photo Cameras			
r.	Generator to supply electricity whenever there is load shading			
s.	Others (Specify) _____ _____			

**16. Does your library have electronic:-**

- i. Theses and dissertations      Yes [    ]      No [    ]
- ii. Past papers                      Yes [    ]      No [    ]
- iii. Research Papers                Yes [    ]      No [    ]
- iv. Others (Specify)\_\_\_\_\_

**17. What are the sources of pressure for ICT adoption in your library?**

- i. University administration
- ii. Library users
- iii. Changing nature of information medium
- iv. Other (Specify)\_\_\_\_\_

### SECTION C: CHALLENGES

Please indicate by way of ticking in the right column, the extent, to which you agree with the given statements as limiting factors towards implementing ICT in your library – Where      1 = Strongly Agree    2 = Agree    3 = Moderate  
 4 = Disagree      5 = Strongly Disagree

18.	Limiting factor	1	2	3	4	5
a.	Cost of computer hardware					
b.	Cost of computer software					
c.	Cost of e-journals & e-books					
d.	Poor communication networks					
e.	Access to computer hardware					
f.	Access to computer software					
g.	Low internet connectivity					
h.	Power outages					
i.	Long –term contracts with book publishers					
j.	Unfriendly and difficult to use					
k.	Fear of technology					
l.	Lack of ICT skilled librarians					
m.	Negative attitude by librarians					
n.	Negative attitude by users					
o.	Lack of computer culture					
p.	No perceived economic or other benefits					

**SECTION D: BENEFITS OF USING ICTs IN YOUR LIBRARY**

Please indicate by way of ticking in the right column, the extent, to which you agree with the given statements - Where 1 = Strongly Agree 2 = Agree 3 = Moderate 4 = Disagree 5 = Strongly Disagree

<b>19.</b>	<b>Benefits of ICT determinants</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
a.	Ease accessibility of information					
b.	Linkages with other libraries					
c.	Linkage with various sources of information					
d.	Ease of communication with library users					
e.	Easy to acquire, manage, store and distribute information					
f.	Enables provision of current information					

**The end**

**Thank you**