MAKERERE UNIVERSITY

MANAGEMENT AND ACCESSIBILITY OF OPEN ACCESS INSTITUTIONAL REPOSITORIES IN SELECTED UNIVERSITIES IN EAST AFRICA

BY

MIRIAM KAKAI

BLIS (Mak); MSc. Inf. Sc. (Mak)

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN INFORMATION SCIENCE OF MAKERERE UNIVERSITY

MAY 2020

DECLARATION

I, Miriam Kakai, hereby declare that this dissertation is my own original work and that it has never been presented to any other University or Institution of Higher Learning for any award of a Diploma or Degree.

Signed ..... Kakai .....

Miriam Kakai

Date ..... 17/06/2020 .....

APPROVAL

We certify that this dissertation has been presented with our approval as Makerere University supervisors.

Signed ..... Date 19th June 2020

Professor Maria G. N. Musoke

Signed ..... Date 17/06/2020

Professor Constant Okello-Obura

COPYRIGHT STATEMENT

DEDICATION

This dissertation is dedicated to my family, especially the young ones who should get inspired to attain this level of education.

ACKNOWLEDGEMENTS

Having reached the completion stage, I would like to extend my gratitude to all those who supported me to this level, but first to the Almighty God who enabled me to be healthy, with a sound mind to reach this far.

I would like to thank my sponsors, SIDA, through Makerere University Library for funding my study to completion, and Makerere University for allowing me to study. I also extend my sincere thanks to the International Science Programme (ISP) for coordinating my attachments in Sweden and the whole ISP team for the good cooperation while I was there in 2015. My thanks also go to the Department of Archives, Libraries, and Museums (ALM) at Uppsala University for the wonderful cooperation and guidance while I was there in 2013.

With great pleasure, I express my sincere thanks to my supervisors, Professor Maria G. N. Musoke and Professor Constant Okello-Obura for having guided me with a critical eye, while providing helpful suggestions for my work. My thanks also go to my Swedish Supervisor, Urban Ericsson who did not go on with me to the end, but did a wonderful job in helping me focus my study. I also extend my gratitude to my Doctoral Committee which was chaired by Dr. David Luyombya for providing additional guidance.

My thanks also go to the institution administrators and staff of Kenyatta University, Muhimbili University of Health and Allied Sciences (MUHAS), and Makerere University for allowing me to conduct this study in their organisations and availing time to respond to my investigations. I also thank my research assistants in all these universities for helping me to collect sufficient data for this study.

Special thanks go to my PhD colleagues and friends who were either still studying or had completed, and a few professors that offered time to read through my drafts, listened to my presentations and provided useful suggestions of where and how to improve my study. Some of these included Nina Olivia, Sylvia Namujuzi, Dr. Eliz Nassali State, Dr. Jane Kawalya, Dr. Ruth Nsibirano, Dr. Christopher B. Mugimu and Prof. I. M. N. Kigongo-Bukenya.

Lastly, I would like to thank my friends, especially those at Makerere University Library and my family, who have always cheered me up and encouraged me, giving me the confidence of finishing at all times.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS / ACRONYMS

AAU	Association of African Universities
AGORA	Access to Global Online Research in Agriculture
AIM	African Index Medicus
AJOL	African Journals OnLine
APCs	Article Processing Charges
ARL	Association of Research Libraries
ASHER	Australian Scheme for Higher Education Repositories
BOAI	Budapest Open Access Initiative
BORA	Bergen Open Research Archive
CARL	Canadian Association of Research Libraries
CCNY	Carnegie Corporation of New York
COSTECH	Tanzania Commission of Science and Technology
CRKN	Canadian Research Knowledge Network
CUUL	Consortium of Uganda University Libraries
DATAD	Database of African Thesis and Dissertations
DOAJ	Directory of Open Access Journals
DOI	Digital Object Identifier
DRGT	Directorate of Research and Graduate Training
EIFL	Electronic Information For Libraries
ERA	Excellence in Research for Australia
GOAP	Global Open Access Portal
HEIs	Higher Education Institutions
HINARI	Health InterNetwork Access to Research Initiative
INASP	International Network for the Availability of Scientific Publications
ICT	Information and Communication Technology
IPM	Intellectual Property Management
IPR	Intellectual Property Rights
IR	Institutional Repository
IRBs	Institutional Review Boards
IT	Information Technology
JISC	Joint Information Systems Committee
KIT	Royal Tropical Institute
LEADIRS	Learning About Digital Institutional Repositories Seminars
Mak IR	Makerere University Institutional Repository
MUHAS	Muhimbili University of Health and Allied Sciences
NHMRC	National Health and Medical Research Council

NIH	National Institutes of Health
NORAD	Norwegian Agency for Development Cooperation
OpenDOAR	Directory of Open Access Repositories
OA	Open Access
OAIR	Open Access Institutional Repositories
OA-IRCSP	OA Repositories: Capacity Strengthening Programme for Africa
OAWG	Open Access Working Group
OSI	Open Society Institute
QUT	Queensland University of Technology
RAE	Research Assessment Exercise
RCUK	Research Councils UK
REF	Research Excellence Framework
ROARMAP	Registry of Open Access Repository Mandatory Archiving Policies
RQF	Research Quality Framework
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
RSP	Repositories Support Project
SC	Scholarly Communication
SCAP	Scholarly Communication in Africa Programme
SHERPA	Securing a Hybrid Environment for Research Preservation and Access
SHERPA/JULIET	A SHERPA service which lists the research funder's OA policies
SHERPA/RoMEO	A SHERPA service which lists the publishers' open access policies
SIDA	Swedish International Development Cooperation Agency
SPARC	Scholarly Publishing and Academic Resources Coalition
SPIDER	Swedish Programme for ICT in Developing Regions
SPSS	Statistical Package for Social Sciences
STEM	Science, Technology, Engineering and Mathematics
UK	United Kingdom
UKCoRR	United Kingdom Council of Research Repositories
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPeTD	University of Pretoria Electronic Theses and Dissertations
UPSpace	University of Pretoria Institutional Repository
USDL	Uganda Science/Scholarly Digital Library
USA	United States of America
WHO	World Health Organisation

ABSTRACT

Under the open access (OA) movement, research is made freely available for the end user with hardly any restrictions on access to the full-text of documents. Institutional repositories (IRs) present universities with an opportunity to provide global OA to their scholarship, yet by the time of this study (2013), the OA avenue was underutilised in East Africa (EA), with the majority of IRs having less than 35% of their content as OA, which inspired the author to investigate this area. The key question asked was: "how could OA to scholarly information in IRs in EA be increased?" The study assumption was based on how IRs were managed, with the investigation focused on the repository managers and the researchers. The study applied the stakeholder and the diffusion of innovations theories in aligning how the various repository stakeholders were integrated into the development and management of IRs. The study cases were purposively selected universities in EA that had IRs with the highest number of records by July 2014. These were Kenyatta University (KU) in Kenya, Makerere University (Mak) in Uganda and Muhimbili University of Health and Allied Sciences (MUHAS) in Tanzania. The study was guided by the pragmatic worldview and conducted using a mixed methods approach, following a concurrent strategy, with data collected in one phase, during which both quantitative and qualitative data were collected simultaneously in 2015. A survey of the researcher's was carried out to collect quantitative data using a self-administered questionnaire, while face-to-face interviews and document analysis were used to collect the qualitative data. Six librarians in charge of managing the IRs were purposively selected and interviewed, while 183 researchers (out of 330), selected using systematic random sampling, responded to, and returned the questionnaire. On the repository manager's side, a comparison of the IR development and management factors revealed that the development of IRs in each of the universities was unique, and influenced by the time when each IR was initiated, with Mak in 2006, KU in 2012, and MUHAS in 2013 when the BOAI (2012) was clearer about how IRs should operate. MUHAS, therefore, followed some of the BOAI established guidelines of setting up an IR, and turned out to be more OA than the other two universities. The universities had IPM and IR policies but none of them had institutional copyright policies. There was mediated self-archiving in each of the universities; with marketing of the IR only done during user education and/or information literacy sessions and via e-mail messages on staff mailing lists. Although the library websites of the universities were used to provide a link to the IR, there was no dedicated web-page to market OA and IR activities. All these factors impacted on what got to be provided as OA in the IRs. On the researchers' side, the study revealed that 43% of the respondents at Mak and 44% of the respondents at KU had published in OA journals, implying that a high percentage of their publications could not be archived for OA in the IR because they were in traditional journals. On the other hand, 70% of the respondents at MUHAS had published in OA journals leading to more of the IR archived publications being OA. Although the majority (81.4%) of the respondents were strongly in favour of OA, there were factors limiting their participation, the most prominent being the researchers' unawareness about the benefits of self-archiving in IRs. It was concluded and recommended that before setting-up IRs, librarians, university administration and the government should work hand-in-hand while planning and managing IRs by implementing the following: Incorporating self-archiving in the university workflow practices, enacting institutional copyright policies for universities, enacting institutional and national OA policies, and incorporating OA and IRs in the Library and Information Science (LIS) training programs. This study contributes to a more informed understanding of the factors that affect OA in repositories and identifies a model framework for developing and managing IRs of universities in EA appropriately.

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

The origins of institutional repositories are traced as far back as 1994 when Stevan Harnad proposed the creation of ftp archives in his subversive proposal for electronic publishing, while Joshua Lederberg later in the discussions that followed, introduced the idea of having institutional rather than disciplinary archives (Okerson & O'Donnell, 1995). Harnad proposed that all authors of esoteric writings should archive them free for all online, which in essence meant providing open access to their publications, an incident that has completely changed the scholarly communication process. Literature about institutional repositories however, started surfacing in the early 2000's, with seminal papers by Crow in 2002, who attributed the change in the structure of scholarly journal publishing to the following reasons:

i. Technological change, in the form of digital publishing technologies and ubiquitous networking, which drove the demand for broader access to research and for more robust digital presentation.

ii. Significant increases in the overall volume of research, especially in the sciences, which strained the capacity of the print publishing model and exacerbated user dissatisfaction with the latency inherent in print publication.

iii. Increased dissatisfaction, especially on the part of librarians, with traditional print and electronic journal price and market models—models that had become less relevant and more difficult to sustain in a period of rapidly escalating prices and relatively static library budgets.

iv. Increased uncertainty over who would handle the preservation archiving of digital scholarly research material (Crow, 2002, p. 5).

With the interplay of all these factors, institutional repositories emerged and are preserving the intellectual output of institutions, while contributing to the fundamental long-term change in the structure of scholarly communication (Crow, 2002). Creaser et al. (2010, p. 147) attributed the development of institutional repositories to a combination of factors which

included: “the open access movement gaining momentum at the turn of the 21st century, drastic increases in journal prices since the 1990s and increased pressure on higher education institutions to compete for research funds through periodic research assessment”. The Budapest Open Access Initiative (BOAI) that was issued in 2002 recommended using repositories as one of the avenues for self-archiving publicly financed research. Universities then started implementing institutional repositories, with a number of funding bodies requiring researchers to deposit research articles in repositories for open access. This led to the flourishing of institutional repositories, especially in the developed world, making research emanating from higher institutions of learning more visible worldwide. Although the initial target of the open access movement was to deposit journal articles in repositories, other types of research materials such as theses and dissertations were also later advocated for deposit in repositories. Crow (2002) pointed out that institutional repositories that constitute the disaggregated model of scholarly publishing included not only pre-prints and research papers, but also extended to research data sets, digital monographs, theses and dissertations, conference papers, listserv archives, and other grey literature. Westell (2006, p. 221) noted that “institutional repositories were not designed to control access but to facilitate open access to their holdings.” … “the pure institutional repository provides material with no access limitations to support the widest possible dissemination of research findings” (p. 222). Shearer (2003, p. 92) also noted that “in most cases, IRs had no barriers to their content or very low-barrier access (such as registration requirements).” Chan (2004) noted that the primary role of institutional repositories was to facilitate open access to the traditional scholarship in institutions. To sum this up, Casey (2012) re-affirmed the purpose of institutional repositories as partly meant to serve as open access repositories of the intellectual output of the faculty, besides showcasing the tangible results of the institution globally.

Academic institutions are the main producers of scholarly and applied research information. Universities in particular produced a variety of knowledge artefacts ranging from books, research reports and papers, conference and workshop papers, theses and dissertations, different types of periodicals, reference materials and many other records availed in electronic format. The challenge universities faced was managing these information resources for appropriate utilization. Jain (2011, p. 125) noted that “for more than a decade, academic institutions had struggled with how to manage the collective, digital intellectual output they produced”. Jain further noted that “institutional repositories had been

increasingly recognised as a vital tool for scholarly communication and an important source of institutional visibility and a viable source of institutional knowledge management". Gibbons (2004) acknowledged the fact that many organisations had digital documents that needed to be preserved, as well as shared. Each institution needed to assess the kind of digital content produced and plan for its preservation and future access. Universities should take advantage of institutional repositories, given that they provide a collective environment for managing and preserving an organisation's digital items. Holderied (2009) noted that "institutional repositories presented academic institutions with the opportunity to provide global open access to the scholarship that was created within that institution." They also enabled global access to the otherwise inaccessible grey literature accumulated in universities. Most academic libraries were noted to have launched institutional repositories purposely to archive their university's scholarly output and, where permitted, to enable access to the archived collection (Mercieca, 2008). Institutional repositories are a major innovation in the scholarly communication infrastructure. However, Prost and Schopfel (2014) in their survey of 25 institutional repositories established that a number of items in these repositories were either metadata without full-text, metadata with full-text only for authorized users, and items that were under embargo or that were restricted to on-campus access. In other words, the level of open access in these institutional repositories was low, and Prost and Schopfel sought to establish whether this was temporary or permanent, but ended up concluding that this would be explicitly clarified in each individual institution's open access policies. Prost and Schopfel's findings prompted the researcher to establish the open access levels of repositories in East Africa, and they were found to be below 35%. This study, therefore, builds on Prost and Schopfel's findings, and goes further to investigate the accessibility of scholarly information in institutional repositories from a managerial perspective by examining the institutional OA and IR related policies and views of the researchers in selected universities in East Africa.

1.0.1 Motivation to investigate open access availability in institutional repositories

The motivation to explore the area of open access originated from the researcher's observation of inaccessibility to electronic resources and materials in the institutional repositories as part of her duties as a librarian at Makerere University between 2004 and 2010. Although Makerere University was being supported by SIDA to subscribe and access about 20 journal databases, with additional access provided through the Research4Life

resources, there was still a large number of articles inaccessible to the researchers, some of which had to be obtained from commercial suppliers using the document delivery service, for researchers who were patient enough to pursue this procedure. The Makerere University institutional repository was developed in 2006 to help in the management, preservation and access to Makerere University's scholarly information, but most of the content deposited had restricted access. Although one could request to access the restricted content from the institutional repository, some items could not be provided because they required the permission of the authors, whose contacts were not available to the repository managers. The dilemma of not being able to fully access scholarly information that had been made visible on the internet, therefore, drove the researcher into exploring the accessibility of scholarly information in institutional repositories.

1.1 Background to the study

"Institutional repositories emerged alongside the Open Access to scientific literature movement" (Ferreira, Rodrigues, Baptista & Saraiva, 2008). Young (2009, p. 1) noted that "the open access movement was an attempt to free scholarly communication from restrictions on access, control and costs" for the end-user. The open access movement was partly as a result of the dissatisfaction with the traditional scholarly communication process which in the 1980's experienced a serials' crisis (a period when the prices of scholarly journals rose sharply, as libraries were facing problems of annual budget cuts and inflation, that led to cancelling serial subscriptions to accommodate price increases in the core serials that they maintained). This was also affirmed by Shearer (2003, p. 90), who noted that the "philosophy of open access grew out of the dissatisfaction with the traditional pricing system of scholarly publishing in the west, where universities and research institutions had been forced to cancel a significant number of subscriptions over the past decade". Institutions in the developing world, with severely limited budgets or none at all, were the most affected by the serials crisis. Ochs, Aronson, and Wu, (2004, p. 175) who wrote about the launch of the 'Health InterNetwork Access to Research Initiative' (HINARI) and the 'Access to Global Online Research in Agriculture' (AGORA) programmes that availed research information in the developing world freely or cheaply, noted that "access to the priced literature, particularly journals, was the most pressing 'information problem'" at that time. It had also earlier been established in a World Health Organisation survey carried out in 2000 that "researchers in developing countries ranked access to subscription-based journals as one of their most

pressing problems" (Swan & Hall, 2010, p. 1). Institutional repositories providing open access to research literature were, therefore, a welcome venture.

1.1.1 The origin of open access to scholarly literature

In the summer of 1994 (specifically on 27th June 1994), Stephen Harnad (a cognitive scientist, by then, working at Princeton University as a researcher and editor) posted what he called a subversive proposal to a number of discussion lists (some of which included the Electronic Journals mailing list at Virginia Polytechnic Institute - VPIEJ-L, SERIALST, BITNET and Usenet), calling on all authors of "esoteric" writings (writings written only for research impact, and not for royalty income) to archive them free for all online. This posting initiated a series of online exchanges and debates, which later led to the formation of Cogprints (an open access archive for self-archived articles in the cognitive sciences) in 1997, and a book published out of the online correspondences (Okerson, & O'Donnell, 1995).

In December 2001, in a conference convened by the Open Society Institute (OSI) in Budapest (which led to the Budapest Open Access Initiative, signed in 2002), a group of open access activists encouraged scholarly authors to amend their publishing practices. This was done to enable the free distribution over the Internet of the scholarly information usually published in peer-reviewed journals and conference proceedings. They proposed two avenues through which this could be done: Through publishing in open access journals (the Gold route to open access) and depositing copies of articles published in traditional journals in open access repositories (the Green route to open access). The wide uptake of online repositories is, therefore, attributed to the Open Access Initiative (Jones, Andrew & MacColl, 2006). In 2012 while celebrating ten years of existence, the BOAI made further recommendations on OA policy formulation, licensing & reuse, infrastructure & sustainability, advocacy & coordination, to strengthen how open access could be achieved. For instance, it was recommended that "4.1: Every institution of higher education should have an OA repository"; "1.1: Every institution of higher education should have a policy assuring that peer-reviewed versions of all future scholarly articles by faculty members were deposited in the institution's designated repository"; "1.2: Every institution of higher education offering advanced degrees should have a policy assuring that future theses and dissertations were deposited upon acceptance in the institution's OA repository. At the request of students who intended to publish their work, or seek a patent on a patentable discovery, policies should grant

reasonable delays rather than permanent exemptions"; "1.3: Every research funding agency, public or private, should have a policy assuring that peer-reviewed versions of all future scholarly articles reporting funded research were deposited in a suitable repository and made OA as soon as practicable"; "1.6: Universities with institutional repositories should require deposit in the repository for all research articles to be considered for promotion, tenure, or other forms of internal assessment and review"; "OA repositories typically depended on permissions from others, such as authors or publishers, and were rarely in a position to require open licenses. However, policy makers in a position to direct deposit into repositories should require open licenses, preferably CC-BY when they can" (BOAI, 2012).

Since then, the scholarly communication landscape has radically been changed, with more than 10,000 open access journals (DOAJ, 2014), and more than 2,000 institutions that had set up repositories worldwide (OpenDOAR, 2014) by June 2014. The open access movement is a powerful force for change in the scholarly communication process. The network of open access repositories was envisioned as the backbone of the open access movement as libraries around the world began implementing and capturing the intellectual assets of their institutions. Harnad (2007) envisioned that about 5% of the research would be archived by the open access journals, while the remaining 95% could be freely accessed via repositories if all researchers immediately began self-archiving their work that they publish in traditional journals. Swan and Chan (2012) noted that around 60% of publishers and 95% of journals registered in SHERPA (an online database of publishers' policies and self-archiving) permitted self-archiving of some sort, although most researchers were not aware of this provision.

1.1.2 Progress in the development of institutional repositories worldwide

By June 2014, the developed world was leading in the number of repositories around the world, with Europe having 44% of the repositories, North America 20%, Asia 20%, South America 9%, Africa 4%, Australia 2%, Central America 1%, the Caribbean and Others minimally at 0% (OpenDOAR, 2014).

The presence of repositories had made research, which was often financed by public funds equally accessible to all, rich and poor, provided they had access to the Internet. A number of governments, funding bodies, and institutions around the world had passed policies mandating open access, which had supported the establishment and thriving of repositories.

Notably, Europe, North America and Australia had succeeded in making their scholarship open, with most of the universities having repositories because of a number of enabling factors.

In Eurasia, "Korea had published open access journals and created repositories since early 2000, with the government taking the lead." There were four national repositories and five major institutional repositories (Shin, 2010, p. 232). In Sweden, the national program, openaccess.se, managed by the National Library of Sweden, "supported a vast number of projects regarding development of repositories and awareness-raising on open access" (Gilbert & Lindholm, 2011, p. 67). The Swedish Research Council, which financed most of the research in Sweden, also passed mandates from 2010, requiring open access for all its research grants. As a result of these efforts, most if not all higher institutions of learning in Sweden setup repositories to enable researchers to self-archive publications as per the Swedish Research Council's mandate.

In the United States of America (USA), library associations played a big role in promoting the growth of institutional repositories. In Canada, the Canadian Association of Research Libraries (CARL) played a lead role in monitoring the development of individual institutional repository projects of its member institutions by facilitating the exchange of best practice and lessons learned since 2003 (Shearer, 2006).

In the USA and the United Kingdom (UK), organizations such as SPARC (Scholarly Publishing and Academic Resources Coalition) greatly influenced the growth of institutional repositories. In the UK, because of the Research Assessment Exercise – RAE (now referred to as the Research Excellence Framework - REF), authors were required to present their publications to the Higher Education Funding Councils for evaluation, and most of these publications were deposited in the institutional repositories. Besides this, a number of institutions enforced mandates to ensure that the institution's scholarly information was archived. The UK government through its strong recommendations about scientific publications also passed resolutions requiring all higher education institutions to establish repositories on which their published output could be stored and from which it could be read, free of charge, online (House of Commons Science and Technology Committee Report, 2004).

In Australia, institutional repositories thrived on government and institutional support. Kennan and Kingsley (2009) indicated that the majority of Australian universities had institutional repositories. Also as noted by the Australian Open Access Support Group (2013), all universities had repositories, many of which were pioneered by the university libraries. This was possible because of the government funding provided through the Australian Scheme for Higher Education Repositories (ASHER) in 2007-2009, which was originally intended to assist the reporting requirement for the Research Quality Framework (RQF) research assessment exercise, now Excellence in Research for Australia (ERA). Besides institutional mandates that required researchers to deposit their work in the repositories, in 2012, funding mandates by the National Health and Medical Research Council (NHMRC) and the Australian Research Council made it possible for researchers to self-archive their work in the repositories. The scenario of institutional repository development in Africa was, however, a bit different, as explained in section 1.1.3.

1.1.3 Open access and institutional repositories in Africa

As noted in section 1.1.2, Africa still had an access problem to its own scholarly information. Research was conducted and reports mainly availed as print documents to the parent institutions, with limited circulation to the rest of the world. A few of these research findings ended up in journal publications, with only 4% of the world's repositories representing Africa. Chisenga (2006, p. 2), noted that "much of the scientific research output from Africa was in form of grey literature, that is, unpublished information and knowledge resources such as research reports, theses and dissertations, seminar and conference papers;" with very little of it reaching the world's well-established international scientific journals. Chisenga further noted that where abstract databases existed, "… it was usually very difficult to get access to the actual documents unless one visited the institutions where the documents were produced" (Chisenga, 2006, p. 2). This meant that scholarly information from Africa was still underutilised because of its limited dissemination and presence on the web.

According to a 2006 study report by the Institute of Development Studies at the University of Sussex, Brighton about accessing research in Cameroon, the majority of respondents said that when using the internet to search for information, they used foreign sources because the Cameroonian ones were too difficult to access. It was also noted in the key findings of that study: "the limited dissemination of research results and sharing of ideas was a barrier to

accessing information, and at times, resulting in the duplication of research endeavours" (Wolfe & Fisher, 2006). Christian (2008) also noted that:

> The state of open access to research in developing countries is so poor that it is much easier for a researcher in Nigeria to know what has been published on a given issue by a researcher in the United States or Britain than to locate a similar publication by a researcher in a neighbouring country like Cameroon (p. 19).

These scenarios show the situation of accessing research in most African countries.

Commenting generally, Chan, Kirsop and Arunachalam (2005) noted that many initiatives had been started to resolve the access problem, but progress had been slow, with most of them dependent on grants. In Africa, some of the initiatives embarked on to manage African research information include the Africa Portal (a specialized site for Africa's policy issues), which was fully open access since its inception in 2008; the African Journals OnLine (AJOL), which provided partial open access; and the Database of African Thesis and Dissertations (DATAD) programme coordinated by the Association of African Universities (AAU), which was only an abstract database by the end of 2014. DATAD was initiated as an abstract database of thesis and dissertations in February 2000 to August 2003 as a pilot project with 11 African universities and launched the same year (2003) as DATAD Online (Materu-Behitsa, 2004). DATAD's main objective was to provide information on African theses and dissertations. By 2014, DATAD was advocating for the setting up of institutional repositories in the member countries with e-thesis hosted locally at the institutional level, from which content would be harvested for the regional database. In 2012, the AAU, in collaboration with the Royal Tropical Institute (KIT), was running a programme titled "Open Access Repositories: Capacity Strengthening Programme for Africa (OA-IRCSP)." This programme was supporting the establishment of institutional repositories in Africa, and this set the ball rolling for more institutions in Africa to set up institutional repositories.

According to the Directory of Open Access Repositories (openDOAR, 2014), statistics in July 2014 indicated that there were 102 institutional repositories in Africa; of which, South Africa had 29; Kenya had 12; Nigeria had 11, Algeria had 9, Egypt had 7; Zimbabwe had 6; Tanzania had 5; Ghana and Sudan had 3 each; Morocco, Namibia, Senegal and Uganda had 2 each; Botswana, Cameroon, Cape Verde, Ethiopia, Lesotho, Mozambique, Rwanda, Tunisia, and Zambia had 1 each. In comparison to the rest of the world, there were 1,234 institutional

repositories in Europe, 539 in North America, 491 in Asia, 239 in South America, 102 in Africa, 64 in Australasia, 15 in the Caribbean, 13 in Central America, and 3 in Oceania. The developing world had the least number of repositories. Considering the East African region, Kenya was doing well with at least 12 institutional repositories, followed by Tanzania with 5 and Uganda with 2 (openDOAR, 2014).

With the above statistics, Africa was making an effort to make its research visible to the world through institutional repositories. Although open access institutional repositories were still relatively recent developments in the field of Library and Information Science by 2014, they had become popular sources of information in academic libraries in the developed world. The developing world, and Africa in particular were still slowly adopting these initiatives.

Given the fact that institutional repositories were only a tool enabling open access, embracing open access in itself would be the engine to setting up institutional repositories in Africa. However, by 2013, many nations in Africa were still unaware of the relevance of open access to the extent that there were no open access national policies existing on the continent, except for South Africa that had national statements about open access (Nwagwu, 2013).

Nwagwu (2013, p.3) noted that there was a "very low level of awareness prevailing in the higher educational institutions and research institutes, organizations and governments" in Africa. Twelve years down the road since the inception of the open access concept, and its penetration in Africa was still unnoticed. Just as Nwagwu (2013) illustrated, it was probably because African leaders faced with the most challenging issues like hunger, health, and education, did not find issues of access to scientific information engrossing enough. Trotter, Kell, Gray and King (2014) in the Scholarly Communication in Africa Programme (SCAP) report noted that part of the problem was because most African universities had not taken a strategic approach to scholarly communication, ending up with scholars who were not engrossed in venturing to use the available ICTs and web technologies to further publicize their work to the rest of the world, besides using the traditional publishing models. Given the world perspective, many governments and funding organizations in the developed countries valued the fact that 'publicly funded research should be freely accessed' and had laid the foundation of achieving this by deriving policies that embraced open access. By 2014, the UK government had played a lead role in this. In Africa, there were no strong bodies encouraging the uptake of open access except for a few programmes such as the 'Open

Access Repositories: Capacity Strengthening Programme for Africa (OA – IRCSP)', EIFL open access projects in Africa, the 'Open Access Africa' annual conference normally organized by BioMed Central, and recently (August 2015), SPARC Africa. These were all, however, linked to external organizations advocating for open access in Africa.

In the developed world, institutional repositories were implemented with the involvement of either an umbrella body or the government, with noted steady growth. The approach adopted in the African countries was different. In Africa, institutions seemed to be grappling individually, with some support and encouragement from organizations such as the International Network for the Availability of Scientific Publications (INASP), Electronic Information For Libraries (eIFL) in collaboration with library consortia and development partners, plus collaborating libraries. Through workshops and small competitive grants, INASP and eIFL, as well as support from development partners such as SIDA, CCNY and NORAD had enabled librarians in Africa to understand the concept of institutional repositories, with many promising to initiate repositories in their institutions.

Although institutional repositories feature internationally after the existence of disciplinary repositories such as ArXiv (developed by physicist Paul Ginsparg in 1991 as a means of circulating scientific papers prior to publication, this repository focused on preprints in high-energy physics and, in time, broadened to other related disciplines, including astrophysics, mathematics, and computer science.); the presence of repositories in Africa date back to when the African Index Medicus (AIM database) started. For instance, since 1995, Sir Albert Cook Medical Library at Makerere University had maintained a database of locally produced health literature periodically sent for inclusion in the AIM database (Musoke, 2007). Most of the entries in the AIM database were linked to the full-text and therefore accessible worldwide on the internet.

Globally, however, institutional repositories build on from the researchers' practice of posting research online (on personal websites, departmental sites, and disciplinary repositories), an indication of the desire for a wider exposure of, and access to their work (Johnson, 2002). While the practice of posting research online (self-archiving) was gaining momentum in some disciplines (i.e. physics and mathematics) in the developed world in the early 1990's, researchers in developing countries were still sharing hard copy postprints because of limited Internet facilities. The practice of availing preprints online, even after publishing (either in a workshop, conference, or journal) was not common. Online access to

research literature was, therefore, scarce, except for instances where conference proceedings were hosted on a departmental website or a paper published in an open access journal or provided through the AIM database.

Worldwide, most of the institutional repositories found within colleges and universities were initiated by the library, sometimes in collaboration with the information technology departments (Creaser, 2010; Shreeves & Cragin, 2008) or with development partners/collaborations. The content ranged from journal articles (preprints and postprints), conference papers, working papers, book chapters, to thesis and dissertations. Some institutions, including universities, created isolated repositories of electronic thesis and dissertations, independent from the other category of publications normally found in institutional repositories. South Africa being an early adopter of repositories in Africa, is discussed in the next section, followed by East Africa where this study was conducted.

1.1.3.1 Institutional Repositories in South Africa

South Africa had the highest number of repositories in Africa by June 2014, and this was achieved out of the collaborative efforts in training and learning from each other right from the very beginning. EIFL and the Mellon Foundation were noted to have played an important role in the development of the information industry in South Africa. EIFL, in particular, was noted to have been very supportive of open access and the development of repositories in South Africa (Van Deventer & Pienaar, 2008). The University of Pretoria was the first institution with a repository (UPeTD) in South Africa, developed in 2000 as a pilot, and focused on thesis and dissertations. By 2003, manuscripts were being uploaded on a voluntary basis; and in January 2004, it was mandatory for every masters and doctorate student to submit their research to the repository. By 2005, the University of Pretoria had set up another repository (UPSpace) to cater for scholarly publications and other collections. What helped the University of Pretoria excel in its pioneering role with repositories was the approach it took in steering the repository management process by "sharing expertise with enthusiasm and helping colleagues to start their own operations" (Macha, & Jager, 2011, p. 4), thus serving as the benchmark for others to follow.

1.1.3.2 Institutional Repositories in East Africa

Institutional repositories in East Africa were being promoted through library consortia, in collaboration with EIFL (Electronic Information for Libraries), an international not-for-profit

organization based in Europe, but working with libraries worldwide to enable access to digital information especially in the developing and transition countries. As a result of the various open access advocacy and training workshops conducted by EIFL under the Swedish Programme for ICT in Developing Regions (SPIDER) project, a number of universities agreed to develop institutional repositories. The EIFL/SPIDER project theme in 2015 was "Open access: Knowledge sharing and sustainable scholarly communication in Kenya, Tanzania and Uganda" and the target audience were the libraries and in some instances the researchers (SPIDER, 2015). Prior to the SPIDER project, Makerere University was the pioneer institution in East Africa with an institutional repository.

Makerere University first launched a repository in 2006, after piloting it for one year. The development process was initiated by some science researchers and librarians who sought for support from development partners. Earlier in 2003, Makerere University Library with support from partner universities, specifically Tufts University and University of Tennessee, Knoxville in the USA, held several training sessions on digitisation of library materials and digital display software, some of which were repository software. By 2004, Makerere University Library had set up a digitisation section, which was later put in charge of a digital library project proposal for implementation. The digital library project proposal was written by the Library in collaboration with lecturers in the then Faculty of Science (now College of Natural Sciences) at Makerere University and the focus was on scientific publications in institutions in Uganda. The project was called Uganda Science Digital Library – USDL (USDL project proposal, n.d.). After the repository was launched in 2006, the scope was broadened to include other research works and the name was changed to Uganda Scholarly Digital Library (USDL). During the launch, representatives from other Ugandan universities were invited and encouraged to participate in USDL, however, none responded. Later after implementing the repository only at Makerere University for seven years, it was re-named Makerere University Institutional Repository (Mak IR) and has been supported financially by Makerere University and SIDA (Swedish International Development Cooperation Agency).

The institutional repositories at Kenyatta University, initiated in 2012, and that at Muhimbili University of Health and Allied Sciences, initiated in 2013, were recent projects with information about their development hardly available online. This information was therefore part of the findings.

1.2 Statement of the problem

Research done in Africa is increasingly becoming visible on the internet through repositories. By 2013, a number of academic libraries had made their institutional scholarly information visible on the web through repositories. Hence, it was possible to know the kind of research that was being conducted in universities on the continent. Institutional repositories have the potential of improving access to research information world-wide, and East Africa in particular. However, by the time of this study, many universities in East Africa either did not have any institutional repository (with reference to the OpenDOAR) or those that had one; access to the full-text of the scholarly information was limited (as established by the researcher). This limitation was either because only an abstract was provided online or the full-text file was attached but restricted. There were generally no further access guidelines that an end-user would follow to obtain the full-text content online; hence, the need to improve the accessibility and usage of scholarly information from East Africa. Earlier in 2014, Prost and Schopfel established similar findings from 25 repositories that they surveyed by reviewing the IR websites selected from the OpenDOAR. Trotter, Kell, Gray and King (2014) in the SCAP report, which investigated the visibility of African scholarship in four Southern African universities, recommended using OA principles in order to give African research a higher likelihood of being more visible and accessible to scholars, government, industry and civil society personnel who would leverage it for development. The SCAP report noted that the OA principles were already being used in the global North, especially promoted by funding bodies in the EU, the UK and the USA. Universities in the developed world had, therefore, set up institutional repositories to digitally archive scholarly information for the future as well as using the IRs as open access channels.

Unfortunately for East Africa, as established by the researcher by the end of 2013, there were few institutional repositories, and where they existed, the level of open access was still below 35%, implying that most of the scholarly information from universities was still inaccessible digitally. By 2013, universities in East Africa were, therefore, missing out on the opportunities of using the Internet to make scholarly information more accessible nationally and worldwide. This was slowing down research growth and limiting the application of knowledge for development within and beyond the East African region (Trotter, Kell, Gray & King, 2014). Based on the fact that universities dominantly conduct local research that is best suited to addressing local needs, then, if the findings of this research are not freely

downloadable from the IRs, then the impact on applying that knowledge for development is reduced. The limited exposure of the full-text affects usage and citation of the actual research findings, which further affect the researchers' and institution's recognition and reputation. This observation required an empirical study to investigate the causes of limited open access in institutional repositories in East Africa. The key question this study sought to answer, therefore, was how could access to scholarly information in institutional repositories in East Africa be increased?

1.3 Aim of the study

To examine the management of institutional repositories in the selected universities in East Africa and propose interventions that could improve access to scholarly information in these universities.

1.4 Objective(s)

The study was conducted in three selected universities in East Africa, with the assumption that the factors affecting access to information in the IRs could have been managerial, leading to investigating how the IRs in these universities were developed and managed. However, considering management alone would have been one-sided and in-exhaustive, so the element of how aware and participative the researchers were in the IR activities was also investigated, since they were the main content contributors. The specific objectives of the study, therefore, were to:

1. Find out how the institutional repositories in the selected universities were developed and managed.
2. Review best practices in the management of institutional repositories.
3. Assess the researchers' awareness and participation in open access in general and institutional repositories in particular, in the selected universities.
4. Identify the challenges, if any, in providing open access in institutional repositories in the selected universities
5. Propose strategies for increased open access to scholarly information in institutional repositories in the selected universities.

1.5 Research questions

The overall question in this study was "how could access to scholarly information in institutional repositories in East Africa be increased?" To answer that question, there was a need to establish where the problem originated from.

The study was, therefore, guided by the following specific research questions:

1. How were the institutional repositories in the selected universities in East Africa developed?
2. How were the institutional repositories in the selected universities in East Africa managed?
3. To what extent were the researchers aware of the institutional repository and the concept of open access in the selected universities in East Africa?
4. What institutional repository activities had the researchers in the selected universities in East Africa participated in?
5. What challenges, if any, were limiting the provision of open access in institutional repositories in the selected universities in East Africa?
6. What strategies were appropriate to increase access to scholarly information in institutional repositories in the selected universities in East Africa?

1.6 Scope and delimitations of the study

The study focused on institutional repositories (IRs) in universities in East Africa; how the IRs were managed and the factors that affected the provision of open access to scholarly information in the IRs. Open access was exclusively to the scholarly information and did not include anything to do with open research data or open data in general. The study was carried out in universities with the highest number of records in the institutional repository in each of the three countries of East Africa by July 2014; namely Kenyatta University in Kenya, Makerere University in Uganda, and Muhimbili University of Health and Allied Sciences (MUHAS) in Tanzania. All the three universities run their institutional repositories on the DSpace software, which gave the study a good footing for a comparative investigation without any institution taking advantage of features of other software (such as Digital Commons or BePress) that help in marketing the IR by sending statistics of usage to the submitter (supposedly the authors), who get encouraged to further self-archive or inform others to self-archive (Giesecke, 2011).

1.7 Significance of the study

Institutional repositories generate, store and provide information on the research output of universities, which can be used to measure the researcher's performance and/or assess the scholarly impact of the institution using bibliometrics. This study will, therefore, serve as a guide to university and library administrators on how to generate more content in IRs that is freely available for use to impact on citations that are often used as a bibliometrics measure. Once open access has been achieved in the IRs, it will contribute to an increased global impact of the scholarly information originating from universities in East Africa.

Open access policies tend to promote awareness about, and participation in institutional repositories because they either encourage or require researchers to self-archive, yet none of the East African countries had open access policies by 2013. There were only a few institutions that had institutional repository policies especially in Kenya, namely the University of Nairobi, Kenyatta University, Jomo Kenyatta University of Agriculture and Technology, Pwani University and Strathmore University (ROARMAP, 2014). The absence of countrywide open access policies had partially contributed to the limited awareness about open access and institutional repositories in East Africa. Czerniewicz and Goodier's (2014, p.8) observed that "the lack of a national open access policy in South Africa had hindered the development, growth and availability of local research". The findings of this study will, therefore, inform policy in a number of ways. At the institutional level, the study is expected to improve the institutions' understanding of the researchers' perceptions and participation in institutional repository activities, thereby informing practice. The study will also highlight some of the factors limiting the accessibility of scholarly information in these universities with recommendations drawn for action where necessary. The study may also be used by institutional policy makers in East Africa, who may be interested in initiating and managing institutional repositories as a tool for the preservation and dissemination of research information from universities. It may also raise awareness of government and other funding organisations in universities in East Africa about the need for OA mandates to the research they fund. Although the study entails a case study of three university-based IRs, which may not be representative of all IRs in East Africa, the findings and analysis provide usefull guidelines and strategies that may inform and guide IR managers how to improve access to the scholarly information in institutional repositories in East Africa.

1.8 Definition of terms

Institutional Repository (IR): Different individuals view institutional repositories according to the role they play (Ware, 2004). There are, therefore, various definitions as outlined below: The LEADIRS workbook defines an institutional repository as a database with a set of services to capture, store, index, preserve and redistribute a university's scholarly research in digital formats. Shreeves and Cragin (2008) define an institutional repository as "a set of services and technologies that provide the means to collect, manage, provide access to, disseminate, and preserve digital materials produced at an institution" (p. 89). According to Lynch (2003, p. 328), an institutional repository is a set of services that a university provides to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution." Crow (2002) defines an institutional repository as a "digital archive of the intellectual product created by the faculty, research staff, and students of an institution and accessible to end-users both within and outside of the institution with few, if any, barriers to access". In this study, Crow's definition was used as the working definition because it clearly states who constitute the creation of the IR, the audience & the level of access, an important issue in this research.

Open Access (OA): According to the Budapest Open Access Initiative (BOAI, 2002) definition, open access to peer-reviewed research literature, is the free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution and the only role for copyright in this domain should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited. In other words, open access is the principle that scholarly information should be made accessible online, free of charge to the user, immediately after publication. Although the BOAI definition is broad enough, covering all aspects of access and use of scholarly literature, Suber's (2015) summarized version of open access, as shortened by PLoS is used

as the working definition, that is: OA is the "free availability and unrestricted use" of publications or scholarly literature/information online.

Scholarly Communication (SC): According to the Association of Research Libraries (ARL, n.d.), Scholarly communication can be defined as "the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community and preserved for future use. The system includes both formal means of communication, such as publication in peer-reviewed journals and informal channels, such as electronic listservs." Graham (2000) noted that until the onset of the Internet, the basic system of scholarly communication was based on three processes: (1) the informal networks or the "invisible college" concept, which includes informal communication in person and through letters, working papers and other grey literature (Kennan, 2008). With the Internet, the informal networks are handled via e-mail, listservs, web archives, etc.; (2) the initial public dissemination of research, which may take place at conferences or via preprints; and (3) the formal publication through journals and books. It was worth noting that institutional repositories were one of the channels enabling scholarly communication.

Scholarly information: Scholarly information simply means information written by experts in a field. Librarians at the Baker Library (Harvard Business School) expound on experts in a field to include people with advanced degrees and/or experience doing research in the field. Examples of where these are found are universities. The University of Melbourne ("What is scholarly", n.d.) defines 'scholarly information' as having four dimensions: 1. *Published information and collections used by scholars to inform their learning, teaching and research* – which may or may not be provided through the university. These include books, refereed journals, maps, monographs… and other physical materials. 2. *Materials created for learning and teaching purposes* – these could include, for example, course notes and presentation slides. 3. Information created in the course of research activities – examples of such information are numerical data collected from scientific instrumentation and laboratory work; information collected from surveys, interviews and other social studies. 4. *Research outputs* – such as papers, chapters, monographs, articles, letters, presentations, posters, demonstrations and speeches, processed research data, visualisations of large datasets, models, web sites and multimedia objects. This study specifically refers to scholarly information as defined above, but produced by scholars or researchers in a university setting.

Self-archiving is the practice of depositing a digital copy of your publication on a publicly accessible website, preferably an OAI-compliant archive like repositories. Crow (2002) defined self-archiving as a broad term often applied to the electronic posting, without publisher mediation, of author-supplied research. Crow further explained that in practice, self-archiving often encompassed both the posting of pre-prints and most times published papers by individual researchers on personal web sites and the inclusion of such research on discipline-specific e-print servers. Pinfield (2003) on the other hand noted that the term was used in a very general sense to mean simply mounting a paper on the web.

Management: According to the online business dictionary, management is defined as "the organization and coordination of the activities of a business in order to achieve defined objectives" ("Management", 2015). Koontz and O'Donnel define managing as "an operational process initially best dissected by analyzing the managerial functions … The five essential managerial functions (are): planning, organizing, staffing, directing and leading and controlling" (as cited in Cole & Kelly, 2011, p.12). This study adopted Koontz and O'Donnel's definition, with modifications focused on the managerial functions as applied to institutional repositories, thus: planning, budgeting, staffing, collection development, marketing and advocacy, and systems maintenance.

Access to scholarly information: Access to scholarly information is exclusively defined by the researcher as the ability of a user on the Internet to be able to retrieve the full-text of an item housed in an institutional repository, either directly from the interface of the repository or from a search engine.

Visibility: Visibility in this study is taken to mean the metadata available on the Internet that shows that this bulk of research is available from a given institution or organisation, or metadata retrievable from multiple sources, for instance a journal article available directly from the journal site, a journal indexing site, an open access repository, social media platforms, etc. It can also be regarded as research presence on the web.

1.9 Conceptual framework

Universities in their settings may provide OA to some of their documents through various ways. However, increasingly, universities are centrally collecting digital materials in IRs. How IRs are developed (entailing a number of preliminary activities such as needs assessment and advocacy to university administration for buy-in for the IR project, etc.) and

how they are managed (entailing aspects such as planning, budgeting, staffing, marketing, etc.) affects access to the scholarly information that they preserve. However, predominantly, management of the IR is what makes the end result, that is, what and how the full-text is accessed. In the process of developing and managing IRs, all the stakeholders of IRs have a role to play, although only two of the stakeholders (the librarians and the researchers) were investigated in this study, with the perspective that information about the involvement of the other stakeholders would be established from these two key stakeholders. In the process of managing IRs to provide OA, challenges are encountered. To achieve effective access (that is, freely downloadable full-text) to the content in IRs, this study proposed interventions specified as managerial strategies that could improve open access to the content of the IRs in universities in East Africa. The main concepts in this study, therefore, were IR development, IR management, the library and the researchers' views, challenges in providing OA in IRs, strategies for improved access to scholarly information in IRs and IR access/open access. The relationship of these concepts is illustrated in Figure 1.1.

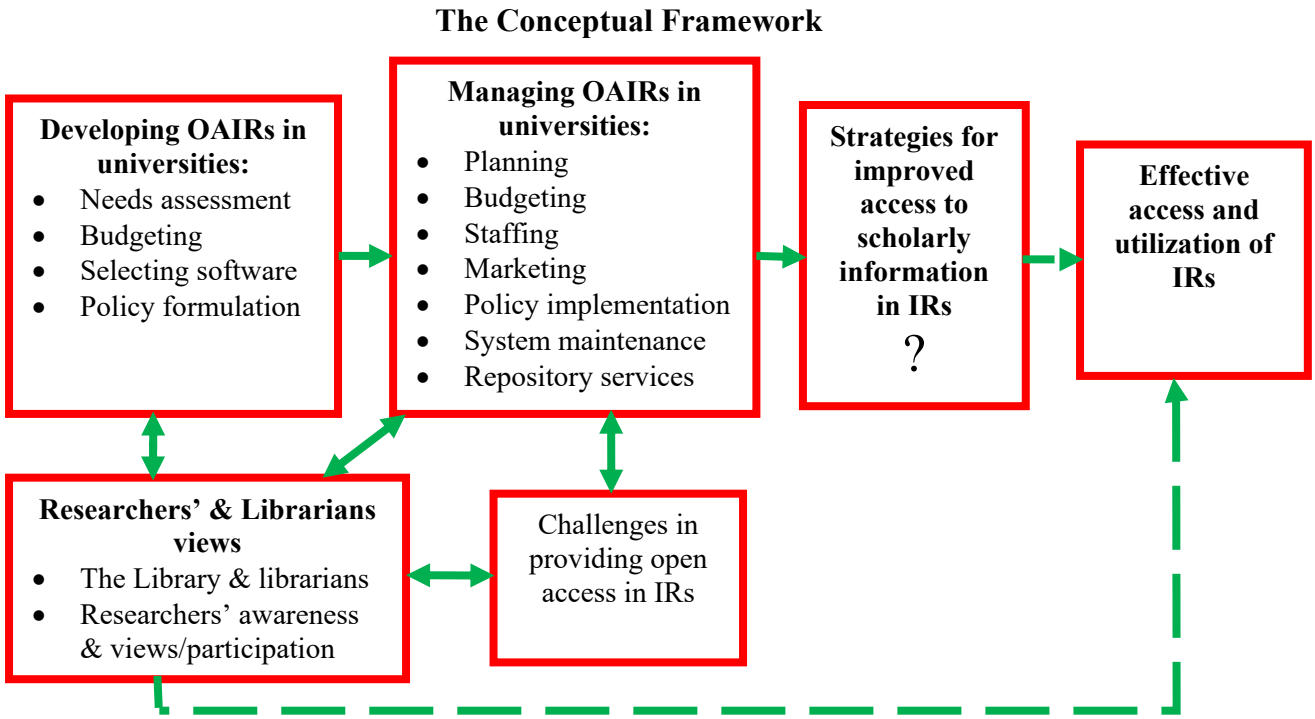


Figure 1.1: Conceptual framework for effective management and access of IRs

(Source: Author)

1.10 Structure of the dissertation

This dissertation has six chapters. In chapter one the study was introduced, with a brief of the kinds of research emanating from universities and how repositories were being used in managing and disseminating these information resources. This was followed by a background to the study, where the history of open access and institutional repositories was explained from the world perspective to the East African level where the study was conducted. This was followed by the statement of the problem, the aim of the study, the objectives, the research questions, the scope of the study, the significance of the study, definition of terms and the conceptual framework. In chapter two, literature on the development and management of institutional repositories was reviewed, starting with the theories on which the study was founded. The literature on the provision of open access through repositories was also reviewed since this was a pertinent area of the study. Chapter three described the methodology followed, starting with an introduction, the philosophical assumptions, research approaches, research design, the area of study covered, the study population, and sampling procedures used, the data collection methods, how the data was analysed, the data control measures used, the ethical procedures followed, and the study limitations encountered and how they were mitigated. In chapter four the findings were presented based on the objectives of the study. Chapter five discussed the findings following the issues and themes raised in chapter four. In chapter six, a summary of the findings, the contribution to new knowledge in the LIS field, the conclusions, recommendations highlighting the key policy issues that are meant to enable attaining open access in institutional repositories in universities in East Africa, and areas for further study are provided.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section aimed at introducing the thesis context in relation to the related literature. First, the theoretical perspective of the study was explained, followed by literature on the setting up and management of institutional repositories. The literature on the challenges of developing and managing institutional repositories was also reviewed, including the perception of institutional repositories. Since open access was one of the major issues, literature on open access in general and on open access policies was also reviewed. Strategies for successful open access institutional repositories and studies related to the development of institutional repositories were also reviewed, with the research gap presented at the end.

2.1 Theoretical perspective

Advancements in technology, in addition to other economic factors, have brought about changes in the scholarly communication process. For years, research was communicated through the print media, but with the advent of the Internet and electronic publishing, new ways of communicating research emerged. Jones (2007, p.13) specifically noted that for "over the last 40 years, information provision had changed and adapted through effective use of computers and technology." Jones further clarified that these "changes had affected publishing, making the production of the written word easier and opening access to the pre-publication stages more widely than before." Open access and institutional repositories were the changes occurring in the information environment. They have changed the way publishing and scholarly communication used to be done and this change needed to be embraced systematically. Although the work of institutional repositories was highly technical, that is, requiring the design and implementation of robust information infrastructure and functional systems, Palmer, Teffeau and Newton (2008) noted that it was equally highly managerial, requiring continual planning, prioritizing, and coordinating with respect to the expectations of various stakeholders. Therefore, in framing the theoretical perspective for identifying strategies that could be used by institutional repository managers to fulfill the research dissemination function of their repositories, the stakeholder theory

provided adequate guidelines. The diffusion of innovations theory also provided guidelines of how this change could be managed.

2.1.1 Applying the stakeholder theory

Stakeholder theory is a management theory that advocates for addressing the concerns of all stakeholders in a firm as opposed to concentrating on the interests of senior managers and stockholders (Flak & Rose, 2005). Stakeholder theory was

> originally proposed by Freeman in 1984 as a practical, effective, and ethically responsible way of managing private companies. Freeman argued that the traditional business assumption that organizations should focus on maximizing shareholder profit was inadequate and that attending to the needs of multiple stakeholders makes the firm more competitive in the long run (Flak & Rose, 2005, p. 643).

Despite its original focus on profit making organizations, the theory can also be applied in managerial aspects of non-profit organizations like government organizations. Flak and Rose, (2005) noted that it had been adopted in many contexts, including the public sector; tailoring its application to e-government. Scholl (2001), and Scott, Golden, and Hughes (2004) apply the stakeholder theory to e-government on the realisation that the main barriers to e-government implementation were not technical but social and cultural, and therefore needed processes that would enable managing all the stakeholder relations to reduce conflicts. Similar to e-government, the challenges to implementing open access in institutional repositories were not technical but cultural, especially in instilling a change of mind-set among researchers (Chan, Kwok & Yip, 2005; Suber, 2012). Genoni (2004), while reflecting on the Online Computer Library Centre (OCLC) findings also noted that technical issues were not necessarily difficult, but highlighted the politics and culture of an institution as the likely challenges when developing and managing institutional repositories. To this effect, insights of stakeholder theory could also be useful in the management of institutional repository initiatives because:

- The planning of an institutional repository needs to be done strategically in consultation with all the possible stakeholders in order to achieve fruitful goals.

- Managing an institutional repository could be likened to running a business, where the managers have to keep in touch with the suppliers and consumers of content by marketing

the service, consulting with the institutional administration for policy guidelines and keeping track of the external technological changes that affect running the repository. This all rotates around consulting with all the institutional repository stakeholders.

Utulu and Ngwenyama's (2017) noted that the stakeholder theory:

> addresses the diverse categories of rational organizational actors that influence the 'hows' and 'whys' organizations reach their goal. It is one of the body of theories focused on assessing how organizations are oriented towards addressing the status and influence those connected to them have on the achievement of corporate goals (p. 5).

A stakeholder in an organization, according to Freeman's (1984) definition is, "any group or individuals who can affect or is affected by the achievements of the organization's objectives." "The stakeholder theory proposes that the firm's success is dependent upon the successful management of its relationships with its stakeholders" (Elijido-Ten, 2004, p. 3). Freeman and Phillips (2002) argued that the "stakeholder theory was a managerial conception, where an organization's success was dependent on how well it managed the relationships with key groups such as customers, employees, suppliers, communities, financiers, and others that could affect the realization of its purpose." Freeman (2001) illustrated that assertion diagrammatically as follows:

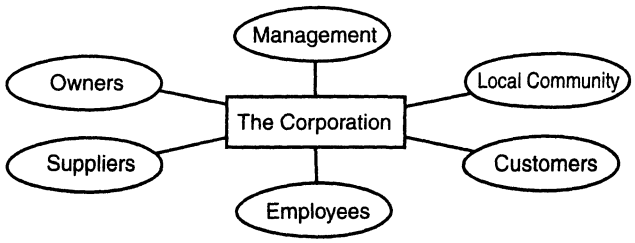


Figure 2.1: A Stakeholder Model of the Corporation

(Source: Freeman, 2001)

With reference to Freeman's (2001) illustration, and Utulu and Ngwenyama's (2017) concluding remarks that "IR innovators must endeavour to identify all IR innovation stakeholders and provide avenues for negotiating collective IR innovation objectives that are acceptable to all of them" (p. 9); there was need to identify all the associated stakeholder groups of an institutional repository in this study. Swan (2008, p. 29) noted that "repository stakeholders come in a number of guises" and identified some of them as: "institutional managers, research managers, research funders, repository managers, end users (as authors)

and end users (as readers)". In university settings, the library has often been in charge of managing institutional repositories. Bustos-Gonzalez, Fernandez-Porcel and Johnson (2007) noted that although the library had often taken the lead in establishing and managing institutional repositories because of its experience in collecting, organising, preserving and sharing information, it should not work in isolation, but collaborate with the academic departments and the information technology services for the smooth running of the repository. The library should stretch further to the administrative units and the funding bodies of the university especially in the formulation of policies that govern the repository. In fact, it should reach out to all the stakeholders of the university. Crow (2002, p. 5) in the SPARC position paper identified the "faculty as the principal contributors and stakeholders, librarians as implementers, and provosts and deans as vital administration proponents", and at some point the publishers. Institutional repository stakeholders identified in Utulu and Ngwenyama's (2017) paper included: faculty, research staff, students, university administration, funding agencies, librarians, academic disciplines, commercial publishers, conference and workshop organizers.

Considering institutional repositories as projects that need to be managed as a business entity within an academic institution, in perspective with the university units that have been identified in the literature in relation to developing and managing repositories, Swan's (2008) stakeholders were re-categorised in addition to others as follows: the library, the information technology department, the researchers, the institution administration, the research funding bodies, the research coordinating bodies, publishers and students. Following the stakeholder model of the corporation, the stakeholders involved in the development and management of institutional repositories in university settings were illustrated diagrammatically as follows:

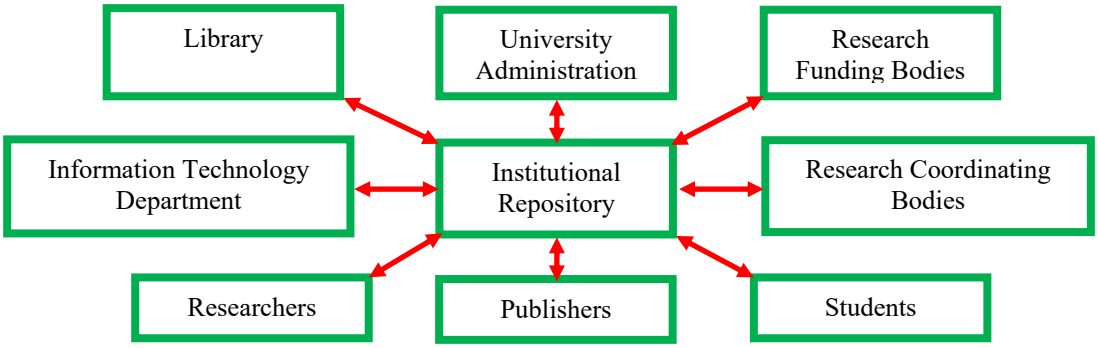


Figure 2.2: A Stakeholder Model of the Institutional Repository

(Source: Author)

2.1.2 The diffusion of innovations theory

Institutional repositories as a new innovation in universities have changed the way librarians relate with researchers, in the bid to inform them on how to contribute publications for deposit in the repositories. How researchers' respond to this change and the way they disseminate and publicize their publications can best be studied using the diffusion of innovations theory. The decision to use this theory originated from the need to establish how institutional repositories had been adopted as an innovation and how this new change was introduced and integrated into the university system by the key players, the librarians. This theory blended in well with the research questions raised in this study. The diffusion of innovations theory helped in understanding how researchers had adopted and participated in the activities of the institutional repository, as well as providing open access to their work. On the other hand, the diffusion of innovations theory also helped in understanding the structure the librarians followed in marketing the institutional repository to the university community. This theory guided in understanding how institutional repositories were introduced into the university community, knowing that they were a new venture that needed a change in the way researchers were used to disseminating and publicizing their publications. The librarians, therefore, served as change agents in the diffusion of innovations theory as far as introducing institutional repositories were concerned.

Below is an overview of the diffusion of innovations theory and how it related to the objectives of this study.

The diffusion of innovations theory dates back to the 1960's, developed by Everett M. Rogers, a sociologist, and communications scholar. Diffusion is the process through which an innovation is communicated to the members of a social system using certain channels over time (Rogers, 2003). This theory has been applied widely in agriculture, marketing, education, health, and technology, especially when introducing new ideas to the community. In Library and Information Science, Jones, Andrew and MacColl (2006) used the diffusion of innovations theory in the advocacy of institutional repositories in universities, while Dorner and Revell (2012) used it as a framework to establish how subject librarians promoted institutional repositories as an information resource.

The assumption that underpinned this section was that librarians as change agents were involved in a diffusion process when introducing institutional repositories to the community

of researchers in universities. The approach librarians used in communicating about institutional repositories affected how they got adopted. Rogers (2003) described five adopter categories, through which librarians could strategically target to quickly diffuse institutional repositories to researchers in universities. Therefore, grouping researchers according to these adopter categories could help in quickly getting the message of institutional repositories to the community of researchers in the university.

According to Rogers (2003, p. 299), "the distinctive characteristics of the five adopter categories meant that these adopter categories could be used for audience segmentation, a strategy in which different communication channels and/or messages were used to reach each sub-audience."

Rogers categorizes the members of a social system into five groups, specifically according to their characteristics and values, the degree of innovativeness, and the point in time when they adopted innovations. These categories included the innovators, the early adopters, the early majority, the late majority, and the laggards.

The innovators were considered as the most venturesome, due to the desire for the rash, the daring, and the risky. They were not necessarily respected by the other members of the local system, but they were often the first to launch a new idea in the social system. "Their interest in new ideas led them out of a local circle of peer networks and into more cosmopolite social relationships" (Rogers, 2003, p. 282).

The early adopters were referred to with more respect. They were a more integrated part of the local social system than the innovators. While the innovators were cosmopolites, the early adopters were localities. They had the highest degree of opinion leadership, to whom potential adopters looked up for advice and information about an innovation. According to Rogers (2003, p. 283), these were "the individuals to check with before adopting a new idea". "This adopter category was generally sought by change agents as a local missionary for speeding the diffusion process".

The early majority were noted to adopt after deliberating for some time before completely adopting a new idea. They interacted frequently with their peers and this positioned them as a good target to easily share the new idea with others. "They provided interconnectedness in the system's interpersonal networks" (Rogers, 2003, p. 284). They, however, did not hold

positions of opinion leadership in the social system. They followed with a deliberate willingness in adopting innovations but seldom led.

The late majority were noted to be sceptical and cautious, and only adopted an innovation when most of the others in their social system had adopted. Rogers (2003) noted that the late majority could adopt as a result of increasing peer pressures and they adopted after ensuring that most of the uncertainty about a new innovation had been removed.

The laggards were normally the last to adopt an innovation in a social system and were referred to as the traditionalists. Their point of reference was the past, with decisions made based on what had been done before or previously, and they followed a network of others with relatively the same traditional values. Laggards tended to be suspicious of innovations, with adoption only when they were certain that a new idea would not fail (Roger, 2003).

According to Holland (1997, p. 391),

> "Diffusion theories provide a framework through which professionals can understand the processes by which new technologies are disseminated. These ideas offer helpful insight into the current practice and should inform future strategies. By understanding the factors which enhance success and prevent failure, information professionals should be able to create and implement successful strategies for diffusion that reflect the values, needs and behaviour of their clients."

2.1.3 Theoretical framework

The inaccessibility of content in institutional repositories could have been a management problem, since, repository managers were expected to ensure that what was deposited in the repository had adequate access rights. This included liaising with researchers and all the other stakeholders, to acquire online dissemination rights. The process that ensured that such rights were obtained was often through the policies developed and the strategies used when developing the institutional repository. Both the stakeholder and diffusion of innovations theories incorporated aspects of how best repositories could be managed to ensure maximum accessibility. The key concepts therefore were the "management of institutional repositories" (independent variable) that involved liaising with all the stakeholders as enumerated in Figure 2.2, "institutional repository development strategies" (intervening variable) that could follow the diffusion of innovations theory adopter categories, and accessing IR content (dependent

variable), which was the final output that aimed at achieving effective access of the information in the institutional repository. Diagrammatically, this was illustrated as follows:

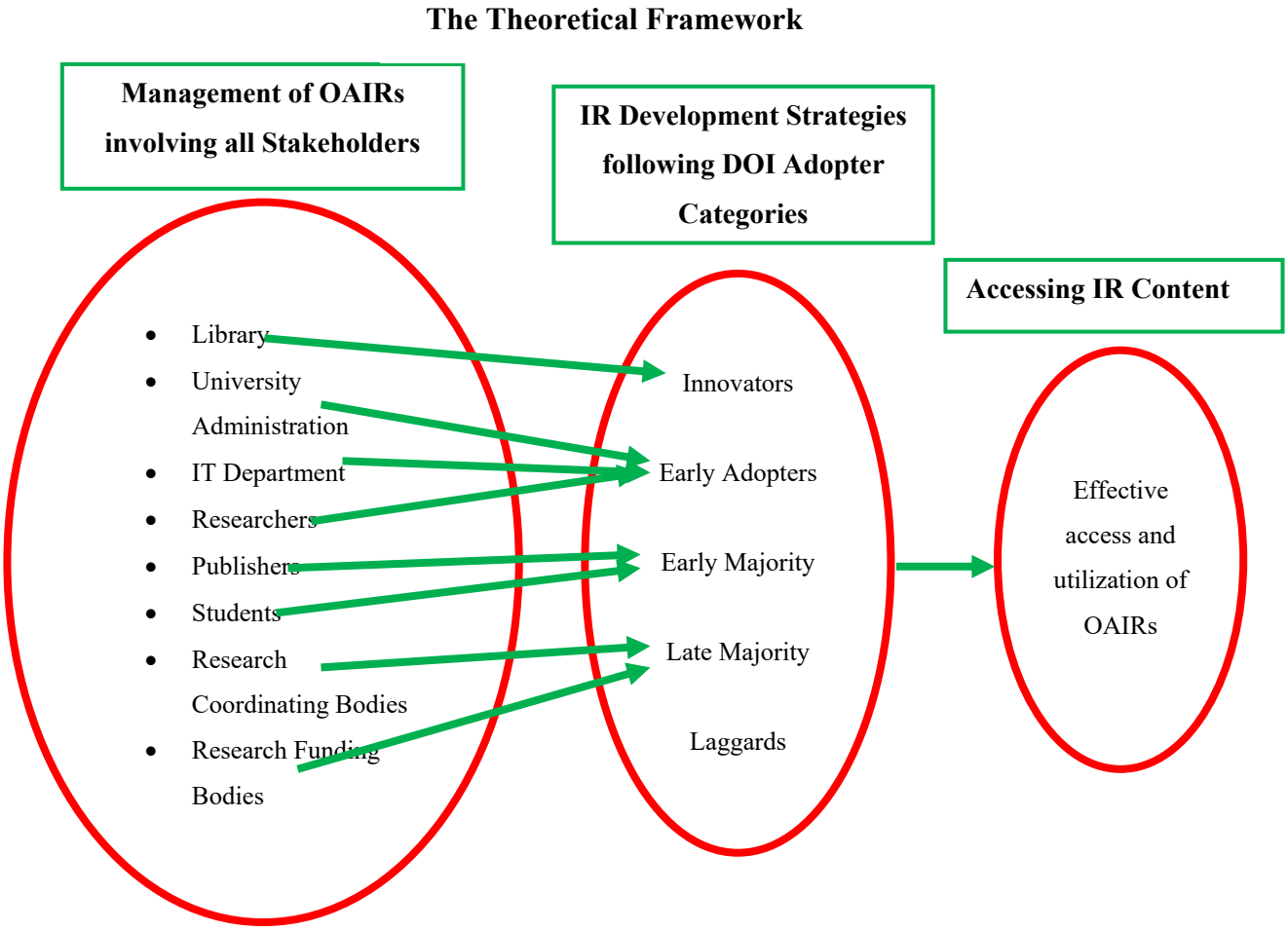


Figure 2.3: Theoretical Framework for Effective Management and Access to IR Content

(Source: Author)

2.2 Developing institutional repositories

Barton and Waters (2004), in the Learning About Digital Institutional Repositories Seminars (LEADIRS) workbook, explained the process of setting up institutional repositories using experiences from experts in the United Kingdom (UK). This showed that there were no clear-cut procedures, but guiding steps that universities could use to set up institutional repositories. The LEADIRS workbook enlisted the following steps as the most essential in setting up institutional repositories:

1. Learning about the process by reading about and examining other institutional repositories

2. Developing a service definition and service plan, which entailed:
    - Conducting a needs assessment of your university
    - Developing a cost model based on this plan
    - Creating a schedule and timeline
    - Developing policies that govern content acquisition, distribution, and maintenance
    - Assembling a team
    - Technology – Choosing and installing software platforms
    - Marketing
    - Launching the service
    - Running the service which yielded into managing the institutional repository

Barton and Waters (2004) acknowledged the fact that each university's institutional repository was meant to be unique, depending on the environment in which it was operated. Different institutions had handled the above steps variedly. However, to ensure success, each of these steps was essential even though they might not be done in the sequence presented. Gibbons (2004) summarized the process of developing institutional repositories into eight essential approaches. These were: 1) making the business case, 2) defining the purpose of the repository, 3) defining repository services, 4) choosing repository software, 5) developing repository policies, 6) staffing, 7) setting up communities, 8) marketing the repository.

It is essential to specify why there is need for an IR and some of the common reasons and basis for the objectives of developing an IR were enumerated in 'making the business case' section of Swan's (2008) findings as follows:

i. Increasing the visibility and dissemination of research outputs
ii. Providing free access to research outputs
iii. The preservation and curation of research outputs
iv. The collection of research outputs
v. Research assessment and monitoring
vi. A place for teaching and learning materials
vii. The development of special (or legacy) digital collections

Stazano (2016) outlined the process of developing an IR in form of a flow chart with the overall steps summarised under the following headings that he explained further as individual flow charts: "Project initiation, Define content, Define feature set (Create metadata schema, Define access protocols, Define maintenance process), Choose tool, Build/install and maintain system" (p.4).

Most of the IR development guidelines provided in the literature (Barton & Waters, 2004; Gibbons, 2004; Stazano, 2016) outlined the processes of setting up and having a functioning repository, with minimal emphasis on managing it. Swan (2008), however, pointed out that "those responsible for instigating and running a repository have much work ahead in managing it so that it successfully achieves the expectations of which it is capable" (p. 16).

> Setting up a repository is only the start of the process and is relatively easy in the overall scheme of things. Once established, there are challenges in collecting content, in looking after that content in the face of the ever-changing digital information world, in adding value to the content and maximising its usefulness, and in ensuring that the bases on which repositories operate are legally sound (Swan, 2008, p. 18).

Librarians and repository managers should, therefore, consider success beyond having a functioning IR to one that achieves the objectives that it was set out to provide through appropriate management. Swan (2008), described the process of setting up and managing a repository using the viability component of the repository business model (where the viability factors were focused on making the business happen). An extract (reproduced in Figure 2.4) of the viability component in the business analysis matrix illustrates the IR development and management questions that need to be addressed while planning to setup a repository.

	Viability
Business case	***Does our business fit stakeholder needs and preferences?*** • Will the service fit user needs? • Can we make the case to the institution/organisation? • Is a pilot project necessary or advisable? • Will it tell us much? **A**
Business scope and development	***Can we develop and launch this?*** • What is the business going to offer? • How might this change over the short-to-medium term? • Can we do it all ourselves? • Can we make the case to the institution and to the users? **B**

Business management	*Can we manage this business successfully?*
	• What key performance indicators should we use? • What goals might be thrust upon us by others? • Do we need to outsource anything? • How are we going to market our business? • What new tasks might be involved? • What policies and procedures need to be in place? **C**

Figure 2.4: An extract of the viability component in the business analysis matrix

(Source: Swan, 2008, p. 28)

Swan articulately elaborated each of the questions presented in the business analysis matrix extract above, and are, therefore, not explained further in this study.

2.3 Management of institutional repositories

Allard, Mack and Feltner-Reichert identified 'management' as one of the themes discussed in the IR literature, and defined it as "keeping an IR running after the initial planning and implementation has been completed" (2005, p. 331). However, the management of institutional repositories begins right from the initiation of the project or service within the university and it encompasses many aspects including some of the functional roles of managing an organisation, such as: planning, budgeting, staffing, collection development, advocacy and marketing. Each of these aspects constituted the main areas discussed in this study, in addition to a few broad institutional repository management models tailored to encourage the participation of researchers, enhance depositing of content and ensure appropriate dissemination of research information emanating from universities.

2.3.1 Planning

Developing an institutional repository entails managing the whole project and this starts with planning. Bankier, Foster and Wiley (2009, p. 110) noted that "successful repositories involved planning, commitment, and a defined focus". Planning for the services going to be provided by having an institutional repository was a key aspect in the development and management of repositories. Barton and Waters (2004) described these as a service plan listed in section 2.2 above. Nabe (2010, p. 19) listed some of the tasks included when planning for an institutional repository to include:

- Conducting an environmental scan or survey of the experience of institutions who had functioning institutional repositories

- Contacting vendors of commercial platforms for demonstrations and price quotes
- Evaluating open source platforms via either implementation or exploration of existing sites
- Preparing a proposal for going forward, including an estimate of costs; and
- Establishing a timeline for implementation and rollout.

Note, however, that these are the common issues addressed during the institutional repository development phase. While managing the repository, other planning stages included ensuring that all the necessary documents for needs analysis, policies (OA, IR, Copyright, Creative Commons (CC) licences and IPM policies) and consent forms, letters to publishers requesting to archive institution-author publications, author addendums that emphasize the need for authors to have the right to self-archive when publishing, leaflets and brochures for marketing the service, and training materials when the service is run are prepared. All these processes could be done at different stages; however, what is important is that they were all necessary for the smooth running of the repository project. Universities that had planned for all these activities had managed to collect most of their researcher's scholarly information in the institutional repository and availed them to the public as open access.

Many institutions committed the mistake of planning for institutional repositories according to the software workflow process. Learning from institutions that used similar software, they observed how the workflow was conducted and used that as the basis to start their own institutional repositories. Many of the case study sites (USA-based universities) in Campbell-Meier's (2011) findings downloaded DSpace and then identified collections for the repository. Campbell-Meier advised that the needs analysis which led to the collections on campus being known should inform the type of software that was suitable for the institutional repository other than forcing the content into predetermined software. The trend of starting off by installing software before planning for the types of collections in a repository was also common in most African universities. The University of Pretoria and the University of Cape Town in South Africa were exceptions in this case. Macha and Jager (2011) clearly explain how these two universities focused on the kinds of collections they had targeted for the institutional repository as they selected the software to use. DSpace for the University of Pretoria and DigiTools for the University of Cape Town.

2.3.2 Budgeting

It was difficult to put a fixed figure for either the development or operating costs of institutional repositories because they were very "diverse in scope and varied in their technical execution" (Crow, 2002, p. 27). Nabe (2010) also acknowledged the fact that it was difficult to come up with a reliable estimate for developing and managing an institutional repository, however, because it was unlikely to get support without a budget, an estimate of the cost was needed in whatever circumstance. Crow noted that these costs depended "on the nature and extent of the repository implementation, and budget practices of the institution" (2002, p. 28). Nabe identified the two major components of the institutional repository budget to be: the equipment (hardware and software), and the personnel, in addition to the marketing and training costs. Nabe noted that the costs of these components also depended on the type of software used (either open source or commercial). When open source software was used, it was acquired at no cost, but required consultations with the information technology staff to install and operate or manage. When commercial software was used, a subscription and maintenance cost had to be factored in to acquire and use. Besides the computers that needed to be used to capture the data for the institutional repository, Nabe noted that minimally, the main hardware requirements were servers that could include the server meant to deliver the content, a backup server and to a lesser extent a test server. The costs of these depended on the institutional goals for the institutional repository. For instance, if the institution intended to archive Video files, these would require more storage space in terms of memory and therefore more costly servers. Additionally, if the institution intended to digitise some of its existing collections, then scanners would also be included in the equipment budget.

The personnel component on institutional repository budgets was considered the largest cost when open source software was used, with the need to have a full-time information technology staff either hired or provided in-house from the existing staff of the institution. Besides the technical support staff, there was a need to boost the outreach efforts with enough personnel. Nabe (2010, p. 21) noted that "given the well-documented difficulties in populating institutional repositories, aggressive, persistent outreach efforts consumed or should consume the lion's share of the personal commitment."

Crow outlined the institutional costs required to address repository policy, content management and the marketing issues to include:

- Developing content access policies;
- Deciding on what metadata to store and present;
- Creating digital document identifiers (DOIs);
- Crafting author permission and licensing agreements to disseminate work indefinitely;
- Developing document creation and input guidelines suitable for long term archiving and proper presentation;
- Training staff and authors in using the software to submit content;
- Creating document submission instructions; and
- Marketing the repository concept to prospective depositors (2002, p. 28).

2.3.3 Staffing

Most of the literature on institutional repositories described the involvement of librarians in collaboration with information technology personnel without specifically spelling out the knowledge and skills requirements for managing repositories. The United Kingdom had taken the lead in trying to define the roles and skills required to successfully manage institutional repositories. These were spelt out in the SHERPA document (2008) "Institutional repositories: Staff and skills set" compiled by SHERPA, with input from the United Kingdom Council of Research Repositories (UKCoRR) members. Although this document spelt out mainly two categories of staff: a repository manager and a repository administrator, repositories may be staffed with more than these two categories, with the roles of each shared depending on the available resources. The SHERPA document acknowledged the fact that "in some repositories, the skills, knowledge, and abilities required may be expected of an individual repository post with the assistance of general IT personnel". The roles played in the two main posts provided in the SHERPA document were as follows:

1. Repository Manager – who managed the 'human' side of the repository including content policies, advocacy, user training and a liaison with a wide range of institutional departments and external contacts.

2. Repository Administrator – who managed the technical implementation, customisation and management of repository software, managed metadata fields and quality, created usage reports and tracked the preservation issues.

The skills mentioned in the SHERPA document (2008) were categorised under the following headings: management, software, metadata, storage and preservation, content, liaison, advocacy, training and support, current awareness and professional development. Nabe (2010) on the other hand noted that "the skillsets of librarians matched well with the general needs for an institutional repository, but not all librarians would have the skills necessary for institutional repository work." Nabe further noted that the desired skills of institutional repository staff also depended on the goals of the institutional repository, putting emphasis on the early stages primary goal of promoting and demonstrating the institutional repository's effectiveness and benefits to the institution. To this effect, the following skills were specified: boldness, being knowledgeable, persuasiveness, persistence, and flexibility. The other skills for the general management of the institutional repository that Nabe explained were leadership and teaming skills. Leadership was broken down into two types, with the first type covering a coordinator's role who oversaw the entire institutional repository operations where planning, implementing, maintaining and extending the repository were covered. This, Nabe noted, required organisation and management skills. The second type of leadership required serving as the primary contact for the institutional repository, heading the publicity effort, including meeting with potential contributors and supporters. This, Nabe noted required speaking, presentation, and marketing skills. All in all, Nabe's description of the skills requirement of institutional repository staff fitted in well with those described for the "repository manager role" in the SHERPA document, although this required more than one member of staff. Jones' (2007) description of the roles and responsibilities of institutional repository staff tallied with those of the SHERPA document, except that the "repository administrator role" was split into two, with the "system support role" as an independent post. Since most institutions call on the support of a general information technology personnel, this could be the ideal split of the expected roles in managing an institutional repository.

Repositories being a new phenomenon that is evolving rapidly as technologies develop (Swan, 2008), reskilling of all the stakeholders is essential given that the generation of researchers in universities spans through Rogers (2003) five adopter categories that need to

be appropriately segmented with repackaged message about open access and institutional repositories to easily get diffused to librarians, researchers, administrators, students and policy makers in universities.

While reporting about the essential contributions of liaisons (or college librarians as they are called in the East African region), Swan (2008) noted that there was a shift in the nature of liaison roles with the introduction of institutional repositories who need to receive continuous professional development in order to cope with the trend of being repository managers and administrators. In some universities in Europe, USA, UK, and Australia, the positions of repository managers and administrators were either advertised for new entrants that had the skills described by Nabe (2010) or reskilled the librarians that took on such responsibilities. For example, at the Florida State University (FSU) in the USA, a new developer was hired when the library migrated the repository from bepress to Islandora (Smart, 2019).

2.3.4 Collection development

Collection development in the context of repositories in universities involves collecting digital content from the researchers, staff, students and administration of the University for the Institutional Repository. While commenting on Lynch's (2003) definition of institutional repositories, Giesecke (2011) noted that:

> The repository then is a system for dissemination and stewardship of the intellectual life and scholarship of an institution. It becomes a new way for the institution to contribute to the broader world of scholarship. The repository is cast as a new way to do collection development, to expand this function from the identification and purchase of published materials, to the gathering and dissemination of the works of the faculty (p. 530).

The concept of collection development is therefore still used by the library in reference to gathering digital content for the institutional repository, although Genoni (2004, p. 300-301) was not certain about "how the task of content development for repositories was related to the other content selection responsibilities managed by the library". This was later clarified in the following quotation:

> Whereas it was once a point of contention as to whether the key principles of collection management could be applied to digital formats, it is now taken for granted

> that the realm of collection management incorporates content in whatever form it is acquired or provided by a library (Genoni, 2004, p. 303).

There are, therefore, a number of collection development strategies used to collect content in institutional repositories. However, it is important for each institution to identify the strategies that apply to their needs and document them into content collection workflows. Nabe (2010) described all the possible ways of getting content for the institutional repository, while Mark and Shearer (2006) listed six strategies as applied in an international review conducted by the Canadian Association of Research Libraries (CARL).

In most universities around the world, it was common practice for researchers to provide lists and sometimes copies of their publications on departmental websites. This is what Nabe (2010) referred to as "low-hanging fruit," a good target to start off with when developing a repository. Nabe, however, cautioned repository managers who used this strategy to always notify the authors and get their consent when uploading their publications in the repository. Mark and Shearer (2006) considered this as content harvesting and further reported that Glasgow University took this further by directly depositing articles from open access journals and other publishers that allowed self-archiving.

Mark and Shearer (2006) also described the procedure of creating researcher bibliographies within the institutional repositories for authors by setting up personal pages as alternative access points with links to the publications available through the repository. The University of Rochester was listed as one of the universities that had used this strategy to collect content for the repository.

"Most institutions begun their content recruitment activities through a variety of promotional activities on campus" (Mark & Shearer, 2006, p. 5). This was the most used strategy which included conducting seminars and workshops about open access and the importance of the repository, distributing brochures, publishing articles about the repository in campus newsletters, launching the repository with a big event and banners announcing the existence of the repository. Thereafter, they collect content for the repository.

Offering mediated depositing services for the authors also helped in quickly getting content into the repository. Although the process of self-archiving did not take a lot of time, it had been proven that researchers were reluctant to do it (Crow 2002, Royster 2010). Most repository managers resorted to requesting the authors to send them their publications, or

their CVs so that they would look out for those publications that could be archived as open access and deposit them in the repository on behalf of the researchers. Royster (2010) acknowledged this as one of his strategies at the University of Nebraska-Lincoln.

Digitising some of the library collections or publications housed in departments were also avenues of populating the institutional repository. The Colorado State University for instance retrospectively digitised the Atmospheric Science papers series from the Atmospheric Science Department and included them in the institutional repository (Paschal, 2010).

A number of universities had implemented open access policies or mandates as a way of getting the researchers to deposit their publications in the institutional repository. One of the early implementers of mandates was the Queensland University of Technology (QUT) in Australia. It was easier to contact authors for content with a legitimate document requiring them to comply. Swan and Brown (2005) found out from their survey of authors that the majority were willing to self-archive if obliged to do so by their employer or funding body. Implying the authors would comply with mandates by these bodies. Shearer (2003) listed developing repository policies as one of the essential approaches when developing an institutional repository, while Harnad and McGovern (2009) emphasized mandates as the essential strategy of depositing publications in institutional repositories.

Although all these methods were tried out by a number of institutions, a number of limitations had been registered, and some of these were:

- According to Rowlands and Nicholas (2005), when publishing, authors, in general, did not seem to mind about retaining their copyright in the article, nor obtaining permission to self-archive a copy of the article in any kind of repository. It, therefore, became difficult for authors in universities to think of depositing materials in the institutional repository, because, to them, all rights related to the article were given to the publisher.

- Institutional repositories, normally embraced in the category of the green road to open access were one of the hopes of impacting on the scholarly publishing model. However, as noted by Shreeves and Cragin (2008), reporting with reference to the United States of America, low self-archiving rates had dampened this goal. Most institutional repositories flourished with a mixture of content, composed of working papers, thesis, and dissertations, conference papers; with a small fraction of the

published work. This diversity in content had, however, promoted accessibility to grey literature that was previously inaccessible.

- Kim (2011, p. 246) also noted that the potential value of institutional repositories had not yet been fully appreciated by faculty members or researchers. "Several studies indicated that only a small proportion of the faculty deposited articles or data into institutional repositories" (Jantz & Myoung, 2008; McDowell, 2007; Xia, 2007; Xu, 2008). Content recruitment in institutional repositories was therefore still a hassle in many universities. Researchers were not very responsive to submitting content probably because "institutional repositories failed to appear compelling and useful to the authors and owners of the content." To capture the researcher's attention, the institutional repository interface might require enhancements as indicated in Foster and Gibbon's (2005) study. In deterring researchers further, Foster and Gibbons also noted that the promotional language that institutional repository managers used was unfamiliar to the researchers, who, therefore, did not realize the benefit of submitting their work.

2.3.5 Advocacy and marketing

Advocacy for institutional repositories could be done at different stages; either internally within the institution when the repository is being introduced or by an external body when promoting repositories to institutions.

In the United Kingdom (UK), the Joint Information Systems Committee (JISC) served as the external IR advocacy body that provided funds for a period of seven years (November 2006 to July 2013), to establish a support infrastructure (the Repositories Support Project – RSP) to assist all Higher Education Institutions (HEIs) to establish institutional repositories (Pennock & Lewis, 2007). Pennock and Lewis noted that before then, there were about 69 institutional repositories in the UK; and by January 2014, the Registry of Open Access Repositories reported 252 institutional repositories in the UK. RSP provided extensive support to HEIs in England and Wales, and a few others abroad. The principle aim was to increase the pace of institutional adoption of repositories by providing practical assistance and advice. The support entailed an outreach programme of advice and information, with support materials focused on four themes: technical (software selection and installation, technologies, metadata, interoperability), organizational (staffing, business requirements and incentives,

copyright clearance and digital rights management), repository management (policies, workflows, archiving and preservation), advocacy (advocating to different stakeholders and advising on advocacy within institutions). This was provided through a series of events, some of which were conducted in a summer school, a series of publications and consultancy visits. This equipped those who were to take charge of introducing and managing institutional repositories on what to do.

Internal repository advocacy programmes are best handled with a marketing plan that contains clear messages for the different stakeholders in the institution (Nabe, 2010). Advocacy for institutional repositories may first be directed at the institution administrators when they are being introduced, and then later marketed to all stakeholders in the institution for participation.

2.3.6 Institutional repository management models

Libraries have for long provided traditional services geared at supporting teaching and research in universities. The adoption and introduction of open access and repositories has presented a set of new services aimed at supporting the research dissemination of a university's scholarship, with the services categorised according to the kind of repository activities. Swan (2008) identified three categories of activity-related repository services in existence and below is a selection of some of them.

A) Repository services related to ingest activities:

   i) Digitisation services: digitising legacy material such as older journal articles and theses, and special collection material.

   ii) IPR/copyright advisory/information services: advising on rights issues for authors, readers and institutions/repositories.

   iii) Open Access advisory/information services: advising on issues around opening up research outputs of all types.

B) Repository services related to data-provision activities:

   i) Metadata creation services.

   ii) Metadata enhancement services.

C) Repository services developed in response to user needs:

i) Access and authentication services: systems that integrate repository content with institutional records and databases.

ii) Usage data services: providing feedback on repository usage (downloads, citations, etc.).

iii) Research monitoring and analysis services: tools that enable the analysis of research outputs from an institution, set of institutions or larger.

iv) Personalisation services: gathering information of specific interest to specific users.

v) Publishing services: peer review, copy-editing services and publishing services.

Libraries could provide a mixture of these repository services depending on the institutional needs, technical skills, financial capabilities, and the repository management models that are adopted. Armstrong (2014, p. 44) pointed out that "despite their discipline expertise, many professors do not have the time or experience to fully understand issues such as negotiating copyrights, evaluating journals, or using alternative publishing options". When publishing, many researchers aim at getting their manuscripts accepted, and thereafter, sign the associated publication agreements without analysing the policy statements provided. Armstrong further noted that for libraries to focus on the research dissemination mission, it is essential to "examine the needs of their local research community and find ways, often on an individual basis, to support them in sharing their scholarship" (2014, p. 45). Librarians "creating and utilizing management models that ensure the delivery of these types of IR services" could, therefore, provide the desirable infrastructure to engage more with the researchers and assist them throughout their scholarly communication life cycle (Armstrong, 2014, p. 43). Below are three repository management models based on Armstrong's (2014) findings.

A) The service oriented IR management model:

This model is based on all kinds of services that can be provided by an IR. For instance, if one of the objectives of the IR was to serve as the central intellectual management tool where

the memory of the university is archived, then the bibliographic records of the repository would serve to increase the discoverability of all the scholarship produced at a university. The kinds of policies developed for an IR also enable the provision of various kinds of services. For instance, if some of the content in the IR was not meant for open access but restricted access or delayed open access, then the policy options designed could enable repository staff to provide consultative services on time limited embargoes, intellectual property rights, copyright licenses and transfer agreements. Armstrong (2014, p. 46) noted that "developing policies that allow for more options and managing those services well, enables institutional repository staff to facilitate dissemination activities that are most appropriate" for various stakeholders and the university at large. Services initiated in response to specific needs, such as the creation of a database to track author and publisher data could enable repository staff to identify the university's publishing trends and answer various kinds of questions, for instance, how accessible is the university's "work once it has been published, and what strategies can the university develop to enable greater discovery. These types of questions are difficult to answer without a centralized service" (Armstrong, 2014, p. 46).

B) The mediated deposit IR management model:

This model entails identifying the university researchers' scholarship (from various sources such as CV's, citations in bibliographic databases, etc.) and archiving it in the IR on behalf of the authors. The activities involved in providing this service could include "reviewing the publisher's copyright policy, soliciting the author's permissions, obtaining the correct version of the publication, and uploading the document into the institutional repository" (Armstrong, 2014, p. 47). This model demands repository staff expertise in scholarly communication issues, good interpersonal and communication skills, patience and good customer care to be able to continuously engage with authors and publishers, soliciting for permissions to archive eligible publications in the repository. For efficiency, it may also require having a central database for tracking citations, publisher copyright policies, and author permission.

C) The mass customization IR management model:

This model embraces the provision of personalised or individualized services in terms of author/researcher webpages within the IR and the ability to extend additional research dissemination services such as feedback on usage data of an individual researcher's

publications. Armstrong (2014, p. 48) noted that "being able to provide customizations on a large scale may require the adoption of technologies that can support such individualized service".

2.4 Challenges in developing and managing institutional repositories

Shearer (2006), with reference to a survey by the Canadian Association of Research Libraries (CARL), reported the challenges of implementing institutional repositories in Canada. Self-archiving by the authors themselves was noted as a rare instance, with most of the work deposited in the repository by staff in the library. However, despite that provision, faculty participation in content recruitment was still the biggest challenge, just like it was elsewhere as evidenced in various studies (Mackie, 2004; Foster & Gibbons, 2005). The staffing in the repositories was also at a minimal level, with on average less than one full-time employee per repository.

The collection policies in Canadian repositories varied from repository to repository. Some repositories were used as publishing platforms for journal issues, others allowed authors to restrict access to the content, others collected only metadata records without links to the full-text, whereas others collected materials that were not scholarly in nature. The different collection policies in CARL disrupted the harvesting service. To the rest of the world, the expected phenomenon of open access in institutional repositories was lost, with more disappointments when accessing information due to lack of freely available full-texts from repositories.

According to the Global Open Access Portal (GOAP), of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the main factors that limited the Open Access Movement in Uganda included lack of open access policies, limited awareness among the stakeholders, poor ICT infrastructure and lack of skilled staff to manage open access projects. In Kenya, the barriers to open access included lack of policy issues by the government, lack of facilities by the institutions, lack of technical expertise coupled with inadequate staffing and lack of sensitisation. In Tanzania, the potential barriers to open access listed by GOAP were low awareness about open access initiatives, misperceptions about open access, and lack of institutional and national advocacy campaigns on open access. Besides the above general limitations to open access mainly based on individual

observations, the challenges encountered by universities in East Africa in managing institutional repositories were hardly documented.

Ahmed and Al-Baridi (2012), who gave an overview of institutional repository developments in the Arabian Gulf Region, found out that lack of awareness about the need for establishing institutional repositories and the advantages of open access publishing were some of the reasons why there were a few institutional repositories in the region.

Limited budgeting and funding of repository activities were also noted as a general challenge in managing institutional repositories in the developing world. Most repositories were implemented by libraries, and after obtaining the initial repository setup requirements like servers and scanners, operating on freely downloadable software, the rest of the activities were considered manageable without funding. Therefore, there were often no operational budgets for running the repository activities such as the production of publicity materials, maintenance of the equipment, identifying additional staff to help in the marketing of the repository and content collection or digitization where there was retrospective scanning of materials for the repository. Thomas (2007) noted that institutional repositories were falsely considered as free and cheap to operate. Estimates from a survey conducted by the Association of Research Libraries (ARL) in 2006 revealed that the average start-up cost was about $182,500 and the average operation cost was $113,500 (Bailey, 2006, p.21), which was in no way affordable in Sub-Saharan Africa. The whole process was considered cheap to operate with no funding dedicated to any activity. The lack of devoted funds to institutional repository projects had limited the importance attached to institutional repositories within the institution and, therefore, their expected growth. Failure to incorporate self-archiving in the institution's workflow was also noted as a factor limiting recruitment of content. Smart (2019) described how workflows were used to improve content recruitment at the Florida State University (FSU) in the USA:

> Following the adoption of the OA policy, a small team of librarians in the Office of Digital Research and Scholarship developed a plan to address the low faculty self-submission rates of journal publications to the repository. This plan pairs a metadata harvesting workflow and semi-automated metadata record creation with outreach emails to researchers about recent publications, providing them with information regarding the OA policy and the opportunity to upload their manuscript to the IR (2019, p.1).

2.5 Perception of institutional repositories

The concept of institutional repositories had been perceived differently at various stages of its development. At the initiation of repositories in 2000 with EPrints from the University of Southampton and in 2002 with DSpace from the Massachusetts Institute of Technology and Hewlett-Packard, the proponents of open access strongly felt that institutional repositories would later serve as a substitute to the traditional journals (Shreeves & Cragin, 2008; Ware, 2004). With the focus on open access, many saw institutional repositories as a way for libraries to push back against the serials crisis (Prosser, 2003). This perception had however, gradually changed, with the traditional journal publishers adjusting to the existing situation and the open access advocates acknowledging institutional repositories as a complementary service other than a substitute. Ware (2004) believed that institutional repositories would fulfill a real and valuable function in supporting scholarly communication, research, and teaching but that this function would be complementary to scholarly publishing rather than in conflict with it.

Chan (2004) noted that "Some proponents of the open access movement saw the institutional repository or the open-access archive as the most cost effective and immediate route to providing maximal access to the results of publicly funded research, thereby maximizing the potential research impact of those publications."

Some research libraries envisioned institutional repositories as a means to expand the amount and diversity of scholarly material that was collected and preserved, thus enhancing teaching, learning, and research at the host institution and beyond (McCord, 2003).

Some saw institutional repositories as a way to enhance an institution's prestige or branding by showcasing its faculty's research output (Crow, 2002). Similarly, others saw them as a means to promote the institution by showcasing its research and scholarship, or as a means to provide management and preservation of research and other material produced at an institution; yet others saw institutional repositories as an essential infrastructure for the reform of the entire enterprise of scholarly communication and publishing (Guedon, 2003). How institutional repositories were perceived in East Africa and whether they were enabling open access were some of the issues investigated in this study.

2.6 Open access

The concept "open access" emerged due to the restrictive access to scholarly journal literature generated by commercial publishing houses who charged subscription fees, license fees, and pay-per-view fees to the end-user of this information. The concept had been advocated for by a number of groups (the Budapest Open Access Initiative – BOAI, February 14, 2002, the Bethesda statement on open access publishing, April 11, 2003; and the Berlin declaration on open access to knowledge in the Sciences and Humanities, October 22, 2003), coming up with various definitions.

The BOAI meeting proposed two strategies to achieve the open access goal and these strategies had been adopted worldwide: (1) Self-archiving (the practice of depositing a copy of a publication, i.e. the author version of a peer reviewed article into an open electronic archive, which may be an institutional or subject-based repository. This was also known as the Green route to open access) and (2) Open access journals (a new generation of peer-reviewed journals that did not charge subscription or access fees but provided their publications free of charge to the public via the Internet. These journals used other methods for covering their expenses. This strategy was also known as the Gold route to open access). Journals providing open access differed by the degree of openness offered. The Direct open access journals had no limitations on access to articles. The Delayed open access journals offered open access to non-subscribers after a certain period of time (like six to twelve months after publication). The Hybrid open access journals offered articles free after an author or grant or institution paid for the text to be free in an otherwise subscription-based journal (Roach & Gainer, 2013). Considering the views of the BOAI meeting, these two strategies (self-archiving and open access journals) were regarded as direct and effective means of enabling open access that were within the reach of the scholars themselves. As far as librarianship was concerned, open access emerged as a topic strongly associated with the "serials crisis", which impacted the budgets of libraries in general, but affecting those in economically weaker countries like in Africa more (Haider, 2007). As far as beneficiaries were concerned, Haider further argued that open access made more sense to those researchers and institutions, who for financial reasons could not afford to purchase scholarly journals, and these were mainly in the developing world. The main disadvantage with open access journals was when Article Processing Charges – APC were enforced and unaffordable by researchers in the developing world.

Open access offers a wide range of benefits to different categories of users, such as researchers, librarians, policy makers, practitioners, educators, businesses, professionals, students and the general public. A number of authors have elaborated the benefits/advantages of open access and/or institutional repositories (ElSabry, 2017; Gibbons, 2004; Proudman, 2007; Shampa, 2012; Swan, 2008; Swan, Willmers & King, 2014; Waller & Morrison, 2004; Wasiwasi & Zaipuna, 2014), with some of the claims debated and contested. This study did not cover all these details; however, it was important to briefly point out some of the advantages for the benefit of the public that might read this dissertation. These include: increased visibility, information discovery and retrieval, usage and impact of research; easier and free access to, and wider dissemination of literature, which enhances the research process; means of managing an institutions scholarship by creating a complete record of their research activities and preserved access to research.

Swan (2008, p. 2) enumerated some of the functions that digital repositories play as follows:

i) To open up and offer the outputs of the institution or community to the world.

ii) To impact on and influence developments by maximising the visibility of outputs and providing the greatest possible chance of enhanced impact as a result.

iii) To showcase and sell the institution to interested constituencies – prospective staff, prospective students and other stakeholders.

iv) To collect and curate digital outputs (or inputs, in the case of special collections).

v) To manage and measure research and teaching activities.

vi) To provide and promote a workspace for work-in-progress, and for collaborative or large-scale projects.

vii) To facilitate and further the development and sharing of digital teaching materials and aids.

viii) To support and sustain student endeavours, including providing access to theses and dissertations and providing a location for the development of eportfolios.

As a result of the broad spectrum of information made available for researchers and any other users to access, a number of policies were enacted at different levels to enable appropriate

action and the smooth flow of information. Some of these policies are covered in the section below.

2.7 Open access policies

Open access policies were one of the recommendations that were drawn during the tenth anniversary of the BOAI (BOAI, 2012). Policies play a critical role in the progress of open access activities. They provide procedural guidelines of what is expected of the authors. Open access policies range from voluntary (where authors/researchers are requested to self-archive or make their work open access) to mandatory (where authors/researchers are required to self-archive or make their work open access). Open access policies are instituted at different levels. The categories include funder open access policies (provided by organisations supporting research), national open access policies (provided by different countries), institutional open access policies (provided by individual institutions like universities), repository open access policies (spelt out by individual repositories i.e. the policy guidelines for the repository itself), and the publisher open access policies (which spell out the copyright and self-archiving rights of authors). Xia, et al (2012) argued that in many institutional repositories, mandatory policies were used as a means of accumulating items in the repository.

Fox and Hanlon (2015, p. 708) observed that "Ultimately, from a national and organisational infrastructure viewpoint, OA needed the support of policy makers at all levels. Without political leadership favouring OA attempts to contribute to the movement, it would remain isolated and experimental. The idea of accessing research information freely online had been embraced by a number of funding organizations, who had set up open access policies for the research that they funded. In the United Kingdom, which has always taken the lead in the global open access movement (Harnad, 2012), the seven Research Councils UK (RCUK) have had policies on open access since 2005. In their open access policy of 8th April 2013, RCUK had a preference for immediate open access (often offered through the Gold route to open access than the Green route). To achieve this goal, RCUK provided funds for the Article Processing Charges (APCs) under the Gold route to open access. For the Green route to open access, RCUKs policy allowed delays of up to six months for the Science, Technology, Engineering and Mathematics (STEM) disciplines and twelve months for the Arts, Humanities and Social Sciences disciplines. Where funds were not available for APCs, RCUK allowed an embargo of twelve months for the STEM disciplines and twenty-four

months for the Arts, Humanities and Social Sciences disciplines before a paper could be self-archived. This portion of the RCUK open access policy allowed a longer embargo than was stipulated in BOAI recommendations and this decision had already attracted publisher reactions on their Green route embargo durations to make the Gold route more attractive for the researchers. For instance, Emerald, a UK-based social science publisher had instituted a twenty-four months embargo where there was none previously (Poynder, 2013). This embargo period tallied directly with the requirements of the new RCUK open access policy. The RCUK's preference for the Gold route to open access and its increment in the embargo duration for the Green route to open access may have had negative implications for the rest of the world.

In the United States, the National Institutes of Health (NIH) – the world's biggest research funder, operated a mandatory open access policy where every researcher was required to self-archive in PubMed Central – a discipline-based repository or archive of biomedical research. Before the mandatory policy was introduced, NIH operated a voluntary open access policy which yielded less than 4% of the expected articles self-archived by authors in the first twelve months. When the mandatory policy was introduced, self-archiving rates went up to 60% of the expected articles, implying that when researchers were voluntarily left to decide whether to self-archive their work or not, very few responded positively (Swan & Chan, 2012).

In the developing world, funding bodies were not yet pronounced on open access issues. Organisations such as the Rockefeller Foundation, Carnegie Corporation of New York, SIDA, and NORAD/University of Bergen had been funding research in Uganda and had supported the development and growth of Makerere University's institutional repository (MakIR) and training of librarians, but there were no policies on open access being followed.

However, there was a growing momentum of establishing national open access policies worldwide, especially in the developed world. Nations were looking out for how to implement open access to enable public access to publicly funded research output. In Canada, the Open Access Working Group (OAWG), jointly created by the Canadian Association of Research Libraries (CARL) and the Canadian Research Knowledge Network (CRKN) was the one spearheading the national open access activities. In Europe, the "national open access and preservation policies in Europe: analysis of a questionnaire to the European Research Area Committee" report by the European Commission reported on the

national status of open access policies in a number of countries like Denmark, Sweden, Spain, France, Italy (mainly for thesis), and Norway which were implementing open access policies. In most countries around the world, however, open access policies were only operational at the institutional level.

Institutional open access policies spelt out how staff and students (i.e. for a university) were supposed to deposit scholarly information in the repository, what scholarly information to deposit and the procedures to follow when dealing with publishers (i.e. their policies and embargos). Most institutions that had mandatory policies registered them in ROARMAP (Registry of Open Access Repository Mandatory Archiving Policies). ROARMAP includes institutional, funder and thesis open access mandates.

Repository open access policies specify the operational procedures of the repository internally. Most institutions draft these out into reference documents for the easy running of the repository.

Publisher open access policies specified the copyright and self-archiving policies that a journal publisher allowed authors to follow. These were collectively provided on the SHERPA/RoMEO site, which specified whether self-archiving was allowed or not, and if it was allowed, which version of the article (pre-print, post-print, publisher's pdf) could be archived, where to archive, and the embargo period to follow if any. A number of organisations that support/fund research also provided open access policies. Research funder open access policies specified the conditions that researchers could fulfill so that the publications accruing from their funding could be provided as open access. They specified the conditions for open access publishing (i.e. whether a researcher should publish in an open access journal), open access archiving (i.e. where the publication should be deposited or self-archived), and data archiving (i.e. where the research data should be archived). These were collectively provided on the SHERPA/JULIET site.

2.8 Strategies for successful open access institutional repositories

"Implementing an institutional repository was not as simple as just installing repository software and making the repository accessible to its potential users" (Ferreira, Rodrigues, Baptista & Saraiva, 2008), it took a lot more for an institutional repository to be regarded as successful. A number of researchers have suggested frameworks and factors that could be

used to measure the success of institutional repositories, with a few agreements and some variations.

The first element of a successful IR could be the number of items in the IR, although numbers alone could mean anything from metadata only items, to archival items besides the scholarly items (open/restricted) that are of more interest in this study. Shearer (2003); Bell, Foster, and Gibbons (2005); Westell (2006); and Ferreira, Rodrigues, Baptista, and Saraiva (2008) regarded content recruitment as one of the critical success factors for IRs, while Blythe and Chachra (2005) qualified this by specifying that IRs were successful only when they achieve broad and voluntary participation by individuals in the communities they serve, which culminated to populating the IR.

Institutional and funding organisational mandates were also considered as one of the contributing success factors of IRs. In the institutional repositories great debate about mandates, Harnad and McGovern (2009) argued about factors that most often lead to increasing the number of items or populating the IR. Harnad presented cases where mandates had increased the deposit rates and amount of content in the IRs and concluded that the success of IRs was dependent on mandates; while McGovern, Proudman (2007) and Callan (2004) emphasized that mandates on their own were not sufficient in attaining deposits in IRs, but they could be supported with additional user-centred services, value-added infrastructural services, advocacy and promotion. An example where these strategies were applied is at the University of Minho, which developed a promotional plan that included designing value-added services for repository users, implementing a mandated deposit policy accompanied with a financial incentive to encourage self-archiving (Ferreira, Rodrigues, Baptista, & Saraiva, 2008). Proudman (2007, p. 63) noted that "repository services need to be developed to answer a researcher's real research interests or problems such as increasing research impact, visibility and access to material" in order to attract active participation towards populating the repository in addition to mandates; and in countries where mandates were difficult to enforce, other methods could be used to encourage researchers to deposit in IRs. Chavez, Crane, Sauer, Babeu, Packel, and Weaver (2007) also argued that services that added value to the content were what made a repository successful. To achieve IR success, Bankier, Foster and Wiley (2009) emphasised providing services that met faculty needs on faculty terms, with the librarians collaborating closely with faculty. However, using one factor alone might not be the best criteria of determining the success of repositories and that

is why other researchers had proposed frameworks with a number of factors considered as measures of IR success.

Westell (2006) proposed eight indicators for measuring the success of repositories by examining the websites of selected Canadian universities that were participating in the Canadian Association of Research Libraries Institutional Repositories project. The indicators were: mandate, integration with planning, funding model, relationship with digitisation centres, interoperability, measurement, promotion, and preservation strategy. Westell concluded that although a critical mass of content was the most important factor that showed how successful a repository was, content alone may not secure the repository from being marginalised; the amount of content had to be accompanied with the promotion of the service, interoperability and other factors.

Kim and Kim (2006) developed an IR evaluation model composed of four categorical factors with thirty-four indicators for use in South Korea's university system under a consortium called "dCollection" (Digital Collection). This was done by first designing a framework generated by reviewing literature on evaluation of both IRs and digital libraries; followed by the evaluation model based on the framework, generated by analysing six university IRs (five foreign and one domestic IR) well-known for IR management through a survey and interviews with IR experts, and lastly by pilot-testing the evaluation model against the dCollection system of four universities. The four broad evaluation categories were: Content; System and network; Use, users and submitters; Management and policy. Kim and Kim concluded that the proposed evaluation model could be used as a guide for universities setting up repositories or those that needed to vitalize their existing IRs.

Swan (2008) noted that repository services were one of the main keys to success for repositories, and explained the various service-oriented IR business models or ways of running a repository.

Proudman (2007) identified seventeen recommendations from six evaluative categories used to analyse six case studies drawn from European institutional repositories and noted that the recommendations could be used as strategies to improve the populating of repositories and their services. The evaluative categories used were: Policies, Organizational aspects, Mechanisms and influential factors for populating repositories, Services, Advocacy and communication, and Legal issues.

Thibodeau (2007) proposed a five dimensional framework for organizing information needed to evaluate the success of digital repositories based on the purpose the repository served and of the environment in which it operated, and these were: service, orientation, coverage, collaboration, and state. Each of these where elaborated as follows: Service meant the functionalities of the repository for the user community; Orientation meant whether the repository emphasized preservation of assets or the satisfaction of the demands of the user community; Coverage meant whether the repository aimed at preserving all or at least the noteworthy products of a given producer or set of producers or to build a collection best suited to the needs of its designated user community; Collaboration meant whether the repository operated in isolation or collaborated with other organizations in order to achieve success, and state meant a moderate consideration of the previous factors according to where the repository was in its development stage. Thibodeau was of the view that describing a repository in-line with these five-dimensions provided a contextualized criterion of how well a repository achieved its objectives, given its resources and constraints.

Each of the studies above focused on measuring the success of individual repositories and not across repositories. Thomas and McDonald (2008) noted that there was need to do both, that is, measure and compare repositories in order to demonstrate the significance or degree of success of an IR. To achieve effective evaluative frameworks for IRs, Thomas and McDonald suggested adopting many of the qualitative criteria explored by Westell (2006), Proudman (2007), Kim & Kim (2006), and others, and supplement them with repository-wide quantitative measurements borrowed from other statistics used by scholars and university administrators, some of which included:

- Scholarly impact of both individual digital documents and the repository overall;
- Comparisons of resource Inputs vs Outputs;
- Categorized total amount of content (e.g., published research gray literature);
- Correlated measures of productivity (e.g., number of faculty, number of deposits per scholar);
- Relationship and influence of local IR with disciplinary repositories, journals, etc.;

- Indicators and adjustments for overall organizational size and resources (Thomas & McDonald, 2008, p. 7).

In respect to this study, Johnson's (2002) definition of an institutional repository clearly indicated that a successful repository was one that had managed to collect most of the institutions' research and made it available as open access, and according to Xia and Sun (2007, p. 15) "the rate of full-text availability in an IR's content was a great indicator of the success of the IR." Most of the proposed indicators discussed in this section were geared at populating the repository; however, having most of the content in the IR as open access was the goal of the open access initiative and movement, and the focus of this study.

2.9 Studies related to the development of institutional repositories

There were some studies that had been done on institutional repositories though none of them addressed the issue of managing institutional repositories and the extent to which open access to the content was being provided.

Campbell-Meier (2008) studied six case studies on institutional repository development and covered subject repositories as well, for which a comparison was made. Emphasis was placed on project management and assessment, with more of the institutional repository developer's voice captured. Knowing that institutional repositories started as library projects but expanded into campus-wide programmes, the involvement of the researchers or faculty should clearly be visible. This study investigated issues of managing institutional repositories, capturing the views of both the repository managers and the researchers who were key as far as what was contained in repositories was concerned.

Palmer, Teffeau and Newton (2008) assessed the approaches used in developing institutional repositories in three unique institutions, with the conclusion that there was no single path to follow, but enabling guidelines that could be learnt from other institutions, which in themselves were few. Although each university adopted a unique procedure depending on the prevailing conditions when developing institutional repositories, there was always something that others could learn from that experience, either positively or take heed not to make the same mistakes. This study assessed the prevailing conditions for institutional repository development and management in universities in East Africa, with the objective of identifying what could be proposed as enabling guidelines from best practices identified by

the study to assist future planners and implementers of institutional repositories and contribute more guidelines as there were few existing ones.

In Dulle's (2010) study, which investigated the factors affecting the adoption of open access in research activities within Tanzanian public universities, the objective was to enhance the use of this mode of scholarly communication within these institutions. The study revealed that the majority of policy makers and researchers were aware of the open access concept, but were users rather than disseminators of open access content. The study did not provide an appropriate pathway as to how institutions could ensure that researchers were participating in the provision of open access through institutional repositories. This study intended to propose strategies of how best repositories could be managed in universities in East Africa to enhance the provision of open access.

2.10 The research gap

Research-based studies so far carried out were mainly focused on the development of institutional repositories with almost none handling the management of institutional repositories, yet this was what constituted the provision of open access in repositories. Wanyenda (2015) acknowledged the fact that there was scant research-based evidence on the development and adoption of open access (OA) and institutional repositories (IRs) in Africa. Most of the articles on institutional repositories were a narration of how they were developed. Little was said about access to the content, except for Prost and Schopfel's (2014) study which explored the level of openness of institutional repositories.

Since most studies focused on how best they could get a repository up and running, with the researchers' needs hardly established through user needs assessments (Markey, Rieh, Jean, Kim, & Yakel, 2007), the issue of bridging the gap between the repository manager and the researcher as far as providing open access was concerned needed to be addressed for the efficient management of institutional repositories. Repanovici (2010) pointed out that most of the problems and barriers that hindered the initiation and implementation of repositories were the attitudes of the researchers towards open access to information and the agreement of archiving the researchers' publications in the repository. The researchers' participation in the activities of the institutional repository, therefore, needed to be investigated.

Nabe's (2010) how-to-do-it manual on managing institutional repositories provided practical guidelines, with examples based in the developed world, which could be applicable in the

developing world, but needed actual studies to illustrate what actually happened, other than only trying to relate issues.

Limited prior research studies on the topic of managing institutional repositories were encountered, with much of what was available being descriptions of how repositories had been developed.

Since institutional repositories were still being developed in the developing countries and having noted that there were not such many studies on the management of institutional repositories, this study sought to provide such guidance for those initiating repositories in universities, especially in East Africa.

There were also a few studies that addressed the concept of open access in East Africa. Three of such studies included one in Kenya by Wanyenda (2015), who evaluated the state of institutional repositories in Kenya, specifically reviewing the content types, the policies and the usage of the repositories, and two in Tanzania, both of which investigated the factors affecting the adoption of open access in Tanzanian public universities (Dulle, 2010), and in Tanzanian health sciences universities (Lwoga & Questier, 2014).

On a world perspective, Prost and Schopfel's (2014) work established that a number of the 25 institutional repositories that they surveyed from the Directory of Open Access Repositories were either with metadata without full-text, metadata with full-text only for authorized users, and items that were under embargo or that were restricted to on-campus access. In other words, these repositories were not as open as expected by the Budapest Open Access Initiatives standards. Prost and Schopfel's study however, did not establish why these repositories were not fully open access, other than pointing out that this would be explicitly clarified in each individual institution's open access policies.

Although it was ideally expected that institutional repositories would provide open access to the content they held, this was not the case in some of the repositories in universities in East Africa. A review of the websites of institutional repositories in universities in East Africa (by the current researcher) established similar findings to Prost and Schopfel's (2014) study. This prompted further investigation to establish this status quo. The question as to why there was limited open access in repositories in East Africa needed to be addressed so that other universities initiating repositories do not follow the current trend of providing metadata of their scholarly information in repositories, but endeavour to attach a freely available version

of the research for the public to download and use. In this study, an investigation of the factors affecting the provision of open access in institutional repositories in three universities in East Africa is reported.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

Before the process of how a research study is conducted is explained, it is important to describe the type of research that is being investigated, along with its attributes. Neuman (2011) noted that the objective of academic research was to try to find answers to theoretical questions within a specific field of study. According to Neuman, research can be classified in a number of dimensions (experimental versus non-experimental, case study versus cross-case research, or qualitative versus quantitative), with the many kinds of studies organised along five dimensions. "The dimensions include: (a) how we use a study's findings and its primary audience (basic and applied research); (b) why we conduct a study (explore, describe and explain); (c) the number of cases and how we examine them (case study and across case research); (d) how we incorporate time (cross-sectional, longitudinal and case study); and (e) decide which techniques we deploy to gather data (quantitative, qualitative and mixed-methods)" (2011, p. 25). A research study can, therefore, be positioned along any of these dimensions or a combination of the dimensions to address specific research questions.

As explained later in this chapter, this study was conducted as a basic research that was both descriptive and exploratory, investigated across three case studies using a cross-sectional design and a mixed methods approach. Basic research is "designed to advance fundamental knowledge about how the world works and build/test theoretical explanations by focusing on the 'why' question. The scientific community is its primary audience" (Neuman, 2011, p. 26). The findings of basic research may not be practical in the short run, but later after knowledge has accumulated over a long time, with impact on many issues, policy areas, or areas of study. Descriptive research provides specific details about the situation, with a well-defined issue or 'how' question as was the case in this study (how could access to scholarly information in institutional repositories in East Africa be increased? How were the institutional repositories in the selected universities developed and managed?). Exploratory research is done when there is little known about the issue being addressed, with a focus on the 'what' question (To what extent were the researchers aware of the institutional repository and the concept of open access in the selected universities in East Africa? What challenges, if any, were limiting the provision of open access in institutional repositories in the selected

universities in East Africa? What strategies were appropriate to increase access to scholarly information in institutional repositories in the selected universities in East Africa?) Across-case research normally focuses on a few of the features being investigated (management of open access institutional repositories) with the objective of comparing these features across numerous cases (Kenyatta University, Makerere University, Muhimbili University of Health and Allied Sciences). Each case is treated as the carrier of the feature of interest.

As generally established and rightly stated by Dillon (2007), the nature of a research problem that is investigated and the kinds of questions that are asked drive the methodology selected for a study (methodology being the whole process of how a research study is conducted), guided by the broad philosophical assumptions of the discipline (Punch, 2006) that influence or inform the research. Walliman (2006) noted that although research is a very practical subject, it is based on theoretical ideas that influence every stage of the process and researchers should bear in mind the thinking behind the various research methods. Williams and May (1996) explained that philosophy was concerned with knowing the kinds of things that exist in the world and what our warrant for knowing them was, while research focused upon their knowable properties. Williams and May further noted that philosophical assumptions were, therefore, the explicit, or implicit, starting point for research. Creswell (2014) pointed out that although philosophical ideas were often concealed in theory, they still influenced research in practice. Awareness about philosophical approaches helps in the making of "informed decisions about the type of study to conduct" (Neuman, 2011, p. 121).

Neuman (2011, p. 94) also noted that each of the philosophical approaches was "associated with different social theories and diverse research techniques"; they answered "basic questions about research differently" and studying the same topic from any of these approaches meant "going about it differently" (2014, p. 120). This implied that "what you try to accomplish when you do research will vary with the approach you choose" (Neuman, 2011, p. 121). The various research techniques (such as sampling, interviewing, participant observation, etc.) also had a background based on assumptions and ideas from the philosophical approaches.

Expounding the broad philosophical assumptions, therefore, helps in explaining the research approach, methods and techniques that are appropriate for a research study. In this chapter, therefore, the broad research philosophical assumption(s) (pragmatism), approache(s) (concurrent mixed-methods) and designs (case study and cross-sectional) were highlighted in

order to guide the justification of the specific research methods (survey, interview and document review) used in response to the research questions addressed in this doctoral research. It also entails details of the area of study, the study population, computation of the sample sizes and the sampling strategies used. The data collection methods, data analysis and interpretation techniques used, the data quality control measures, the ethical issues, the limitations of the study and how they were minimised were also elaborated.

3.1 Philosophical assumptions:

With reference to Creswell (2007), philosophical assumptions "consist of a stance towards the nature of reality (ontology), how the researcher knows what he or she knows (epistemology) and the methods used in the process (methodology)" (p. 16–17); "and the language of research (rhetoric)" (Creswell & Clark, 2011, p. 41). Creswell and Clark (2011) pointed out that the way the philosophical assumptions were discussed in the literature was to bring out the similarities and differences in relation to the stance elaborated as noted below:

> All four worldviews have common elements but take different stances on these elements. Worldviews differ in the nature of reality (ontology), how we gain knowledge of what we know (epistemology), the role values play in research (axiology), the process of research (methodology) and the language of research (rhetoric). These different stances influence how researchers conduct and report their inquiries (Creswell & Clark, 2011, p. 41).

Philosophical assumptions seem to have been an earlier term that now refers to paradigms (Blaikie, 2010; Mertens, 2005), with these two terms used synonymously (Creswell & Clark, 2011). The relationship between philosophical assumptions and paradigms was clarified by Neuman (2011), who noted that philosophical approaches were "similar to a research program, research tradition, or scientific paradigm", with a paradigm having been "an idea made famous by Thomas Kuhn (1970)" to mean "a basic orientation to theory and research" (p. 96) or "a set of generalizations, beliefs, and values of a community of specialists" (Creswell & Clark, 2011, p. 39).

According to Neuman (2011), there are three philosophical approaches in the social sciences (i.e. positivist social science, interpretive social science, and critical social science). Creswell and Clark (2011), however, associated the philosophical approaches (referred to as philosophical worldviews) with the broad research approaches and noted that post-positivism

was often allied with quantitative researchers; constructivism, typically allied with qualitative researchers; transformative world views, often focused on the need for social justice and the pursuit of human rights; while pragmatism was typically allied with mixed methods researchers.

The stance used to explain the philosophical assumptions in this study was based on the methodological perspective, that is, "the process of research" (Creswell & Clark, 2011, p. 41) or "the methods used in the process (methodology)" (Creswell, 2007, p. 17). Pragmatism (a worldview where both qualitative and quantitative data is collected and mixed at various stages) having been the philosophical assumption selected in this study, the research process involved (using both deductive and inductive thinking) working from the top-down by using a theory/theories that guided the kind of data gathered (as the postpositivist researcher); and working from the bottom-up, using the participants' views to build themes (as the constructivist researcher).

As explained later in this chapter, this study used the mixed methods research approach. Creswell and Clark (2011) do not just explain the philosophical approaches in general, but go further and respond to a question that had "occupied the attention of mixed methods researchers for some time" (p. 43), that is, "which worldview(s) best fit(s) a mixed methods study?" (p. 43). Having noted that pragmatism was "typically associated with mixed methods research" (Creswell & Clark, 2011, p. 41), it was further elaborated to show this relationship in terms of this study.

3.1.1 Justification for using pragmatism as the philosophical approach in this study

Creswell and Clark (2011) pointed out that pragmatism was oriented towards what actually happens in the real world, coined as the "real-world practice", with a focus "on the consequences of research, on the primary importance of the question asked rather than the methods, and on the use of multiple methods of data collection to inform the problems under study" (p. 41). This concurs with what Hands (2018) noted as the research question and purpose taking precedent over the paradigm and methodology of a study. In this study, the main research question "how could access to scholarly information in institutional repositories in East Africa be increased?" was the real world practical issue addressed, aimed at proposing strategies of solving the problem, with multiple ways of addressing the issue embraced as stipulated in the pragmatic philosophy.

3.2 Research approaches:

There are two broad approaches (sometimes referred to as strategies) to doing research, that is, quantitative and qualitative, and a third one (mixed methods) that combines the characteristics of both quantitative and qualitative approaches or applies methods used in both approaches (Creswell, 2014). Patton (2002) noted that the difference between the two broad research approaches (quantitative and qualitative) were better captured in the different logics that undergirded the sampling methods used or as Walliman (2006) puts it, by the simple distinction in the unit of measurement or description while collecting and analysing data. While explaining the two approaches, Walliman further noted that quantitative techniques relied on collecting data that was numerically based and amenable to such analytical methods as statistical correlations, often in relation to hypothesis testing; while qualitative techniques relied more on language and the interpretation of its meaning, with data collection methods closely involving the researcher in person and a creative process of theory development rather than testing.

Bryman (2012) specified the fundamental differences between quantitative and qualitative research approaches using three characteristics: 1) The way of reasoning in relation to the role of theory in research (deductive; testing of theory for quantitative and inductive; generation of theory for qualitative); 2) Epistemology (positivism for quantitative and individual interpretation for qualitative); and 3) Ontology (objectivism for quantitative and constructionism for qualitative) but cautioned researchers about a too dogmatic distinction between the approaches, stipulating that:

> "… quantitative and qualitative research represent different research strategies and that each carries with it striking differences in terms of the role of theory, epistemological issues, and ontological concerns. However, the distinction is not a hard-and-fast one: studies that have the broad characteristics of one research strategy may have a characteristic of the other" (Bryman, 2012, p. 37).

Walliman (2006) also clarified that these distinctions were useful in describing and understanding social research, but were not to be seen as mutually exclusive, but rather as polarizations, knowing that there were instances where studies did not conform to all of the conditions listed by Bryman and/or combined the two approaches, usually to examine different aspects of a research problem. Creswell (2014) explained that combining methods

used in the two broad research approaches (quantitative and qualitative) had opened an avenue for a new and third research approach known as “mixed methods” or “blended methods”. The general assumption while using mixed methods is that the "mixing" or “blending” of the data collection methods makes use of the strengths of each method and provides a stronger understanding of a problem or question than either method by itself, and in the process, also overcomes the limitations of each method (Bryman, 2012; Creswell, 2014). This assumption is also based on the technical version of the debate about quantitative and qualitative research.

Debating on the ‘mixing’ assumption, Sale, Lohfeld and Brazil (2002) argued that since the philosophical assumptions on which quantitative and qualitative methods were founded were different, combining the two methods for cross-validation or triangulation purposes may not be the best reasons, but rather for complementary purposes. The grounds for this argument were that “based on their paradigmatic assumptions, the two methods do not study the same phenomena” (p. 44). They further explained that, although the two research approaches were incommensurate, it “does not mean that multiple methods cannot be combined in a single study if it is done for complementary purposes” (p. 50). Emphasis, however, has to be put on the distinction of the specific phenomenon examined by each method in the mixed-methods study, which differs from “merely using the strengths of each method to bolster the weaknesses of the other(s), or capturing various aspects of the same phenomena” (p. 50).

Mixed methods being a new approach to doing research has gone through five developmental stages: 1) A formative period; 2) A paradigm debate period; 3) A procedural development period; 4) An advocacy and expansion period; and 5) “A reflective period that began around 2005 in which many authors assessed the state of mixed methods research, glimpsed into its future, and in some cases launched critiques of its state and direction” (Bryman, 2012, p. 215).

While determining the research approach used in this study, reference was made to the type of research questions derived from the objectives of this study. Objective one required details about the development and management of IRs leading to using the qualitative approach, while objective three required some numerical evidence, leading to using the quantitative approach. Objectives two, four and five required a combination of both qualitative and quantitative approaches leading to using the third research approach (mixed methods) for the whole study instead of the traditional triangulation of methods. Before an account of the

research approach (mixed methods) used in this doctoral study is provided, below is a brief review of research approaches used in PhD studies that focused on open access and institutional repositories.

3.2.1 Research approaches used in open access and institutional repository studies:

The research approaches used in the open access studies reviewed in this section follow the nature of research questions investigated in each case. For instance, although Moller (2006) did not explicitly pronounce the research approach used in her PhD study on "the case for open access publishing, with special reference to open access journals and their prospects in South Africa"; the main research question was "What is the feasibility of the widespread uptake of open access journals as a publication channel within South Africa?" According to de Vaus (2006) and Punch (2006) 'what-questions' are more descriptive in nature and in responding to this research question, Moller used three surveys directed at three different categories of respondents with most of the questions being quantitative in nature, thus, inclining the research approach more to the quantitative-side.

Kingsley (2008), on the other hand, took on a qualitative research approach using the grounded theory method while investigating the effect of scholarly communication practices on engagement with open access in three disciplines in Australian Universities. Kingsley explored university researchers' behaviour and experience with scholarly publication using a broad question that interrogated 'how' the communication practices between researchers affected the uptake of open access scholarly dissemination in Australia. According to de Vaus (2006) and Punch (2006) 'how-questions' are more explanatory in nature, and Kingsley, using the grounded theory method explored this study qualitatively.

Kennan's (2008) PhD study was on: "Reassembling scholarly publishing: Open access, institutional repositories and the process of change". The main research question had both the 'how' and 'why' statements, followed by a specific 'what' question as re-stated here: (a) "How and why is open access reassembling scholarly publishing?" (b) "What role does introducing an open access institutional repository to researchers play in this reassembly?" According to Punch (2006), such studies are both descriptive and explanatory; encompassing various techniques of data collection, which, Kennan achieved using triangulation of methods. To explore the research questions, however, the Actor-Network Theory (ANT) was used as a theory and method; and although Kennan noted that the empirical material used to

illuminate the research question was largely of a qualitative nature, the research approach was more influenced by the ANT ontology and epistemology.

Dulle's (2010) PhD was "an analysis of open access scholarly communication in Tanzanian public universities" and the specific research questions contained 'what' and 'how' questions that qualified the study to have been both descriptive and explanatory as documented in his research purpose (p. 109). However, in justifying why a combination of quantitative and qualitative approaches were used in his study, Dulle noted that "quantitative approaches are best suited for explanatory research while qualitative approaches are more appropriate for descriptive oriented studies" (2010, p. 111), which contradicts Punch's (2006) accounts of what descriptive and explanatory studies imply. Although Walliman (2006) hinted on the fact that historical and descriptive approaches were predominantly qualitative forms of research, while analytical survey or correlation research were principally quantitative, the word 'descriptive' in this statement was not made on the basis of the research questions but in terms of the unit used to capture the data (form of artefacts, words or observations for qualitative approaches, and numbers for quantitative approaches). Punch (2006, p. 38) noted that "research, whether quantitative or qualitative, can be descriptive, or explanatory, or both"; and that the 'what-questions', the 'why- or how-questions' were what was used to differentiate between descriptive and explanatory studies. Punch clarified this statement as follows:

> A descriptive study asks, basically: 'What is the case or situation here?' An explanatory study asks, basically: 'Why is this the case or situation?' or 'How does (or did) this situation come about?' This description–explanation distinction applies to both quantitative and qualitative studies (2006, p. 38).

Therefore, neither one of them (description or explanation) is strictly inclined to quantitative or qualitative studies. However, since descriptive studies normally ask 'what-questions' they could turn out to be mostly quantitative in nature and not qualitative as stipulated in Dulle's (2010) study. Sometimes it is hard to categorise a study as stipulated by Kothari (2004):

> … in practice it is the most difficult task to put a particular study in a particular group, for a given research may have in it elements of two or more of the functions of different studies. It is only on the basis of its primary function that a study can be categorised either as an exploratory or descriptive or hypothesis-testing study and

> accordingly the choice of a research design may be made in case of a particular study (p. 33).

Alzahrani's (2010) PhD study was about "the role of editorial boards of scholarly journals on the green and the gold road to open access", with both 'what' and 'how' research questions "addressed through a survey of the editors and editorial board members of a sample of major scholarly journals" (p. 12). According to Punch (2006), the 'what' and 'how' research questions qualify this study to have been both descriptive and explanatory. However, the research approach used in Alzahrani's PhD study was not directly specified. The research tool used was a web-based questionnaire that had more of the closed-ended questions that tended to be more quantitative than qualitative in nature. This study, therefore, must have been inclined on the quantitative-side.

3.2.2 The research approach used in this study:

This study used the mixed methods research approach and the choice of this approach was based on the objectives and research questions, which necessitated applying both qualitative and quantitative research methods. The study was set out to investigate the causes of limited open access in institutional repositories in East Africa and how access to scholarly information in these repositories could be increased. Establishing causes of limited open access necessitated first describing how the institutional repositories were developed and how they were being managed, which would help in finding out the causal variables that guided the explanation of how open access could be increased. The study was, therefore, both descriptive and explanatory in nature. While explaining about prediction, correlation and causation, de Vaus (2006) pointed out that correlation may be observed, but causation has to be inferred, and because inferences may be fallible, it is important to minimize the chances of making incorrect or invalid inferences, which could be achieved by designing explanatory research appropriately. de Vaus further emphasized that "one of the fundamental purposes of research design in explanatory research is to avoid invalid inferences" (2006, p. 4).

The general assumption in this study was that the factors affecting access to information in the institutional repositories could have been managerial. This study was guided by the stakeholder theory that advocates for addressing the concerns of all stakeholders by involving them in the managerial roles. The stakeholders involved in the development and management of institutional repositories in this study were in relation to university settings

and identified as: the library, university administration, the information technology department, research coordinating bodies, research funding bodies, researchers, students and publishers. Based on the history of open access, institutional repositories have often been initiated by the library, with a broad content base solicited from various university departments, especially the academic departments with a focus on the researchers. It was not certain whether all the stakeholders in the study sites were involved in the IR activities. Therefore, only two of the main stakeholders (the library and researchers) were targeted, with the presumption that knowledge about the involvement of the various stakeholders in the institutional repository development and management issues would be obtained from them.

In the first objective, therefore, a need for an in-depth understanding of how the institutional repositories were developed and managed led to using a qualitative approach because the target audience of repository managers in the libraries was small and there were scanty studies in this area. In the second objective, an understanding of the researchers' awareness and participation in the institutional repositories' activities were explored using a quantitative approach because the target audience was big. Responses to the third and fourth objectives were incorporated in the research tools used for objectives one and two. This corroborates with one of Bryman's findings that "quantitative and qualitative research can each answer different research questions" (2012, p. 633); or what David and Sutton (2011, p. 295) referred to as using "different methods to explore different aspects of the research question". According to Creswell and Clark (2011 p. 10), mixed methods research may also be applied when "a need exists to enhance a study with a second method." In this study, the quantitative data collected from the researchers (the expected main contributors of content in the repository) enhanced the understanding of the strategies used in managing the repositories and why some of the challenges to providing open access were encountered. If only the qualitative approach had been used, with purposive sampling of researchers, the views expressed would have been rich but from a narrow base that would not have been representative enough. The study, therefore, adopted a mixed methods approach because using each of the qualitative and quantitative methods by themselves would not have adequately addressed the study problem, and there was also need to use the complementarity of both approaches to provide a better understanding of the research problem (Sale, Lohfeld & Brazil, 2002).

Within the mixed methods approach, the study specifically followed a concurrent strategy, with data collected in one phase, during which both quantitative and qualitative data were collected simultaneously. Creswell (2009) noted that this strategy could be used when a researcher chooses to utilize different methods to study different groups. In this study, the quantitative method was used to establish the researchers' awareness and participation in open access institutional repositories, while the qualitative study focused on establishing how institutional repositories were managed, for which interviews were directed to the repository managers. The qualitative and quantitative data complemented each other in this study by showing how awareness and marketing (aspects of management) of the repository were done from the researcher's perspective and what the researchers' perceptions of the institutional repository were.

3.3 Research designs:

Research designs are planned strategies of how to conduct research-based studies. They are "detailed plans of how the goals of the research will be achieved" (Ahuja, 2003, p. 120). Creswell (2014) considered research designs as the procedures of inquiry that provide a specific direction of how to conduct a study, while Bryman (2012) and Walliman (2006) referred to them as frameworks for the collection and analysis of data that subsequently indicate which research methods are appropriate for the study. Yin (2009, p. 24) defined a research design as "the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of study". Parahoo (1997, p. 142) simplified the research design definition as "a plan that describes how, when and where data are to be collected and analysed". Yin (2009) and de Vaus (2006) however, pointed out that research designs are not just work plans, because much as work plans provide details of how to complete a project, they flaw from the projects research design. "The main purpose of the design is to help to avoid the situation in which the evidence does not address the initial research questions" (Yin, 2009, p. 27), therefore, the role research designs play "is to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible" (de Vaus, 2006, p. 9). Researchers, therefore, need to first establish the type of evidence needed to answer a research question in order to be able to appropriately describe how that evidence will be collected and analysed, or how to design the research study. de Vaus further noted that "the way in which researchers develop research designs is fundamentally affected by whether the research question is descriptive or explanatory. It affects what information is

collected" (2006, p. 2). The nature of a research question being descriptive or explanatory and its effect on methodology was elaborated in the research approach section of this chapter. Below are the categories of research designs.

There are a wide range of research designs and various authors have categorized them differently; with Vanderstoep and Johnston (2009) grouping them according to where the study takes place (i.e. Laboratory, e.g. Experimental or Field, e.g. Survey) and how frequently the data is collected (i.e. once – one-shot-designs, e.g. Cross-sectional or multiple times, e.g. Longitudinal, Repeated Independent Samples Design). Bryman (2012) outlined five research designs considered in terms of the criteria for evaluating research findings, with three of them similar to Vanderstoep and Johnston's (2009) categorisation (experimental, cross-sectional, longitudinal), and the other two being the case study design and the comparative study design. Creswell (2014) limited the discussion of research designs to the frequently used forms of designs under the three broad research approaches as: surveys and experiments in quantitative research; narrative research, phenomenology, grounded theory, ethnography, and case studies in qualitative research; and convergent, explanatory sequential, and exploratory sequential designs in mixed methods research. Yin (2009) elaborated the five major research methods (i.e. experiments, surveys, archival analyses, histories, and case studies) while discussing the conditions used to guide researchers "when to use each method" (p.8), but these methods are closely linked to the research designs described by various authors. de Vaus (2006) categorised Spector's (1981) summarised version of many designs into four broad types of designs (experimental, longitudinal, cross-sectional and case study) that have sub-categories or variations within each type; and these are the most common designs referred to in research-based studies. de Vaus clarified the confusion between research design and research method by specifying that method is a mode of data collection while design is a logical structure of the inquiry; and "data for any design can be collected with any data collection method" (2006, p. 9). He further pointed out that it was also "erroneous to equate a particular research design with either quantitative or qualitative methods" (2006, p. 10); and concluded that "research design is not related to any particular method of collecting data or any particular type of data. Any research design can, in principle, use any type of data collection method and can use either quantitative or qualitative data" (2006, p. 16).

Applying Yin's (2009) definition of a research design, "the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of study", the key question that this study sought to answer was "how could access to scholarly information in institutional repositories in East Africa be increased?", with the assumption that the factors affecting access to information in the IRs could have been managerial. Some of the factors established in the literature reviewed were: policy issues, authors' self-archiving behaviours, copyright issues, limited awareness among the IR stakeholders, lack of mandates and government support for open access. The argument was that most of these factors were managerial linking the collection of data to all the IR managerial issues. Relating the key research question to the philosophical assumptions (pragmatism) in this study gave rise to using the methodological stance while investigating this problem, leading to examining the research approach (mixed methods) and research designs that were appropriate for this study. The section that follows elaborates each of the four broad research designs (experimental, longitudinal, cross-sectional and case study), with justification of why those used in this study were selected.

3.3.1 Experimental design

Under an experimental design, "the researcher manipulates conditions for some research participants but not others and then compares group responses to see whether doing so made a difference" (Neuman, 2011, p. 47). This study did not apply this design because the investigation was done in its natural setting without manipulating the participants or respondents.

3.3.2 Longitudinal design

A Longitudinal design is research that examines information from many units or cases across more than one point in time. In a longitudinal study, data is gathered from multiple time points and compared to explain the pace and pattern of change across several decades or specified time periods. This study was for academic purposes with a time limit to completion. The longitudinal design was, therefore, not an appropriate option to use.

3.3.3 Case study design

Neuman (2011, p. 42) defined case study research as "research that is an in-depth examination of an extensive amount of information about very few units or cases for one

period or across multiple periods of time." Management of institutional repositories was the issue that needed in-depth information since there were not many studies focused on this aspect of providing open access conducted in East Africa. According to Yin (2009, p. 4) "the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events-such as individual life cycles, small group behaviour, organisational and managerial processes, neighbourhood change, school performance, international relations, and the maturation of industries". This study, therefore, used the case study design, with a focus on the organisational and managerial processes of open access institutional repositories of three universities in East Africa.

3.3.4 Cross-sectional design

A cross-sectional design is where research data is collected at one point in time generating a kind of 'snapshot' of the issue being investigated. According to Neuman (2011, p. 44), "cross-sectional research can be exploratory, descriptive, or explanatory, but it is most consistent with a descriptive approach". The design allows for samples to be described and statistically analysed with patterns of relationships among variables established. The design was also suitable for comparing the same variable to different populations as was the case in this study that was conducted across three countries in East Africa. In other words, "the cross-sectional study design is very appropriate for describing a sample on one or more variables and for seeing connections between the variables" (Adler & Clark, 2011, p. 163).

3.4 Area of study

This study was conducted in three countries of East Africa, namely: Kenya, Tanzania, and Uganda. Although the researcher in this study was a Ugandan, the study extended into the East African region because universities with repositories registered in OpenDOAR in Uganda were limited to only one at the time the proposal for this study was written in 2013. The repositories in each country were selected purposefully, that is, the best performing repository (i.e. the one with the highest number of records by July 2014) was selected for this study. The number of records or amount of content in an IR was noted as one of the indicators of success (Bell, Foster & Gibbons, 2005; Ferreira, Rodrigues, Baptista & Saraiva, 2008; Shearer, 2003; Westell, 2006), and has been used to select IRs in a number of studies, some of which include Prost and Schopfel (2014) and Proudman (2007). Although the Directory of Open Access Repositories (OpenDOAR) website listed 12 repositories in Kenya,

5 in Tanzania and 2 in Uganda by July 2014, not all of them belonged to universities. Only repositories within university settings were considered for this study for purposes of comparing the findings. In Kenya, these included: University of Nairobi (with 69,247 records); Kenyatta University (with 8,855 records); Strathmore University (with 820 records); Pwani University (with 253 records); Dedan Kimathi University of Technology (with 90 records); and Jomo Kenyatta University of Agriculture and Technology (with 732 records). In Tanzania, the universities with repositories included: the Muhimbili University of Health and Allied Sciences (with 1,085 records), and the Open University of Tanzania (with 281 records). In Uganda, the university with a repository listed in OpenDOAR was Makerere University (with 3,015 records). The universities selected for this study were, therefore, the University of Nairobi in Kenya, Makerere University in Uganda, and the Muhimbili University of Health and Allied Sciences in Tanzania. The pilot study was conducted in the second best performing repository in Kenya, namely, Kenyatta University. Although the University of Nairobi was initially selected for this study, permission to conduct the study was not granted, therefore, the main study in Kenya was conducted in Kenyatta University.

3.4.1 Case study sites:

The sites for this study were: Kenyatta University in Kenya, Makerere University in Uganda and Muhimbili University of Health and Allied Sciences in Tanzania. These sites were physically visited to conduct face-to-face interviews, distribute and collect the paper-based self-administered questionnaires, and request for the information that was not available on the university websites.

Table 3.1: Case study sites (as of July 2014)

University	Number of Researcher's / Lecturer's[1]	Repository Type	Software	Number of items[2]
Kenyatta University	761	Institutional	DSpace	8,855
Makerere University	1,331	Institutional	DSpace	3,015
Muhimbili University of Health and Allied Sciences	255	Institutional	DSpace	281

[1]Based on documents collected from the universities

[2]Based on the repository websites as of July 2014

Kenyatta University and Makerere University were closely comparable in size and scholarship, while Muhimbili University of Health and Allied Sciences was a smaller university with a disciplinary bias in the health sciences. All sites had a main campus and other campuses in different locations. However, only the main campuses were visited. The repositories were initiated in different years and were at various stages of development; which also accounted for the level of repository management at each site.

3.5 Population of study

This study targeted the population of researchers and librarians, mainly those working on the repository in the three universities (Makerere University, Kenyatta University & Muhimbili University of Health and Allied Sciences) in East Africa. The key players in the quantitative study were the researchers, whose composition constituted those who were likely to participate in the institutional repository actively by way of submitting publications. The total number of the population of researchers from the level of a professor to an assistant lecturer (part-timers were excluded) in the three institutions was provided as follows: Makerere University – 1,331 (Makerere University Staff List – June 2014 email circular), Kenyatta University – 761 (Kenyatta University Calendar – 2014-2017) and Muhimbili University of Health and Allied Sciences – 255 (MUHAS Prospectus, 2014/2015). The total population of the quantitative study, therefore, was 2,347. The population of researchers in Kenyatta University where the pilot study was conducted was 761 (Kenyatta University Calendar – 2014-2017).

The population for the qualitative study comprised of the professional librarians (i.e. those with a Bachelor's degree in LIS and above) because they were the ones most often in charge of institutional repositories in universities. As there was no exact record of the professional librarians on the websites of the universities selected for the study, the information was gathered by directly inquiring from the university librarians/directors and/or in-charges of the selected universities. By 2014, Kenyatta University had 16 professional librarians working in the Main Library of the Main Campus, Makerere University had 36 professional librarians and Muhimbili University of Health and Allied Sciences had 7 professional librarians. In total, therefore, the population for the qualitative study was 59 professional librarians.

3.6 Sampling

3.6.1 Sample size

For the quantitative study, a sample size for the survey research was established as follows: According to Sarantakos (2005) and Wildemuth (2009), the sample size of a descriptive study could be determined using any simple formula provided the following parameters were known: the confidence interval (i.e. the amount of error that could be tolerated in the parameter estimate), the probability that the true value falls within the confidence interval that you desire, and the degree of variability in the attribute being measured. The formula used was derived from Cochran's (1977) formula for yielding representative samples for proportions in large populations.

The formula was given as follows:

$$SS = \frac{[Z^2 \times (p) \times (1 - p)]}{C^2}$$

Where:

SS = Sample Size
Z = Z-value (e.g. 1.96 for a 95 percent confidence level, i.e. the probability)
p = Percentage of population picking a choice, expressed as a decimal (i.e. the variability)
C = Confidence interval, expressed as a decimal (e.g. 0.05 = +/- 5% points)

To arrive at the estimated sample size, the formula was explained as follows:

For the confidence interval, since the researcher was using data from the sample to estimate characteristics in the population, it was appropriate to have error limits within which those parameters would lie. For instance, if it was required to know the average number of researchers "aware of self-archiving in institutional repositories", it would be okay to have a confidence interval that was 2% or 4% or 5% points above or below the estimate that was derived from the sample. Note that the lower the error limit, the higher the sample size. In this study, since the accuracy of the average number of researchers was not very critical, a confidence interval of 5% points was used. This meant that if the average number of researchers "aware of self-archiving in institutional repositories" in the sample was 200, then

the tolerated averages would lie between 190 and 210 (i.e. 200 minus 5% of 200 and 200 plus 5% of 200).

For the probability that the true value falls within the confidence interval that you desire, you could be 90% confident, 95% confident or 99% confident, again depending on how accurate you would want to be. In this study, a 95% confidence level was taken, for which a Z-value (1.96) was extracted from the tables and used in the computations.

For the variability expected within the population, the degree of variability in the attributes measured referred to the distribution of attributes in the population. It related to the standard of deviation. The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The less variable (more homogeneous) a population, the smaller the sample size (Israel, 2012). Note that a proportion of 50% indicates the greatest level of variability and because a proportion of 0.5 indicates the maximum variability in a population, it is often used in determining a more conservative sample size, that is, the sample size may be larger than if the true variability of the population attribute were used.

According to Godden (2004), the above sample size formula derives a value for an infinite population (i.e. where the population is greater than 50,000). To arrive at a sample size for a finite population (i.e. where the population is less than 50,000), the figure got from the above formula (SS) was adjusted as follows:

$$\text{New SS} = \frac{SS}{1 + [(SS - 1) / Pop]} \qquad \text{Where Pop = Finite Population}$$

The sample size for this study was therefore computed as follows:

$Z = 1.96, p = 0.5, C = 0.05$

$$SS = \frac{[1.96^2 \times (0.5) \times (1 - 0.5)]}{0.05^2} = 384.16 = 384$$

The adjusted estimated sample size was:

$$\text{New SS} = \frac{384}{1 + [(384 - 1) / 2{,}347]} = 330.127 = 330$$

However, to cater for the expected non-response rate while using questionnaires, a higher number of questionnaires (350) were distributed.

For the qualitative study, Patton (2002) noted that there were no specific rules for sample size other than selecting a sample depending on the purpose of the inquiry, what you want to know and a few other factors. Ritchie, Lewis, and El am (2003) however, noted that the sample units in qualitative studies were usually small in size. Since repositories are usually managed by one to two librarians and the purpose of the inquiry was to establish how the repositories were developed and managed, the sample size for the interviews was set at two per university to cater for the repository manager and content manager where applicable. Therefore, six informants were interviewed for the whole study.

3.6.2 Sampling strategy

Sampling is the procedure of selecting study participants from a specified population. Leary (2008, p. 115) noted that "researchers can rarely examine every individual in the population who is relevant to their interests. Instead, researchers collect data from a subset, or sample, of individuals in the population". Sampling can be done through two major ways: probability sampling, where every unit has an equal chance of being selected, and non-probability sampling where all the individuals in the population do not have equal chances of being selected.

For the quantitative study, probability sampling, specifically stratified and systematic random sampling were used. Stratified random sampling is used to "allow all population groups to be represented in the final sample" (Sarantakos, 2005 p. 158). In this study, each university constituted a stratum, from which a sub-sample was drawn. Systematic random sampling was used to achieve an even representation of all the respondents in the population (Kumar, 2005; Sarantakos, 2005). In this study, the sampling frame was arranged according to the different departments in the university, and then according to the academic position of the

researcher/lecturer within the university. This ensured that at least all categories of academic staff were represented in the selection.

Stratified sampling for the three universities was done as follows. For Makerere University, a sample of 187 [i.e. (1331/2347) x 330]; while for Kenyatta University, a sample of 107 [i.e. (761/2347) x 330]; and for Muhimbili University of Health and Allied Sciences, a sample of 35 [i.e. (255/2347) x 330] was used. According to Covey (2008), disciplinary culture was one of the factors that influenced self-archiving. In this study, the different universities constituted the first category of strata and then the different colleges/schools were also treated as strata in order to make comparisons as far as self-archiving in institutional repositories was concerned. Selection of respondents was done as follows: lists of all the lecturers were generated from each of the three university prospectuses and arranged according to the hierarchy of the academic staff per faculty/school/institute. Stratified samples were then computed (i.e. a proportionate percentage of each stratum was used (n/N) x 100) and the participants proportionately selected randomly as follows:

Within the first strata (which was made up of a university), systematic random sampling was used to select the individual participants. After obtaining the list of participants in each strata (university), a sampling fraction *7* was established (i.e. the target population divided by the strata population, *N/n*). For Makerere University, the sampling fraction was 7 (1331/187), for Kenyatta University, it was 7 (761/107), and for Muhimbili University of Health and Allied Sciences, it was 7 (255/35). Then a number was randomly selected between 1 and *7 (i.e. of each sampling frame in each university)*, and then each *7*th number was recorded after the selected number until the total sample *s* was reached for each university. The names in the sampling frame that corresponded to the selected numbers were then used as the sample participants (Sarantakos, 2005, p. 158).

For the qualitative study, non-probability sampling, specifically purposive sampling was used because the universities chosen had particular features (that is using DSpace and the best performing in the country in terms of the number of records in the repository). Extreme case sampling (that is the repositories with the highest number of records in the country) was used to select the institutional repositories because these repositories were the most active and steadily growing, thus worth learning from, as far as managing the repositories was concerned.

For the key informants, a purposive sampling method was used mainly because the selection depended on people's roles in relation to the concept of institutional repositories. In this case, the criterion of choice was based on the knowledge and expertise of the informants as was judged by the researcher, guided by the university librarians / directors / in-charges of the selected universities (Sarantakos, 2005, p. 164). Two informants (the repository manager and a librarian responsible for collecting content) were selected and interviewed in each of the three universities.

3.7 Data collection methods and instruments

Most of the research questions necessitated gleaning information by asking questions and this was done using the survey research method through questionnaires and interviews. The study involved collecting information about the researchers' awareness of and participation in institutional repository activities such as possession of post-prints for self-archiving. This objective was achieved using quantitative methods, specifically using the self-administered questionnaire. Leary (2008), noted that although behavioural researchers prefer observing behaviour directly, getting some information such as perceptions, feelings and attitudes require self-reporting, thus the need to also use the qualitative methods in this study, specifically the face-to-face interviews. To get background information about how repositories in the three universities were developed, available documents were reviewed, including policy documents that spelt out how the repository tasks were handled within each university. The online repository sites of each university were also observed and examined for the kind of access provided to the general public. The details of each of these methods were explained as follows:

3.7.1: Questionnaires:

A "questionnaire is a data collection instrument with questions and statements that are designed to solicit information from respondents" (Adler & Clark, 2011, p. 212). The questionnaire was used with the objective to solicit for views on open access and institutional repositories from a wide range of researchers in a structured and manageable form that was inexpensive and effective at the same time. This information would be of potential value in responding to the study objectives and future management of repositories. Questionnaires are a tool that the author had used before and required minimal additional training to develop and plan the analysis process independent of any third party.

3.7.2: Types of questionnaires and the selection criteria:

Wilkinson & Birmingham (2003) list three broad types of questionnaires: the mail survey, the group-administered questionnaire, and the household drop-off survey. These were all paper-based questionnaires (that can also be web-based), with the mail survey posted to the respondent's (physical) addresses, the group-administered questionnaire distributed to a sample of respondents that are naturally brought together for the purpose, and the household drop-off survey, which is a hybrid of the mail and the group administered survey. Elaborating on the household drop-off survey, Wilkinson and Birmingham (2003) pointed out that:

> Using this approach, the researcher delivers the questionnaire by hand to a member of an identified household for collection at some later date. Among the advantages of this approach are that the drop-off and subsequent collection affords the opportunity for those completing the instrument to clarify questions posed with the researcher (p. 10).

The author opted for the household drop-off survey instrument only that it was not delivered to households but to individuals in university offices. It could, therefore, be re-named as an office drop-off paper-based survey delivered to the respondents with the help of trained research assistants who were provided with the list of potential respondents generated from each university's academic staff lists in the university prospectuses using stratified and systematic random sampling methods.

Questionnaires provide an easy way to question a large number of cases covering large geographical areas (Walliman, 2006), and can be used to collect both quantitative and qualitative data embedded in a mixed methods study. The office drop-off paper-based questionnaire was chosen for a number of reasons, despite knowing the advantages and ease of using web-based questionnaires. Systematic random sampling had been used in selecting the potential respondents of the questionnaire with the sampling method enabling representativeness of all categories of the researchers by rank and discipline. Responses from web-based questionnaires can be biased to only those willing to participate and these may not be as representative as required. Using research assistants to drop-off and later collect the filled questionnaires gave the process a human touch and the respondent feeling personally involved in the study, with personal persuasion and reminders that ensured a high response

rate (Walliman, 2006) unlike the web-based questionnaire where follow-up e-mail reminders can be fruitless.

3.7.3 The self-administered questionnaire for the quantitative data

The quantitative data was collected using a self-administered questionnaire distributed to the researchers in their offices at the three universities in Kenya, Tanzania, and Uganda, with the help of research assistants. This method was preferred because the respondents were literate and could easily be reached on appointment to deliver and collect the questionnaires. The questionnaire was also a low-cost tool to administer to a big sample within a specified period of time. The research assistants were provided with the sampling frames of each university arranged by departments in each school and rank of the researcher, with the names of the respondents highlighted. Information about researchers who were on leave or away was not included in the sampling frames that were used to select respondents, requiring replacing those that were completely not available during the data collection period. Replacements were however, done in line with the gender and rank of the unavailable, and the researcher before/next on the list, creating a slight deviation from the systematic random sampling order, but maintaining the representativeness of the method used. Researchers at the same rank to those selected in the sample (but did not respond by returning the questionnaire) were also later selected and the (additional 37) questionnaires (to the sample size) distributed to them purposely to cater for the known nonresponse rate of the questionnaire tool. Therefore, the questionnaires distributed were more than the sample size in each university, except at Makerere University where only the sampled number (187) was distributed, with the researcher vigorously following up on each questionnaire to ensure that it was filled and returned. At Kenyatta University where the researcher relied mainly on research assistants, and the experience from the pilot study (where the sample size distributed (107) yielded 42% response rate), to obtain at least 50% of the sample, 110 questionnaires were distributed instead of 107. The Muhimbili University of Health and Allied Sciences being a smaller university compared to Makerere and Kenyatta universities, the researcher targeted obtaining 100% of the sample (35 respondents) and therefore distributed questionnaires that were twice the sample (70 questionnaires).

The questionnaire method was used because of its ability to reach “a large and geographically dispersed community at a relatively low cost” (Pickard, 2013, p. 207). A sample of 330 researchers was targeted (with a total of 367 questionnaires distributed) and this sample was

dispersed in three universities, in three countries. However, distributing the self-administered questionnaires to the researchers and making appointments to pick the filled questionnaires later enabled the collection of 183 questionnaires (55.5%) that were used in the analysis of data for this study. This was done between November 2014 and March 2015. The sample, distributed and returned questionnaires in each university were as follows: At Makerere University the sample was 187, the distributed questionnaires were 187 and the filled and returned questionnaires were 89 (47.6% of the sample). At Kenyatta University the sample was 107, the distributed questionnaires were 110 and the filled and returned questionnaires were 57 (53.3% of the sample). At the Muhimbili University of Health and Allied Sciences, the sample was 35, the distributed questionnaires were 70 and the filled and returned questionnaires were 37 (106% of the sample).

The questionnaire was composed of both open-ended and closed-ended questions. The open-ended questions were included to discover what the researchers knew about open access institutional repositories without pre-empting the answers in closed-ended questions. This gave an insight beyond the known facts.

While questionnaires are relatively easy to organize, collect data from a large sample and code for analysis, they have limitations when it comes to collecting details that may require probing for further information. Walliman (2006, p. 91) noted that "the use of interviews to question samples of people is a very flexible tool with a wide range of applications" and can be used to collect views and opinions from experts in the field being studied. This study had some qualitative research questions that necessitated the use of interviews.

3.7.4: Interviews:

Structured interviews are a data collection method in which an interviewer reads a standardized list of questions to the respondent and records the respondent's answers (Adler & Clark, 2011, p. 212). The author was a novice at interviewing and, therefore, chose to use standardized open-ended interviews (Patton, 2002) or structured interviews (Wilkinson & Birmingham, 2003), with a schedule of key questions, most of which were predetermined to avoid missing important information during the interview process. The flexibility of the interview research technique allowed the rephrasing of questions whenever the interviewer noticed that a question had not been properly understood. The questions were directed to the repository managers and content collectors, and asked in a similar sequence, except for

instances where the questions did not apply to the content collectors. The interviews were audio-recorded and later transcribed for analysis.

3.7.5 The face-to-face structured interviews for the qualitative data

Interviews are more suited for collecting in-depth information about a specified topic, and face-to-face interviews, in particular, allowed the researcher to keep the interviewee focused and on track to completion, with less technological distractions. Face-to-face interviews were, therefore, conducted with six librarians, two from each of the three universities in East Africa (that is, the repository managers and content collectors) to establish how institutional repositories were developed and managed. Given the history of institutional repositories, most of them had been managed by one or two individuals, explaining why a few informants were selected. Standardized open-ended interviews as described by Patton (2002), with specific questions were asked to all the interviewees in a similar sequence, except for instances where the questions did not apply to the content collectors. The informants narrated how the institutional repositories were developed, with a description of how they were managed, handled under specific questions on staffing, budgeting, marketing, and policy formulation and implementation.

After the researcher had been granted permission to conduct this study in each of the three universities, the researcher consulted the university librarians about the persons in charge of managing the institutional repositories. The informants were therefore selected with the guidance of the university librarians.

The interviews were voice recorded after the informants' consenting, except for one university where they declined from being recorded.

3.7.6 Document review

"Document review is a way of collecting data by reviewing existing documents." (Evaluation Research Team, 2009, p. 1). Open access and institutional repositories being relatively new concepts, the available relevant literature, much of which was online provided the required background information. Both documents and institutional repository websites were analysed to provide the basis on which the level of open access was ascertained. To establish the level of open access of the institutional repositories of the universities in this study, an analysis of the first twenty items of each letter of the alphabet was checked for full-text

accessibility and the average number of items with full-text content determined. For Makerere University the level of open access was at 22%, for Kenyatta University it was 32% and for Muhimbili University of Health and Allied Sciences it was 98%. Some of the documents that gave an insight into how the institutional repositories in these three universities were developed and managed included the founding proposal documents, the institutional repository policy documents, the intellectual property management documents, and the institutional repository promotional materials.

3.8 Pre-testing and piloting the research instruments

3.8.1 Pre-testing the questionnaire

Van Teijlingen and Hundley (2001) refer to piloting as a mini-version of a full-scale study conducted for a number of reasons, including pretesting research instruments and establishing whether the sampling frame and techniques are effective. The pre-testing of the questionnaire in this study was based on these sound reasons, given that the main study was to be conducted in three countries (Kenya, Tanzania and Uganda). The pilot study was conducted at Kenyatta University, Kenya; with a pre-test of the questionnaire done on a sample of 107 respondents using only research assistants to distribute and collect the questionnaires, and 45 filled questionnaires were returned (42% of the sample) within a time scale of three weeks. It was therefore established that a response rate of about 50% was feasible, provided a few more questionnaires were distributed and/or more research assistants involved. For the main study, the same time scale was used in the three universities (i.e. Kenyatta University, Makerere University and Muhimbili University of Health and Allied Sciences), using research assistants and the researcher also vigorously involved in distributing and collecting the questionnaires.

3.8.2 Piloting the interview schedule

The participant sample involved only one category of informants, the librarians in charge of the institutional repository because the study required details of how the IR was developed and managed. Piloting the interview schedule was done with one member of staff at Kenyatta University Library. This helped the novice researcher to practice interviewing techniques and also be able to identify unclear or ambiguous questions. For instance, the question: “What types of collections are in your IR?” was yielding a different response in reference to how the IR was arranged instead of the types of materials or documents in the IR

as intended by the researcher. This question was therefore changed to read: "What types of documents are in your IR?" There were, however, minimal changes done to the research tools for the main study.

3.9 Methodological bias

Precautions against bias in the methods used were taken as follows:

- The tools used (questionnaire with some open-ended questions & interview schedule) were cross-checked by my supervisors and piloted to eliminate biased questions. The sampling procedures used (systematic random sampling & purposeful sampling) helped in reducing biased samples (for instance selecting respondents only known to the researcher or respondents who answer an emailed questionnaire because they know you or informants that have no experience or knowledge about the subject). In other words, the samples enrolled in the study were based on precision in member selection and free from favoritism. The research assistants were trained and issued with a sampling frame that had the identified respondents to the questionnaire in each university, and this selection was inclusive of the multiple categories of the respondents.

- The researcher also tried to be as objective as possible, refraining from using personal knowledge about the selected universities by using tools that were applied uniformly in all the universities and sticking to the findings generated from the study.

3.10 Data analysis

Data analysis "is the process of making sense of the data and discovering what it has to say" (Holliday, 2007, p. 89). This process was done in stages, according to the type of data that was collected, that is, quantitative data analysis and qualitative data analysis.

3.10.1 Quantitative data analysis

The quantitative data that was collected using questionnaires was checked for non-response and completeness, numbered, the closed-ended questions coded and entered into the Statistical Package for Social Sciences (SPSS) for analysis by the researcher. SPSS was used because the researcher was conversant with the software, having used it at Master's and at PhD as one of her course units. It was also a lot easier to do the analysis using the inbuilt

tools to derive descriptive statistics and frequencies. SPSS was also specifically chosen to be able to capture and analyse the multiple responses in some of the questions in the questionnaire, which the researcher did not know how to derive in MS Excel (the alternative that could have been used for statistical analysis). Descriptive tables and charts were then derived and used to report the findings. Uni-variant statistics were used to describe the variables. The open-ended questions in the questionnaire were typed out in Microsoft word and coded according to the emerging themes per question, and reported accordingly.

3.10.2 Qualitative data analysis

The qualitative data was analysed as follows: the audio recordings from the interviews were transcribed for each informant independently, printed, and hand-coded using themes derived from the objectives and interview schedule. These were then described as narratives, using thematic analysis for each university under the key themes discussed in the literature on the management of institutional repositories. Narrative analysis was particularly used because the interviews were more of a narration of the events of developing and managing repositories in the universities studied. Roberts, (as cited in Bryman, 2004, p. 412) observed that narrative analysis is not only used in connection with life history stories, but also with events, as noted in this quote: "the term 'narrative analysis' is often employed to refer to both an approach – one that emphasises the examination of the storied nature of human recounting of lives and events – and to the sources themselves, that is the stories that people tell in recounting their lives." In this study, the events of how institutional repositories were developed and managed were recounted by telling the stories of what happened, which were then taken as narratives of the events.

3.11 Data quality control

Data quality control mainly refers to the reliability and validity of the instruments. Reliability refers to the purity and consistency of a measure, to repeatability, to the probability of obtaining the same results again if the measure were to be duplicated. For consistency in the answers collected, the data collection tools were piloted before the main study was conducted. This ensured that the questions were clear, complete, relevant and appropriate for the study. Validity, on the other hand, tells us whether the question, item or score measures what it is supposed to measure (Oppenheim, 1992, p. 144-145). Rossi, Wright and Anderson (1983, p. 97) pointed out that validity indicates the degree to which an

instrument measures the construct under investigation. To ensure quality in the responses collected, the researcher made sure that the questions in the questionnaire were easily understandable, with clear definitions of the key terms provided. The questionnaire was approved by the researcher's supervisors after a thorough scrutiny of how clear and understandable the questions were in relation to the objectives of the study. The research assistants were also properly trained to ensure that the returned questionnaires were fully answered.

3.12 Ethical issues

Like all research that involves human subjects, Fowler (2009) cautioned the survey researcher to be attentive to the ethical manner in which the research is carried out. In this regard, this research observed the following protocols to ensure that the participants and respondents were adequately protected:

Before the research commenced, permission was sought, with formal letters (Appendix 5) to conduct research in the study areas at Kenyatta University, Makerere University and Muhimbili University of Health and Allied Sciences (MUHAS). The researcher was a student of Makerere University and the proposal and study tools had already been approved. However, at Kenyatta University and MUHAS, where the study was being seen for the first time, the proposal and research tools were presented to the institutions review boards for approval. At MUHAS, the proposal was also presented to the Tanzania Commission for Science and Technology (COSTECH) for approval before the study could be conducted. Trochim (2006) noted that: Institutional Review Boards (IRBs) "help to protect both the organisation and the researcher against potential legal implications of neglecting to address important ethical issues of participants". On the questionnaires and interview schedules, a call for voluntary cooperation was endorsed on the survey documents or communicated to the participants and respondents beforehand, with the purpose of the research well specified. The participants and respondents were assured of utmost confidentiality and that their responses would be used only for academic purposes. About consent forms, Fowler (2009) noted that they may not be required for sample surveys, however, some respondents at MUHAS requested for them and they were provided.

3.13 Limitations of the study

Although this study was carefully planned, there were some anticipated and unexpected shortcomings that were encountered. First, the study was planned to be conducted in the universities with the best performing institutional repository in the country as far as the number of records was concerned. This was to show how actively the repository was growing and therefore worth studying. In Uganda, where the author originates, only Makerere University had an institutional repository by 2013 when this study started, therefore, it was not possible to have an in-country comparison of institutional repositories. In Kenya, the University of Nairobi had the highest number of records in the IR by 2014 when the repository website survey was conducted; however, the university administration declined to grant permission for the study to take place. Fortunately, Kenyatta University, which was the second in-line, had been selected for the pilot and when the university administration accepted the study to be conducted, Kenyatta University was taken as the main study area in Kenya. In Tanzania, MUHAS was the university with the highest number of records in the institutional repository. Although MUHAS was selected as one of the study areas, it differed in size (in terms of student and staff numbers, and number of programs) in comparison to Kenyatta University and Makerere University. For instance, the samples for these universities were: 187 for Makerere University, 107 for Kenyatta University, and 35 for MUHAS. Comparing the findings of these universities was therefore a bit of a problem for the quantitative study. However, this was overcome by using proportions in terms of percentages. Variations in the number of disciplines per university and the number of respondents enrolled in the study also limited the statistical comparison of the researchers' participation in IR activities across universities.

As for the limitations on the methods, questionnaires are known for their low response rate, that is, people fail to return them (Kumar, 2005). This weakness was anticipated and counteracted by distributing slightly more questionnaires than the derived sample and following up the respondents vigorously to get the questionnaires filled and returned. A satisfactory percentage of 55.5 was attained for analysis.

Information about the involvement of other stakeholders in OA and the IR activities were not very specific in the data collection tools, but implied in some questions, leading to a failure to generate enough information to report in the study. For instance, the question directed to the repository managers: "What did the process of setting up the IR entail?" was intended to

unearth how the university administration, the funding organisations and other stakeholders were involved. However, the author (interviewer) was not experienced enough to probe further at the time of data collection, but realised this later when writing. Some information was, however, gathered in this regard as follows:

- Kenyatta University Library first planned to have an IR setup before involving the other stakeholders, and this was done in a one day conference that was meant to sensitise and train the university community about OA and IRs.

- Makerere University started with a project proposal which was written by the library and some lecturers in the then Faculty of Science in collaboration with development partners who supported the initial stages of setting up the IR.

- Muhimbili University of Health and Allied Sciences first sold the idea to the university administration and involved all the stakeholders in writing the IR policy before setting it up. The involvement of research funding organisations in requiring OA in what they fund was not an issue at any of these universities, but the question was directed to the survey respondents who supported having funder OA mandates.

This study focused on open access in institutional repositories, an area that is changing with time due to developments and experiences shared worldwide. The analysis and discussion of the study was based on data collected in the period between November 2014 and March 2015, and by the time of completion, a lot could have changed in East Africa, making some of the findings out of date. For instance, implementing the IR policy at Kenyatta University by retrospective digitisation of the theses and dissertations to replace the DATAD abstracts (an activity that was already on-going) could have increased the OA level of the IR. The findings and recommendations are, however, meant to serve as precautionary measures for other IR adopters, and also improve the management practices of IRs in the selected universities in East Africa to attain higher levels of open access.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.0 Introduction

In this section, the findings of the study were presented objective by objective. In objective one and two, which was investigated qualitatively, a description of the development and management of institutional repositories in the three selected universities in East Africa was provided. It was a narrative from the interviews conducted with the repository managers and document reviews about the institutional repositories. In development, the process followed in setting up the institutional repository was described. In management, the planning, budgeting, staffing, marketing, policy implementation, and system maintenance issues were collectively presented for the three universities: Makerere University, Kenyatta University and the Muhimbili University of Health and Allied Sciences. Objective three, which was investigated quantitatively, established the researchers' awareness and practices of open access and institutional repositories, in trying to examine why access to the content in most of the East African repositories was limited. Challenges and strategies that were reported using both the questionnaire and the interviews were also presented.

Table 4.1: Descriptive characteristics of the IR development and management aspects at the case study sites

IR Characteristics	**KU**	**MAK**	**MUHAS**
Initial goal and/or objective	Visibility & Accessibility	Accessibility	Visibility & Accessibility
IR software type	Open source (DSpace)	Open source (DSpace)	Open source (DSpace)
Pilot phase & length	About One Year	One Year	None
Funding sources	KU	Makerere University, SIDA	MUHAS, SIDA
Initial IR content scope	ETDs, Research reports	ETDs, Research reports	ETDs, Research reports
No. of IR records by July 2014 (openDOAR)	8,855 records	3,015 records	1,085 records
IR services offered	Digitisation, copyright advisory services	Digitisation, copyright advisory services	Digitisation, copyright advisory services

(Source: Author's field data)

Content collection or collection management: Kenyatta University explored the process of identifying content for the IR from the researchers by encouraging teaching staff to send their curricula vitæ to repository staff for assessment of IR eligible content and also have them included on the university staff profile website pages for easy access.

4.1 The development of IRs in selected universities in East Africa

The data for this section was collected through document analysis and interviews with key informants whose demographics were as follows:

Table 4.2: Demographics of the key informants:

Institution	*Number Interviewed*	*Gender*	*Age Group*	*Academic qualifications*	*Professional Ranks*
Makerere University	2	Male	30-39	Masters Degree	Academic Librarians
Kenyatta University	2	Female	40-49 & 50-59	Bachelors & Masters Degree	Librarian & Deputy University Librarian
MUHAS	2	Male	20-29 & 30-39	Bachelors & Masters Degree	Library Officer & Assistant Librarian

(Source: Author's field data)

4.1.1 The institutional repository at Makerere University in Uganda

Makerere University is a multi-disciplinary university with 7 colleges (28 Schools) and a lecturer population of about 1,331. As reported in section 1.1.3.2, Makerere University started implementing a repository with a project called Uganda Science Digital Library (USDL), with the objective of making scientific literature produced in the country more accessible digitally. In implementing this project, collaboration was sought with the University of Bergen (USDL project proposal, n.d.), which was operating a research archive (Bergen Open Research Archive – BORA) on the DSpace software. The university of Bergen Library opted to host a DSpace instance on its server for Makerere University Library to learn how to use DSpace in preparation for its own installation. Later, when the scanned files of theses and dissertations became too heavy for uploading remotely on the Bergen servers, Makerere University Library procured a server and locally installed DSpace in 2005. The University of Bergen Library visited Makerere University Library and practically trained

a team of six librarians how to work with DSpace and shared experiences of how they conduct advocacy around the university (Kakai, 2009).

In executing the USDL project, the Library started with a pilot, implemented only at Makerere University, in selected science-based faculties. USDL was managed by one librarian, assisted in content collection and uploading by two librarians in the selected faculties; and launched on 12th June 2006. The launching was meant to introduce the new service to the research community and serve as an advocacy and consultative meeting (Kakai, 2009). Therefore, all deans and heads of departments at Makerere University were invited, in addition to representatives of students, librarians from other institutions in Uganda (especially those in the Consortium of Uganda University Libraries – CUUL), and Makerere University Library Heads of Sections and Branches. After the launch, the project was renamed "Uganda Scholarly Digital Library" to embrace all disciplines at Makerere University. A banner, bookmark, and leaflet about the process of uploading content in the repository were prepared for the launch and continued to serve as the publicity materials for the repository. In February 2007, two librarians visited the University of Bergen Library to benchmark the activities of the BORA (Bergen Open Research Archive) repository and further learn in detail how to use DSpace. This helped in the implementation of USDL using the DSpace software.

After the launch, two more of the librarians who had attended the initial training in DSpace activities were assigned to collect and upload publications from lecturers. A special section (the Digitisation Section) in the Main Library at Makerere University was dedicated to working on the then USDL project. This section had two members of staff. By the time this study was conducted in 2014, the Digitisation Section had three full-time librarians, all at Masters Level. Their roles, as reported by the librarian in charge of the institutional repository, included

> "*scanning the theses and dissertations retrospectively and uploading them into the repository, collecting CDs with theses and dissertations from the Directorate of Research and Graduate Training (DRGT) and uploading them into the repository, soliciting for articles from researchers in departments and uploading them in the repository and training researchers and students how to use the repository*".

The then USDL project did not secure funding to enable the involvement of other institutions and the collection of content in Uganda as stipulated in the USDL proposal. So, after

implementing it only at Makerere University for 7 years, it was re-named Makerere University Institutional Repository (Mak IR) in 2014 as already reported in section 1.2.3.2. The type of content in Mak IR as listed by the librarian in charge of Mak IR included

> "*journal articles, conference papers, theses and dissertations, and working papers*".

Besides the Digitisation Section staff, the College Librarians were also trained in the activities of the institutional repository, although their involvement was minimal according to the repository managers' responses on staffing.

4.1.2 The institutional repository at Kenyatta University in Kenya

Kenyatta University is a multi-disciplinary university, with 19 schools and a lecturer population of about 761. Kenyatta University started its institutional repository in 2012 with guidance from Strathmore University, which was the first academic institution in Kenya to go online with an institutional repository (BioMed Central, 2010). As reported by the librarian in charge of the institutional repository,

> "*the idea of having an institutional repository came from the new university librarian, Dr. George Gitau Njoroge. He had just joined Kenyatta University from Strathmore University*".

The idea could have also been driven by the consortium of university libraries in Kenya, which was advocating for the development of institutional repositories around 2012. The objective was to make Kenyatta University research visible and accessible online. Kenyatta University, therefore, started by setting up a DSpace installation, which was first used for training purposes, with trainers from Strathmore University, who were invited to conduct a half-day session on how DSpace works to a group of ten (10) librarians. After the training, two (2) of the trained librarians were given the responsibility of managing the repository and they started off by uploading content that was readily available, the Database of African Thesis and Dissertations (DATAD) abstracts. This largely accounts for what is available as metadata with no full-text in the institutional repository.

> "*We started operating the repository with no policies. The policies came later in 2013 with the general library policies*,"

explained the repository manager, and that is when Kenyatta University started retrospective scanning and uploading the full-text files into the repository. In terms of the type of content, Kenyatta University started off with only theses and dissertations.

> "*The collections are created as need arises, that is, when there are materials for that collection*"

reported the repository manager. This is possible because of the flexibility of the DSpace software that they are using.

The Library at Kenyatta University operated the repository for about a year before involving the rest of the stakeholders (administration, teaching, and librarians). The involvement was through a one-day conference about open access and institutional repositories in 2013, addressed by a guest speaker from Spain, who later stayed on for a week training the librarians how to manage the institutional repository. In 2013 when the institutional repository policy was passed, the Library declared in the newspapers to provide open access to all its theses and dissertations. Graduate students were also required to submit an electronic copy of their theses and dissertations to the Graduate School, where the Library collected them for uploading into the institutional repository.

Marketing of the institutional repository at Kenyatta University was done through workshops and training and literacy programmes in the library, especially for lecturers and graduate students. Hard copy brochures (printed in the library) were also distributed to users especially during the open days, such as the open access week. The repository was also listed on the library website and in the catalogue. The Library solicited for publications in a number of ways: Some of the researchers/lecturers provided their publications by email. Every department had a web page on research publications and this was a source of information for the repository manager about what could be sought for inclusion in the institutional repository. Lecturers also had Google scholar accounts where they publicized their research. The library got some of the publications for the institutional repository from Google scholar. At some point, the library got the lecturers' profiles from the Deputy Vice-Chancellor (Research) and uploaded the publications in the institutional repository.

The types of content in the institutional repository included: Thesis and dissertations (PhD & Masters); Book chapters; Conference/workshop papers; Research papers; Journals, including Kenyatta University journals; and On-going research.

4.1.3 The institutional repository at Muhimbili University of Health and Allied Sciences (MUHAS) in Tanzania

MUHAS is a single discipline university, covering health and allied sciences. It had five schools and two institutes, with about 255 lecturers in total. Repositories having been around the world for a while (since the early 2000's), MUHAS initiated its institutional repository in 2013 after realizing it needed to harvest the local research output of its faculty members, and did it at a time when the Budapest Open Access Initiative (BOAI), in 2012 had made clear recommendations on how institutional repositories should operate. This was what the repository manager had to say on what motivated MUHAS to set up an institutional repository:

> "*We just wanted to harvest the local research outputs because our faculty members do research in various areas, so we thought that having a central storage and to make sure that those research findings can be accessed by the university community and worldwide, it could have an impact and also increase the university's visibility and status*".

Just like in Kenyatta University, the idea to start a repository came from the library director, Dr. Tandi E. Lwoga who presented it to MUHAS administration for consideration. After its acceptance, MUHAS started with preparing the institutional repository policy, which later guided the rest of the activities. However, to implement this project that had financial implications, the library had to adequately convince the administration how important it was to have the repository. The library, therefore, involved the stakeholders (both the administration and the lecturers) right from advocacy to training from the very beginning of the institutional repository project. The librarian in charge of the repository reported that

> "*even in the formulation of the IR policy, we also involved the representatives from schools, so, their ideas and opinions were incorporated in the formation of the policy*".

Four library staff, who worked in the ICT section of the library were assigned the responsibility of managing the repository, and were normally assisted by voluntary and temporary staff whenever available to scan, collect publications from lecturers and upload them to the repository. Part of the tasks that the staff in charge of the repository performed included checking for MUHAS staff publications in online databases, and whenever available

as open access or the publisher allowed the author to self-archive, then they either downloaded or got a copy from the researcher and uploaded them to the repository. Much of what they uploaded in the repository was open access content. The content included journal articles, theses and dissertations and research reports for undergraduate students.

Marketing of the institutional repository was done through workshops, seminars, and training where the researchers were taken through the process of uploading their publications. MUHAS also had an institutional repository committee, with representatives from every school, who served as champions and ensured that the publications produced in their schools were uploaded in the repository.

Financially, the institutional repository was supported by SIDA collectively under the library ICT infrastructural development. Although the librarian in charge of the repository mentioned having three scanners used for digitization, there were none in the ICT office where those in charge of the repository conduct their duties. However, there was one scanner located in the library director's office which was also used by the ICT staff.

4.2 The Management of IRs in selected universities in East Africa

In this section, the findings were presented according to the management functions as far as institutional repositories were concerned: planning, budgeting, staffing, marketing, policy formulation, and system maintenance.

4.2.1 Planning

MUHAS invested in first planning for its institutional repository before implementing it. This was evidenced by the response the librarian in charge of the repository gave when asked what it entailed to set up the institutional repository:

> "*We thought of the requirements that are needed, the technical requirements, and also, the manpower to work on the institutional repository, and we thought of establishing an institutional repository policy because you should have a policy that guides the overall activities of the institutional repository. We have an IR policy that was developed but also we had to convince the management that this thing is very important, it is necessary, so because it has financial implications, so we had to get approval that we implement the project*."

MUHAS's systematically organized institutional repository policy and guidelines was also evidence of the preliminary planning involving all the stakeholders before implementation. The policy was provided both in print version and also included online among the university policies so it could be referred to anytime. The policy spelt out the responsibilities other stakeholders played in implementing the repository and then specified the policy statements and guidelines for each activity in the repository. After producing the institutional repository policy, it was clear to them how to implement the activities, so they did not have a pilot project but started straight away by installing the software, configuring it, training the librarians who were to submit content and later the researchers. The librarian in charge of the repository noted that

> "*the training involved the library staff and also the faculty members, because some of the faculty members, they directly can upload their publications in the institutional repository*".

They, however, did not mention preparing any marketing materials for the repository.

Makerere University also spent some years first planning for the Uganda Science Digital Library project by writing a proposal that was actually meant to solicit for funding (USDL project proposal, n.d.). The repository was then implemented following the procedures outlined in the USDL proposal, although this was done only at Makerere University. Makerere University started with a pilot project because it was trying out the feasibility of the USDL project. There was no policy formulated by then because what needed to be done was spelt out in the proposal. They, however, prepared some leaflets and bookmarks which they used to market USDL to the researchers as presented in Section 4.1.1. They also prepared an author consent agreement (Appendix 3) which was still awaiting senate approval together with the IR policy before being put into use. Brochures were later prepared to inform the researchers further about the repository.

Kenyatta University followed some of Nabe's (2010) tasks while planning its IR by seeking the guidance of Strathmore University Library, which had an already established IR operated on the DSpace open source software. Following Strathmore University's example, Kenyatta University tried out the DSpace software with its DATAD project of theses and dissertation abstracts and initiated its IR. As reported by the librarian in charge of the institutional repository, Kenyatta University later organised for the stakeholder's conference in 2013 as

part of the IR planning activities, with a guest speaker from Spain who talked about institutional repositories. They then embarked on writing the institutional repository policy along with other library policies.

4.2.2 Budgeting

Of the three universities, only Makerere University had an itemized budget for digitisation (scanners) and repository equipment (server and backup system) in the SIDA project under the library. This was synthesized from the librarian in charge of the institutional repository's report. This was what he had to say about financing the repository tasks:

> "*The IR has been hitherto financed mainly through financial support from development partners who have financed IR activities ranging from initial remote hosting of the IR at a partner university to server and related digitisation equipment and software as well as training support to equip IR staff. However, Makerere University is committed to staffing (which translates into wages/salaries in financial terms) to ensure there are librarians responsible for sustaining the deposits and management of IR content. We believe like we have already witnessed that once the benefits of continued online research visibility are felt by stakeholders, Makerere University will provide budgets that sustain the efforts of development partners*."

The rest of the two universities (Kenyata University and MUHAS) had the repository requirements incorporated in the general library budget. MUHAS also had some facilitation under the SIDA project. This was what the librarian in charge of the repository at MUHAS had to say: "*In SIDA, there is an objective for improvement of library and ICT infrastructure in the library, so because the IR is in the library, we also sometimes have collaboration with the ICT Directorate so it chips in from there*."

4.2.3 Staffing

At the time of conducting this study, the Kenyatta University Library had seven (7) members of library staff in charge of the institutional repository. These were synthesized from the librarian in charge of the repository's report stated below:

> "*One is in charge of ICT in the library, four (4) do scanning (or retrospective scanning of the theses), two (2) are in charge of looking for research papers or data*

harvesting and uploading of content into the institutional repository; one (1) does editing and institutional repository management."

Most of the publications in the institutional repository were uploaded by the library staff on behalf of the lecturers. Staff capacity to handle institutional repository tasks was built internally through orientation of new staff and transfers. All the librarians in charge of the institutional repository also worked in the special collections section of the library.

Makerere University Library had three (3) librarians who were dedicated to working on the repository tasks, who on a daily basis reached out to get publications from researchers, uploaded them, and handled the DSpace workflow processes of editing and ensuring that the metadata provided was of good quality. The three librarians also worked hand in hand with the college librarians in collecting publications from the different schools. Reporting verbatim, the librarian in charge of the institutional repository specified the roles they play as follows:

"*Their role, we have talked about raising awareness, so they do marketing, that is one of the roles, to market the repository, but also the other role is to design and have materials that can help market the repository, as well as doing the actual submission of materials, because like I said, it is our librarians mainly who are doing the self-archiving work on behalf of our researchers.*"

MUHAS assigned the responsibility of the institutional repository to the ICT Section of the Library, which had four (4) librarians at the time the field study was conducted in February 2015. They, however, often got assisted by voluntary and temporary staff to digitise publications and upload them to the repository. The rest of their duties were as explained in section 4.1.3.

4.2.4 Marketing and training

As noted in sections 4.1.1, 4.1.2 and 4.1.3, marketing was mainly done as part of training workshops and e-mail messages to the researchers. The librarian in charge of content collection at Makerere University enumerated how marketing the IR was done as follows:

"*We market the institutional repository at Makerere through different fora: for example the different information literacy workshops that happen in the library. We*

also train students on how to use the repository in the user education programme for first-year students. We also participate in the open access week where we talk about the institutional repository, we have also designed brochures that talk about the repository, and also consistently writing onto the staff mailing list about what the institutional repository is all about."

The librarian in charge of the institutional repository at Kenyatta University also reported that

"*marketing is done through workshops and training and literacy programmes in the library, especially for lecturers and graduate students. We also use brochures (hard copy), the library website and the catalogue*."

MUHAS, on the other hand, markets the IR through exhibitions, besides the training sessions with students and staff. The librarian in charge of the institutional repository noted that:

"*populating it is our biggest concern and also marketing the IR, because if you have populated the IR and the people are not aware of it, it becomes useless, so we have to make it popularly known. The marketing issues, … and whenever there are exhibitions because we have exhibitions at MUHAS as the university, so we go there and market the IR.*"

4.2.5 Policy formation

Kenyatta University, Makerere University and Muhimbili University of Health and Allied Sciences (MUHAS) had institutional repository policies developed at different stages of the repository development. MUHAS started with a policy before it implemented the institutional repository project. While explaining the process of setting up the institutional repository, the repository manager at MUHAS noted that

"*We thought of establishing an institutional repository policy because you should have a policy that guides the overall activities of the institutional repository*."

Kenyatta University developed its repository policy later after implementing the repository for some time; as stipulated by the repository manager:

"*We started operating the repository with no policies. The policies came later in 2013 with the general library policies*"

Makerere University on the other hand first implemented the institutional repository while adhering to the institutions' umbrella of policies, namely the Makerere University Intellectual Property Management Policy (IPM) and the Research and Innovations Policy, where the library was mandated to collect publications from every researcher and archive them for future use. At the time of collecting data for this study in March 2015, Makerere University had submitted a revised draft policy to the Academic Policies and Appeals Committee of Makerere University Senate for consideration.

All the librarians in charge of the institutional repositories at Makerere University, Kenyatta University and Muhimbili University of Health and Allied Sciences made reference to their IPM policy, but none of the universities had an institutional copyright policy. Kenyatta University had a statement about the use of creative commons licenses in its IR policy and IR website but nothing was specified on the individual items/documents that a user downloads.

4.2.6 System maintenance

In all the three universities studied, the library worked in collaboration with the IT department to maintain the system in use (DSpace for all cases). Besides being stated during the interviews, it was also stipulated in the institutional repository policies of Kenyatta University and MUHAS. All the three universities opted to use open source software because of the initial low cost involved when starting an institutional repository. None of the universities had been able to manipulate the software to explore usability beyond what was provided, except for Makerere University that had worked on the statistics and reporting tool, with the help of a consultant. None of the three universities had an IT staff fully dedicated to maintaining DSpace within the library.

4.2.7 Institutional repository services

As reported in section 4.1, the institutional repository services provided at Makerere University, Kenyatta University and Muhimbili University of Health and Allied Sciences were focused mainly on the digitisation of print theses and dissertations retrospectively, in addition to some copyright and open access advisory services in the process of providing mediated deposits on behalf of researchers.

4.3 Researchers' awareness and participation in open access and institutional repositories in selected universities in East Africa

Researchers, being the key content contributors in institutional repositories, often played an important role in the success of repositories. Their response to the changes in the scholarly communication process brought about with the advent of open access was important in analysing the management of repositories in East Africa. This section begun with the demographic information about the respondents to the questionnaire tool, which was then, followed by the general awareness and use of various open access facilities to gauge the researchers' involvement with open access. It also considered the researchers' participation in open access and institutional repositories, the researchers' habits and practices with publicity of their publications, institutional repository policy building in universities and the efforts towards open access to content in institutional repositories. The results were reported using tables and bar graphs. The bar graphs were preferred because the researcher needed to compare values across categories.

4.3.1 Demographic information about the respondents to the questionnaire

The demographic information about the respondents to the questionnaire was presented in two tables and three graphs. These were the gender of the researchers, the age-groups of the researchers, the academic qualifications of the researchers, the academic ranks of the researchers and the college or school of the researchers.

As illustrated in Figure 4.1, there were more male respondents in all the universities, that is 78% for Makerere University, 77% for Kenyatta University and 65% for MUHAS.

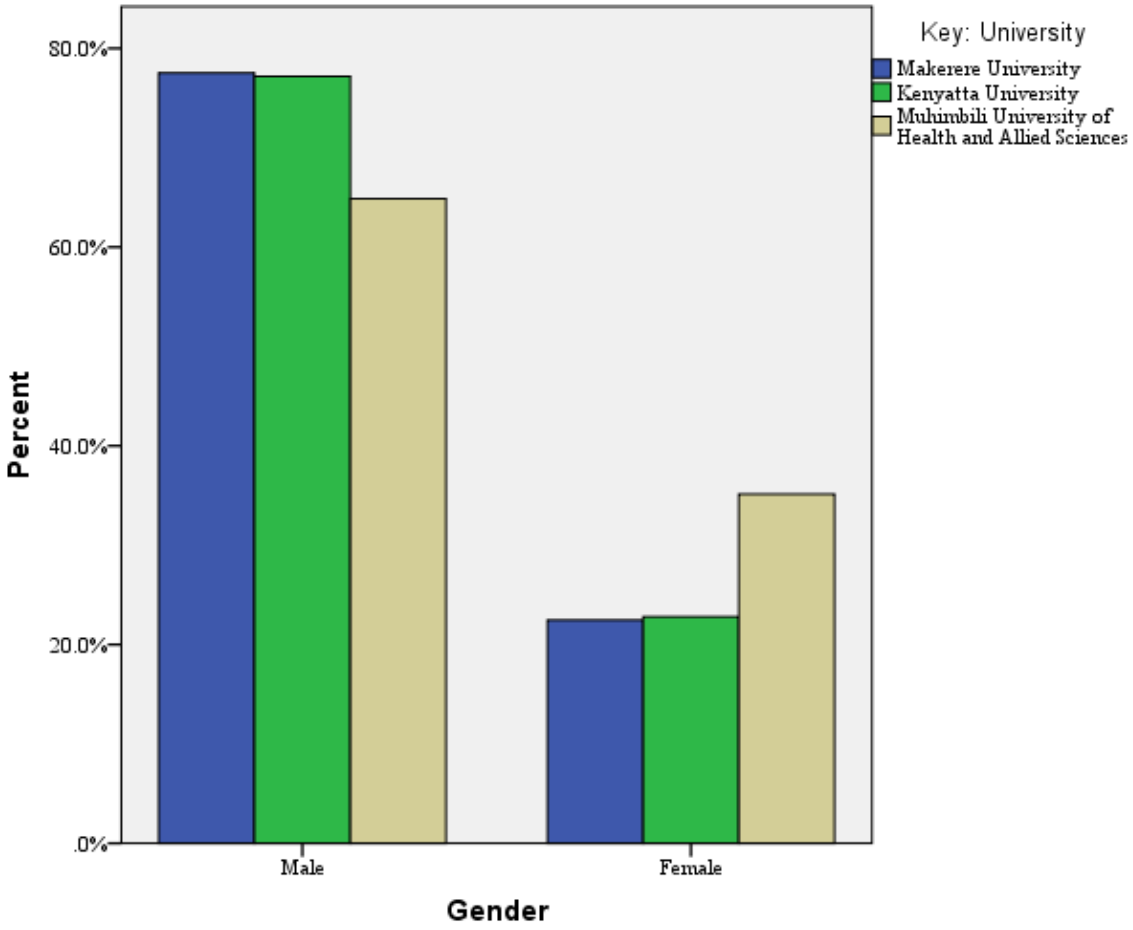


Figure 4.1: Gender of the Respondents

(Source: Author's field data)

Most of the respondents were between the age groups of 30-39 and 40-49 for Makerere University and Kenyatta University, while at MUHAS, they were in the age groups of 30-39 and 50-59, although it also had a good representation of those in the age group of 40-49. To sum it for all the universities, the respondents were between the ages of 30-59 which represents the active publishing stages of researchers. This is illustrated in Figure 4.2

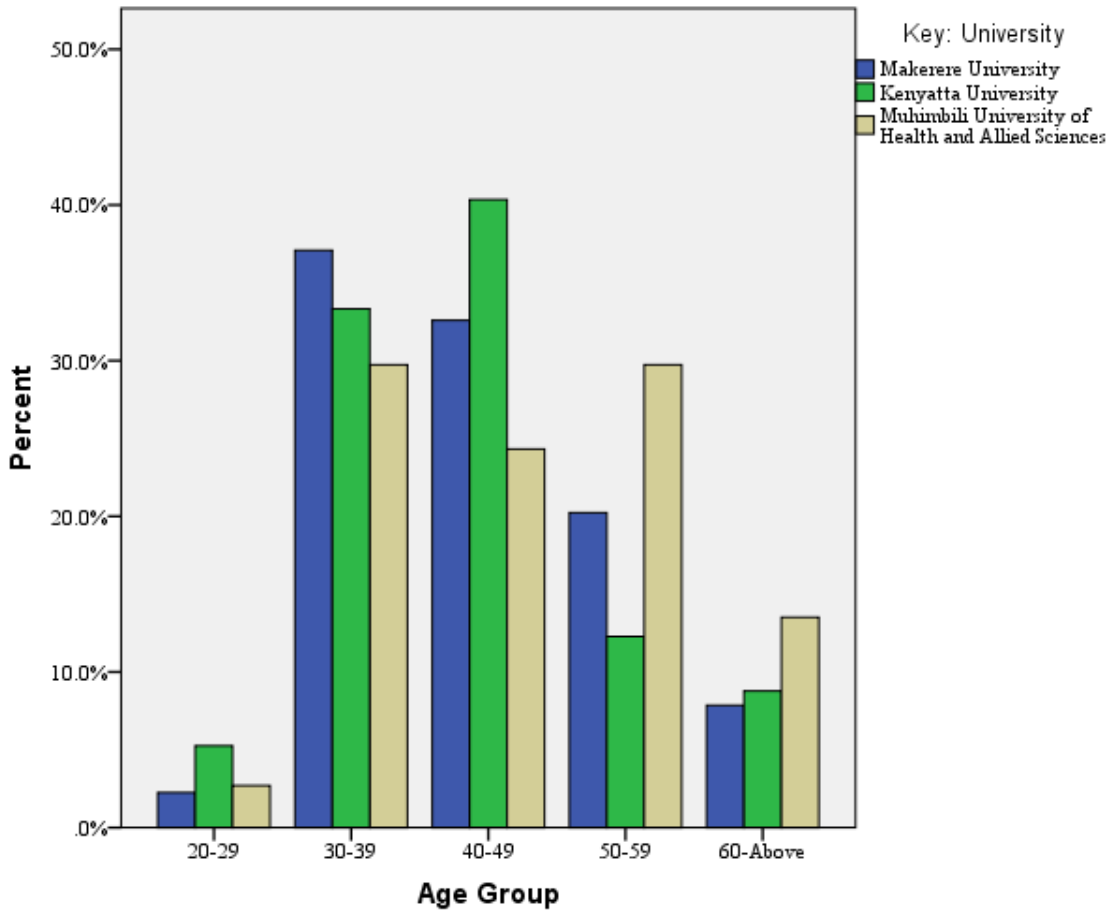


Figure 4.2: Age groups of the respondents

(Source: Author's field data)

More than half of the respondents, that is 56% for Makerere University, 60% for Kenyatta University and 59% for MUHAS were PhD holders. By the time one acquired a PhD, they would have at least published some papers and could be aware of open access and institutional repositories. The respondents' qualifications are illustrated in Figure 4.3.

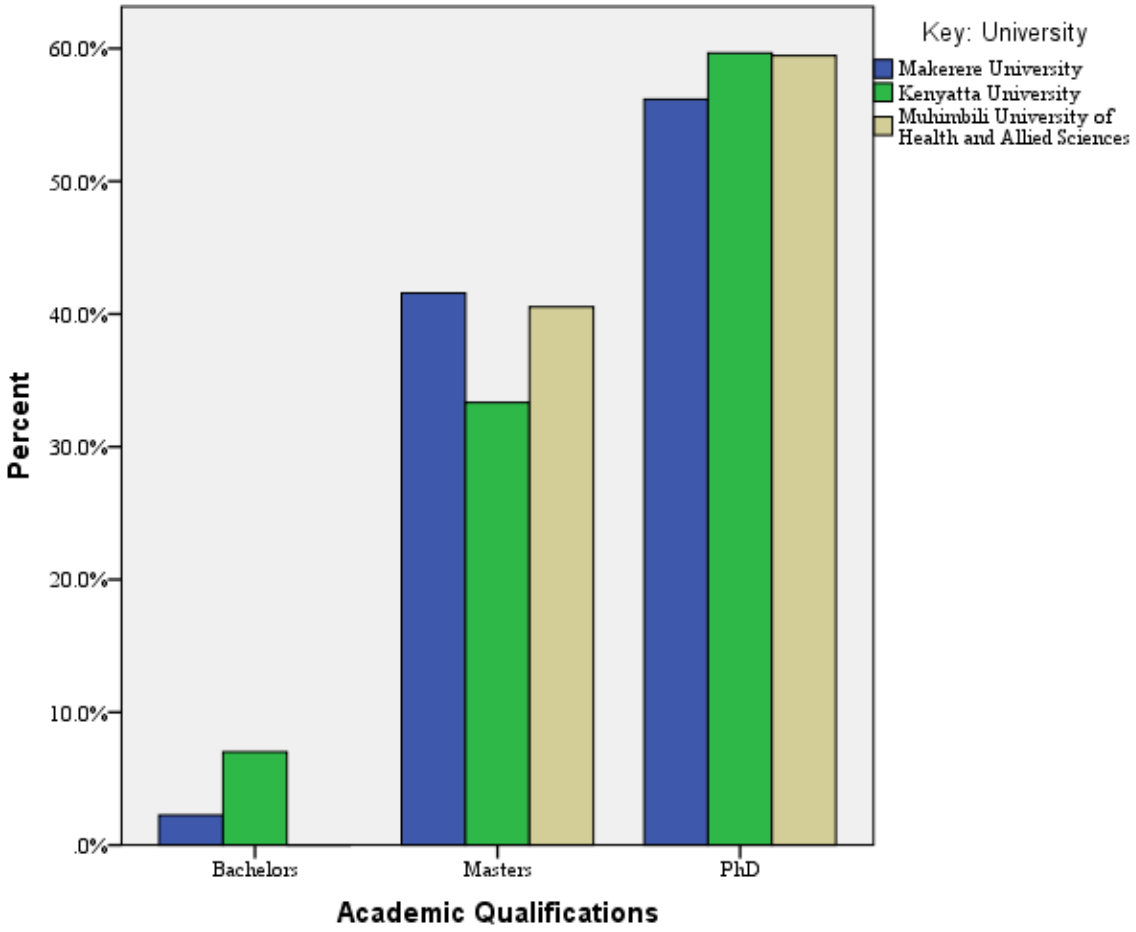


Figure 4.3: Academic Qualifications of the Respondents

(Source: Author's field data)

Most of the respondents at Makerere University were Assistant Lecturers (32%), followed by Lecturers (30%). At Kenyatta University, the majority of the respondents (47%) were Lecturers, followed by Assistant Lecturers (21%). At MUHAS, most of the respondents (38%) were Lecturers, followed by senior Lecturers (27%). This is shown in Table 4.1.

Table 4.3 The respondents' Academic Rank

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Academic Rank	1 Teaching Assistant	5 (6%)	9 (16%)	0 (0%)	14 (8%)
	2 Assistant Lecturer	28 (32%)	12 (21%)	9 (24%)	49 (27%)
	3 Lecturer	27 (30%)	27 (47%)	14 (38%)	68 (37%)
	4 Senior Lecturer	10 (11%)	6 (10%)	10 (27%)	26 (14%)
	5 Associate Professor	10 (11%)	2 (4%)	3 (8%)	15 (8%)
	6 Professor	8 (9%)	0 (0%)	1 (3%)	9 (5%)
	7 Other	1 (1%)	1 (2%)	0 (0%)	2 (1%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

At least all the schools and colleges were represented, except for one (Humanities and Social Sciences at Makerere University) that was over-represented as shown in Table 4.4.

Table 4.4 The respondents' School and College

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
School	1 Agricultural and Environmental Sciences	8	2	0	10
	2 Business and Management Sciences	8	7	0	15
	3 Computing and Information Sciences	8	0	0	8
	4 Education and External Studies	8	17	0	25
	5 Engineering, Design, Art and Technology	8	3	0	11
	6 Health Sciences	7	8	37	52
	7 Humanities and Social Sciences	24	19	0	43
	8 Natural Sciences	8	1	0	9
	9 Veterinary Medicine, Animal Resources & Bio-security	10	0	0	10
Total		89	57	37	183

(Source: Author's field data)

4.3.2 Awareness and use of open access facilities

Awareness is essential for researchers to utilize any service. Once researchers were not aware of a service, then there were high chances of it not being used. For researchers to have utilized open access facilities, they needed to know of their existence, importance and benefit to them as individuals. For researchers to have provided full-text publications that were freely and openly accessible to the public in institutional repositories, they needed to know that their university had an institutional repository, know what versions of the publications they were supposed to provide, the policies that guided them to deposit, the importance of depositing their work, and when they needed to deposit. To this effect, it was important to know whether the researchers at Makerere University, Kenyatta University, and Muhimbili University of Health and Allied Sciences (MUHAS) had published in any open access journals (for content that could easily be deposited into institutional repositories); were aware of the Directory of Open Access Journals (a place where they could easily identify open access journals to publish their work); had deposited their publications in any repository (for those aware of subject repositories as well); and whether they were aware of the institutional repository in their university (to be able to deposit their publications). Each of these aspects is reported in Figure 4.4, Figure 4.5 and Figure 4.6 and explained consecutively:

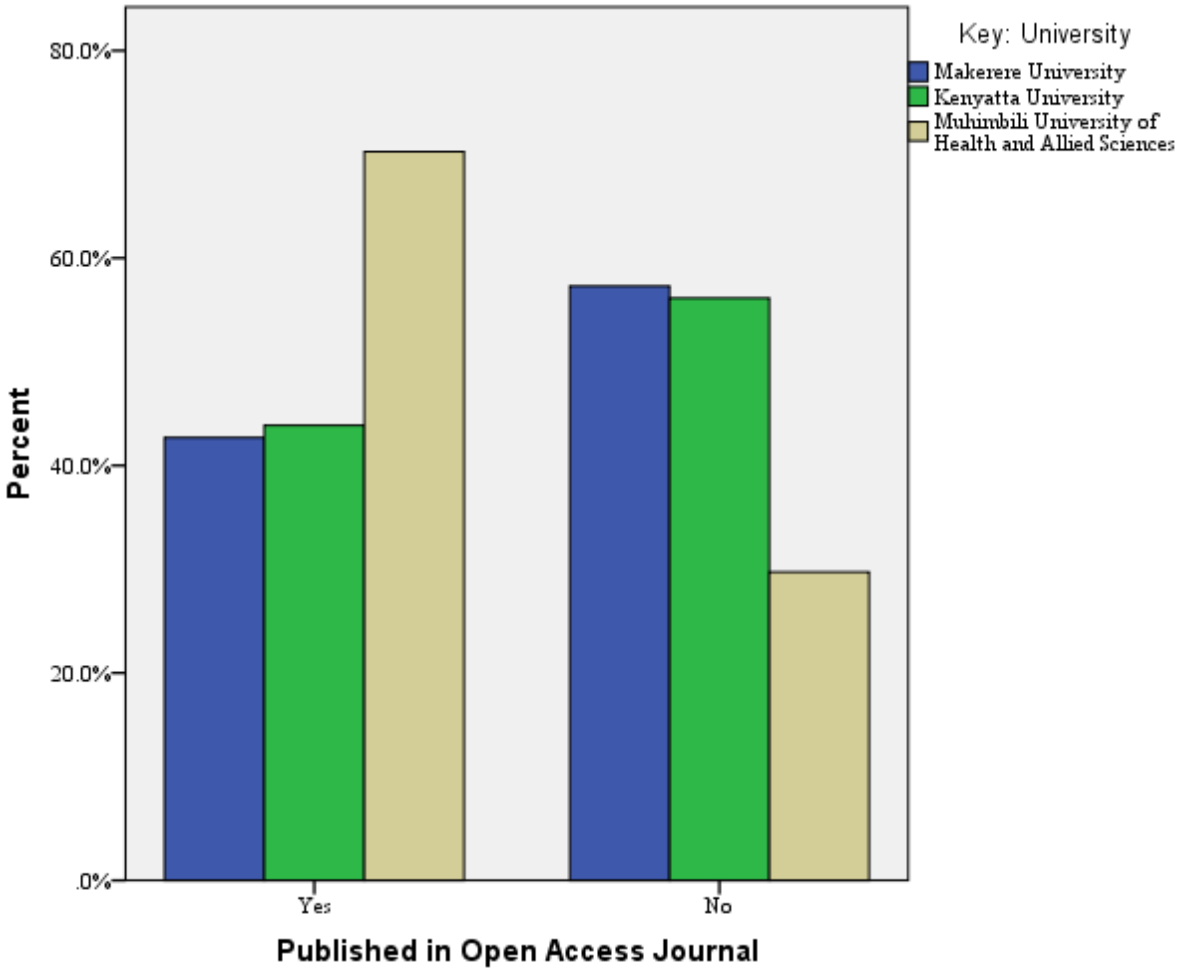


Figure 4.4: Having published in an Open Access Journal

(Source: Author's field data)

As illustrated in Figure 4.4, less than half the population surveyed at Makerere University (43%) and at Kenyatta University (44%) had published in open access journals, while the majority of the survey respondents at MUHAS (70%) had published in open access journals. This could explain why, through the website analysis (done by the researcher) of the repositories in these institutions, MUHAS had much of its full-text content (98%) available as open access. The respondents who selected "no" to this question were prompted to give a reason why they had not published in an open access journal. Out of the 83 who responded to this question, 29% were either not aware or had no knowledge of open access journals. Those who said they were still working on publications or did not have the time to publish or had no publications as yet were 23%. Those who had not got the opportunity or chance to publish in an open access journal were 20%. Those who said they had access to traditional journals or the ones that they found relevant to publish with were not open access were 16%.

Lastly, those who said the reputation of open access journals was not good or they were not allowed for promotion purposes were 12%.

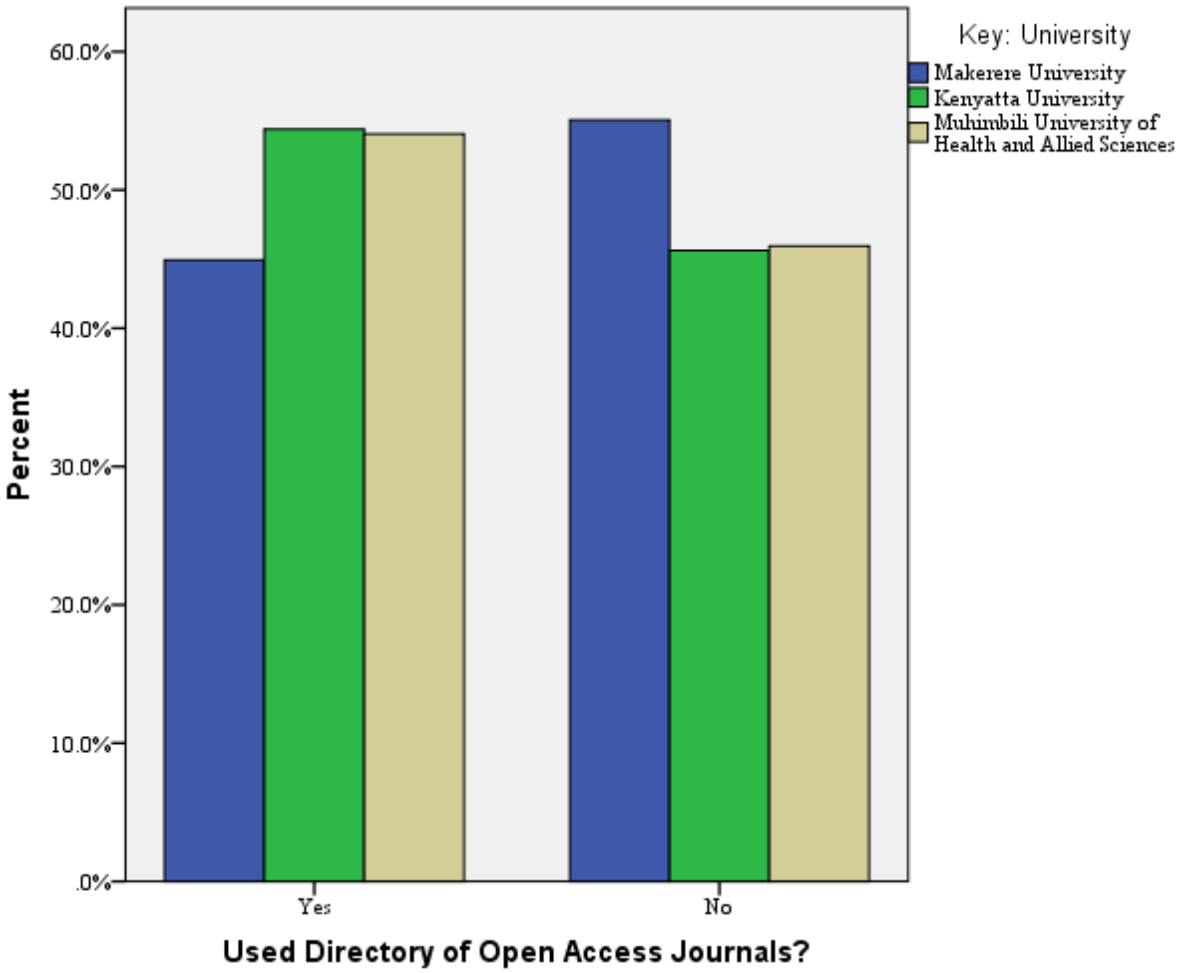


Figure 4.5: Having used the Directory of Open Access Journals (DOAJ)

(Source: Author's field data)

As illustrated in Figure 4.5, generally, about half of the overall respondents in these universities (50.3%) had not used the Directory of Open Access Journals (DOAJ). None use of DOAJ was more at Makerere University (55%) than at Kenyatta University (46%) and MUHAS (46%). This implied that a number of researchers simply discovered literature freely downloadable without knowing some of the sources that could help them find more, and avenues for them to also provide open access. Respondents who said "no" to this question were prompted to give a reason why they had not used DOAJ. Out of the 72 respondents who gave a reason as to why they had not used DOAJ, 88% were either not aware of DOAJ or they did not have information about it. Those who had tried using them noted that "access to materials was not direct and it consumed time". Another respondent

said, “I don’t find my preferred articles there”. Those who preferred not to use them said because they had other alternatives, or there were “too many forms and sources of information”.

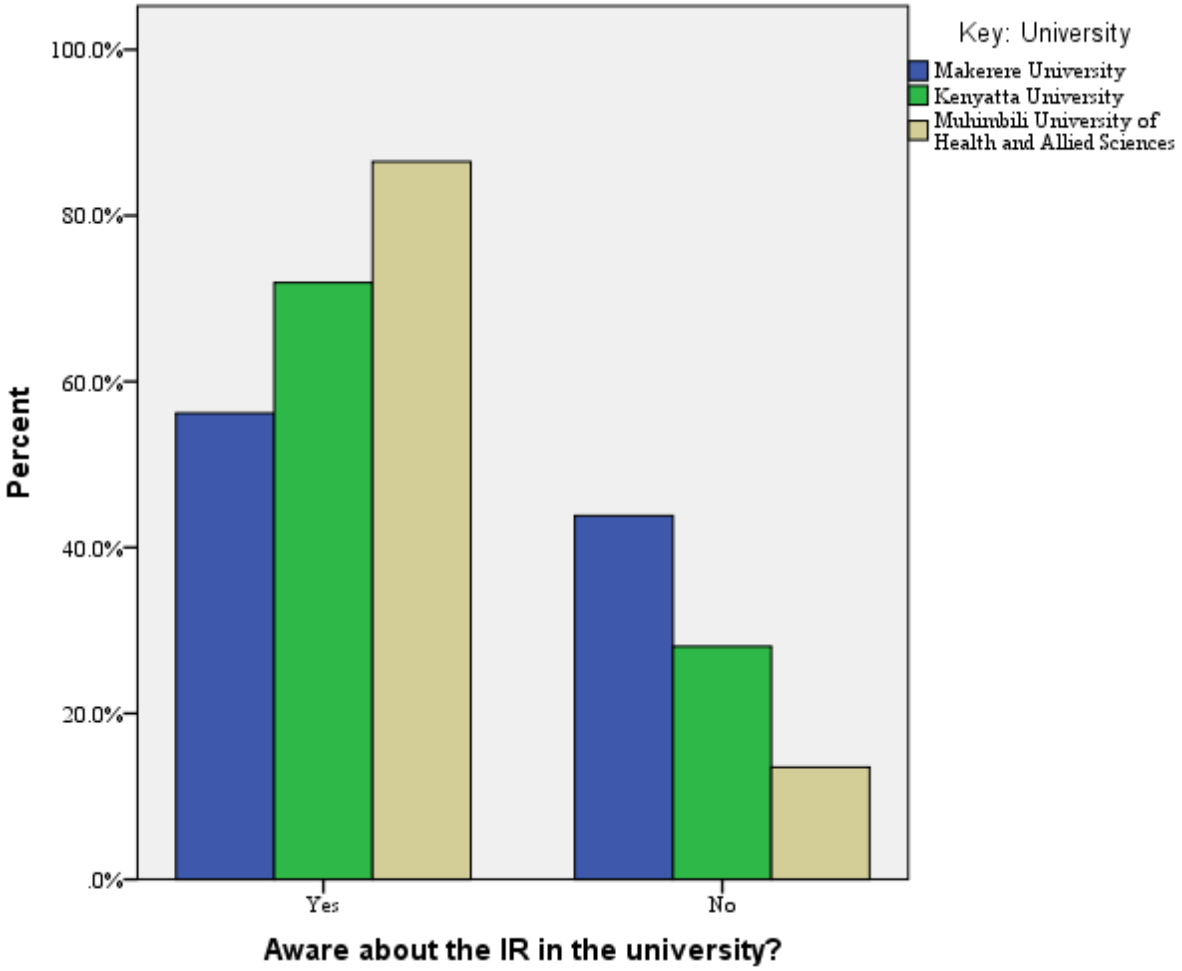


Figure 4.6: Awareness about the institutional repository in the university

(Source: Author’s field data)

As illustrated in Figure 4.6, on a general note, more than 50% of the respondents were aware of the institutional repository in their university. Awareness of the institutional repository was highest at MUHAS with 86%, followed by 72% at Kenyatta University, and 56% at Makerere University. The respondents who answered “yes” to this question were asked how they came to know about the institutional repository in their university. Out of the 116 who responded to this question, 38% said through awareness and publicity by the library, 33% said through training, seminars, and workshops and 19% said through colleagues and library staff.

To be certain the respondents knew about the institutional repository in their university, they were prompted to list the types of publications archived in the repository. Out of the 106 who responded to this question, 78% were either fully aware or had an idea of the types of publications in the institutional repository. These managed to list at least two to three types correctly. The remaining 22% were either not sure or were guessing, with responses such as "online journals", "Elsevier, American Chemical Society", "German Adult Education Association", "Research journals".

4.3.3 Researchers' participation in open access and institutional repositories

Open access as a concept was still new to some researchers, and so its applicability in institutional repositories could not be generalised as normal practice, it needed to be assessed in the three universities in this study. The provision of scholarly literature on the Internet without any restrictions was the principle on which open access operated. Using a set of four Likert scale questions, the respondents to this study were asked whether they supported the open access principle and three other aspects. As displayed in Table 4.5, the majority of the respondents (81.4%) in the three universities (as shown in the column for the total) were strongly in favour of the open access principle. Very few (1.1%) were strongly against open access.

Table 4.5: In favour or against the open access principles (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Support OA	1 Strongly in favour	75 (84.3%)	40 (70%)	34 (92%)	149 (81.4%)
	2 Mildly in favour	10 (11.2%)	8 (14%)	2 (5%)	20 (11.9%)
	3 Neither	2 (2.3%)	5 (9%)	1 (3%)	8 (4.4%)
	4 Mildly against	1 (1.1%)	3 (5%)	0 (0%)	4 (2.2%)
	5 Strongly against	1 (1.1%)	1 (2%)	0 (0%)	2 (1.1%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

Requesting researchers to provide their already published article for deposit into the institutional repository, at first sounded odd to them because they thought they had done what was necessary to get their work out there for the public to access. It did not occur to them at first that they needed to do more to ensure that more people accessed their work until the

benefits were elaborated. Since institutional repositories were still a new concept, the respondents to this study were asked whether they were in support of institutional repositories being one of the scholarly communication models. The results to this question are displayed in Table 4.6, with the majority of the respondents (80%) strongly in favour of the idea that institutional repositories were in-line with the scholarly communication channels.

Table 4.6: In favour or against IRs as model of scholarly communication (SC) (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Support IR as SC	1 Strongly in favour	75 (84%)	39 (68%)	33 (89.2%)	147 (80%)
	2 Mildly in favour	12 (14%)	13 (23%)	2 (5.4%)	27 (15%)
	3 Neither	2 (2%)	3 (5%)	2 (5.4%)	7 (4%)
	4 Mildly against	0 (0%)	2 (4%)	0 (0%)	2 (1%)
	5 Strongly against	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total		89 (100%)	57 (100%)	37 (100%)	183(100%)

(Source: Author's field data)

Most of the content deposited in the institutional repositories at Makerere University, Kenyatta University and MUHAS was done by library staff on behalf of the researchers, and sometimes without the author's knowledge, as reported by the repository manager at Kenyatta University. As long as the publishers' policies allowed, a librarian would harvest and deposit the work into the repository without consulting the author or getting his/her opinion on whether they did mind providing their publications in repositories as open access. The respondents to this study were asked whether they would be in favour or against providing their publications as open access through institutional repositories, and the results are as reported in Table 4.7.

As shown in Table 4.7, the majority of the respondents (73%) were strongly in favour of providing open access to their publications in the institutional repository, except for a few in Kenyatta University (6 respondents) who were strongly against it.

Table 4.7: In favour or against open access provision in IRs (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Support OA in IR	1 Strongly in favour	73 (82%)	29 (51%)	32 (87%)	134 (73%)
	2 Mildly in favour	16 (18%)	18 (32%)	3 (8%)	37 (20%)
	3 Neither	0 (0%)	1 (2%)	2 (5%)	3 (2%)
	4 Mildly against	0 (0%)	3 (5%)	0 (0%)	3 (2%)
	5 Strongly against	0 (0%)	6 (10%)	0 (0%)	6 (3%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

Researchers have different opinions about the quality of work deposited in institutional repositories, noting that most of it was not peer reviewed. To assess this, the respondents were asked whether they would cite the publications deposited in institutional repositories or use them for referencing when writing research. The majority (75%), as shown in Table 4.8 were strongly in favour of using publications deposited in institutional repositories for referencing.

Table 4.8: In favour or against using IR publications for referencing (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Support IR Pubs for Ref	1 Strongly in favour	72 (81%)	37 (65%)	28 (76%)	137 (75%)
	2 Mildly in favour	14 (16%)	12 (21%)	6 (16%)	32 (18%)
	3 Neither	3 (3%)	4 (7%)	3 (8%)	10 (5%)
	4 Mildly against	0 (0%)	4 (7%)	0 (0%)	4 (2%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

4.3.4 Researchers' habits and practices with publicity of their publications

The practice of self-archiving is born out of behaviour or a habit and many researchers could do it on whatever site just to let their work easily discovered. Others after publishing thought that was the climax, and the rest of the publicity was supposed to be done by the journal or the publisher. To establish the self-archiving culture of the researchers in this study, the

respondents of the survey tool were asked to state the various ways they normally used to publicize their work for others to use them. One hundred and forty-nine (149) respondents answered this question, with each providing either one or more than one options where publicity of their work was done. The scores were as illustrated in Table 4.9.

Table 4.9: Distribution of respondents who provided options for publicizing ones work (N = 149)

		Responses	Percent of Cases
		n	(N = 149)
Publicizing Options[a]	Social Media	20	13.4%
	Websites & Internet	18	12.1%
	Journals & Books	66	44.3%
	Email & Notice Boards & Newsletters	24	16.1%
	Seminars & Workshops & Conferences	23	15.4%
	Repositories	14	9.4%
	Share Hard Copy & In Library	14	9.4%
	Google Scholar	3	2.0%
	Open Access	6	4.0%

Note. Assessment is based on valid cases (i.e. the number of respondents).

(Source: Author's field data)

As shown in Table 4.9, the biggest number of respondents (44.3%) depended on the journal or the publisher to do the publicity for them. In fact, one noted that "*we normally publish in international journals; most of them have wide circulation*". The next group of 24 respondents (16.1%) mentioned communication through e-mail, notice boards and newsletters to their colleagues or community where they work. These communication channels were a one-time instance that was read and often forgotten, and/or sometimes deleted especially for e-mails, and therefore not very reliable if used alone. Social media, especially ResearchGate also featured highly among the scholarly publicity options among researchers at Makerere University, Kenyatta University, and at MUHAS. Works in social media got discovered through search engines like Google and Google Scholar so they reached a wider audience, however, not all authors uploaded the actual publications and neither did they do this for all their publications. Websites (personal, departmental,

institutional) and the Internet, in general, came next in the scores in Table 4.9. Work on websites was however in most cases only a listing of where these works had been published, with no full-text included on the site. So, they almost only served as a source of information. Repositories, both institutional and subject also featured in the responses of how researchers publicized their work, although only a few respondents (9.4%) mentioned them.

To explore more on how researchers self-archived their work, they were specifically asked to choose where they would prefer depositing their work if offered options like: a personal website, a departmental website, an institutional repository, and a subject repository. The participants had the choice of selecting as many options as they wished, and the results were as displayed in Table 4.10.

Table 4.10: Distribution of respondents who selected depositing preferences (N = 183)

		Responses	Percent of Cases
		n	(N = 183)
Depositing Preference	Personal Website	53	29.0%
	Departmental Website	73	39.9%
	Institutional Repository	142	77.6%
	Subject Repository	69	37.7%

Note. Assessment is based on valid cases (i.e. the number of respondents).

(Source: Author's field data)

As shown in Table 4.10, institutional repositories took the highest position, with 142 responses. This was followed by departmental websites, then by subject repositories that many were probably not yet aware of or were not there in every field of study. Personal websites took the least responses probably because not very many researchers owned personal websites and therefore saw no reason to select it. These results also showed how highly these respondents valued institutional repositories. However, it was important to establish whether researchers would prefer depositing the publications in the IR themselves or they would need someone to do it on their behalf. As shown in Table 4.11, the majority of the respondents (54%) preferred depositing on their own provided they were guided on how to do it.

Table 4.11: Researcher Deposits or Mediated Depositing (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Who Deposits	1 Deposit on my own	52 (58%)	29 (51%)	17 (46%)	98 (54%)
	2 Need someone to deposit on my behalf (Mediated depositing)	37 (42%)	28 (49%)	20 (54%)	85 (46%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

4.3.5 Acceptance of institutional repository policies in universities

To assess the level of agreement with the establishment of university and funder policies, the respondents were asked to respond to Likert-type questions shown in Tables 4.12 and 4.13.

Table 4.12: University mandate to deposit in the institutional repository (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
University Mandatory Deposit	1 Strongly in favour	66 (74%)	31 (54%)	27 (73%)	124 (68%)
	2 Mildly in favour	13 (15%)	15 (26%)	7 (19%)	35 (19%)
	3 Neither	7 (8%)	2 (4%)	3 (8%)	12 (7%)
	4 Mildly against	0 (0%)	6 (11%)	0 (0%)	6 (3%)
	5 Strongly against	3 (3%)	3 (5%)	0 (0%)	6 (3%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

Table 4.13: Funder mandate to deposit in the institutional repository (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Funder Mandatory Deposit	1 Strongly in favour	66 (74%)	34 (60%)	23 (62%)	123 (67.2%)
	2 Mildly in favour	13 (15%)	15 (26%)	11 (30%)	39 (21.3%)
	3 Neither	5 (6%)	0 (0%)	3 (8%)	8 (4.4%)
	4 Mildly against	3 (3%)	3 (5%)	0 (0%)	6 (3.3%)
	5 Strongly against	2 (2%)	5 (9%)	0 (0%)	7 (3.8%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

As shown in Table 4.12 and 4.13, the majority of the respondents, 68% for university mandates and 67.2% for funding body mandates were in favour of requiring researchers to deposit publications into the institutional repositories in the three universities. Some few were strongly against these policies at Makerere University and Kenyatta University. None of the respondents were in disagreement with these policies at MUHAS, except for three (8%) who were undecided (on neither side).

The question of establishing a university mandate was re-enforced with another question where the respondents were prompted for a reason if they selected "no". The question was: "Would you support the establishment of a policy that required researchers to deposit all their research output in an institutional repository?" To affirm their responses shown in Table 4.12, very few actually said no as shown in Table 4.14.

Table 4.14 Policy to deposit all publications in institutional repository

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Policy to Deposit in IR	1 Yes	73 (82%)	45 (79%)	33 (89%)	151 (83%)
	2 No	16 (18%)	12 (21%)	4 (11%)	32 (17%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

The researchers who justified the reason for selecting "no" were 26. Some of the reasons presented were as follows:

Fifteen (15) of the respondents noted that research not financed by the university should not be dictated over and that researchers should have the freedom to make choices of their own.

Four (4) of the respondents noted that research was done to earn a living and therefore there should be incentives allocated for depositing work in repositories.

Three (3) of the respondents noted that works deposited in repositories should be selectively done because not all works were worth public display, some were patented and others worried for the intellectual property of works like creative works and compositions.

Two (2) of the respondents were worried about plagiarism and their work being stolen by those with funding for commercial use.

One (1) of the respondents was concerned about providing more awareness for one to consent to deposit works in repositories.

4.3.6 Providing open access to content in institutional repositories

To assess why much of the content in institutional repositories in East Africa either had no full-text or had full-text that was restricted, it was important to establish whether the researchers often had the versions required to provide open access and whether they agreed to have those versions deposited into the institutional repository.

Post-prints are the most common version of publications often recommended for self-archiving by most publishers specified on the Sherpa-Romeo site (a site that specifies the permissions that are normally given as part of each publisher's copyright transfer agreement with respect to self-archiving). The respondents were asked whether they normally kept the post-print version of their articles. As portrayed in Table 4.15, the majority of the respondents (75%) in all the universities agreed to keeping their post-print versions of their publications after publishing. This gave the impression that if requested for, the post-prints would be availed for inclusion into the institutional repositories.

Table 4.15: Keeping Post-prints after Publishing (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Do you keep Postprint	1 Yes	70 (79%)	36 (63%)	31 (84%)	137 (75%)
	2 No	6 (7%)	4 (7%)	4 (11%)	14 (8%)
	3 I have never published	13 (14%)	17 (30%)	2 (5%)	32 (17%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

However, researchers have different opinions about the versions of publications provided through institutional repositories, with some considering versions other than the published version as different and misleading when used as references by novice researchers. To get the opinions of the respondents to this study, they were asked whether it would be acceptable to them for the post-print to be held in the institutional repository.

Table 4.16: Acceptance to deposit post-print in the institutional repository (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Deposit Post-print in IR	1 Yes	75 (84%)	51 (89%)	31 (84%)	157 (86%)
	2 No	13 (15%)	6 (11%)	5 (13%)	24 (13%)
	3 Not sure	1 (1%)	0 (0%)	1 (3%)	2 (1%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

Again, as displayed in Table 4.16 the majority of the respondents in the three universities (84% at Makerere University, 89% at Kenyatta University, and 84% at MUHAS) agreed to providing the post-print in the institutional repository. The respondents who declined to provide the post-print in the institutional repository were asked to give a reason. Some of the reasons of the 18 respondents who answered this question were as follows:

Eleven of the respondents' reasons resonated around the following issues: Let the information that was meant for publishing be availed to the public after it has been published. This reduces the challenge of plagiarizing unpublished material or being copied by unscrupulous fellows. Others said it confuses young researchers while citing an article appearing in two different fora with different logos, and it does not look authentic since it is still a draft that may require further review by experts or some corrections might have to be made before publication.

Three were not certain of the accessibility of the post-print in the repository, noting that there may be limited access, or that the work would not be accessible to many academics, or that accessibility may be with difficulty. These respondents were probably not familiar with accessing content in institutional repositories that is why they were uncertain about the accessibility of the post-prints.

Two of the respondents rightfully noted that it depended on the conditions of the respective journal used for publication.

Two respondents also noted that the post-print was for their personal storage because it was their intellectual property.

Content uploaded in repositories may on request be restricted according to some policy. However, with the author's permission content may be left in open access. The respondents to this study were, therefore, further asked whether it was agreeable to them to have the content deposited in repositories to be made open access. The results as portrayed in Figure 4.7 show that the majority of the respondents (97% at Makerere University, 91% at Kenyatta University and 100% at MUHAS) agree to providing open access to content in institutional repositories.

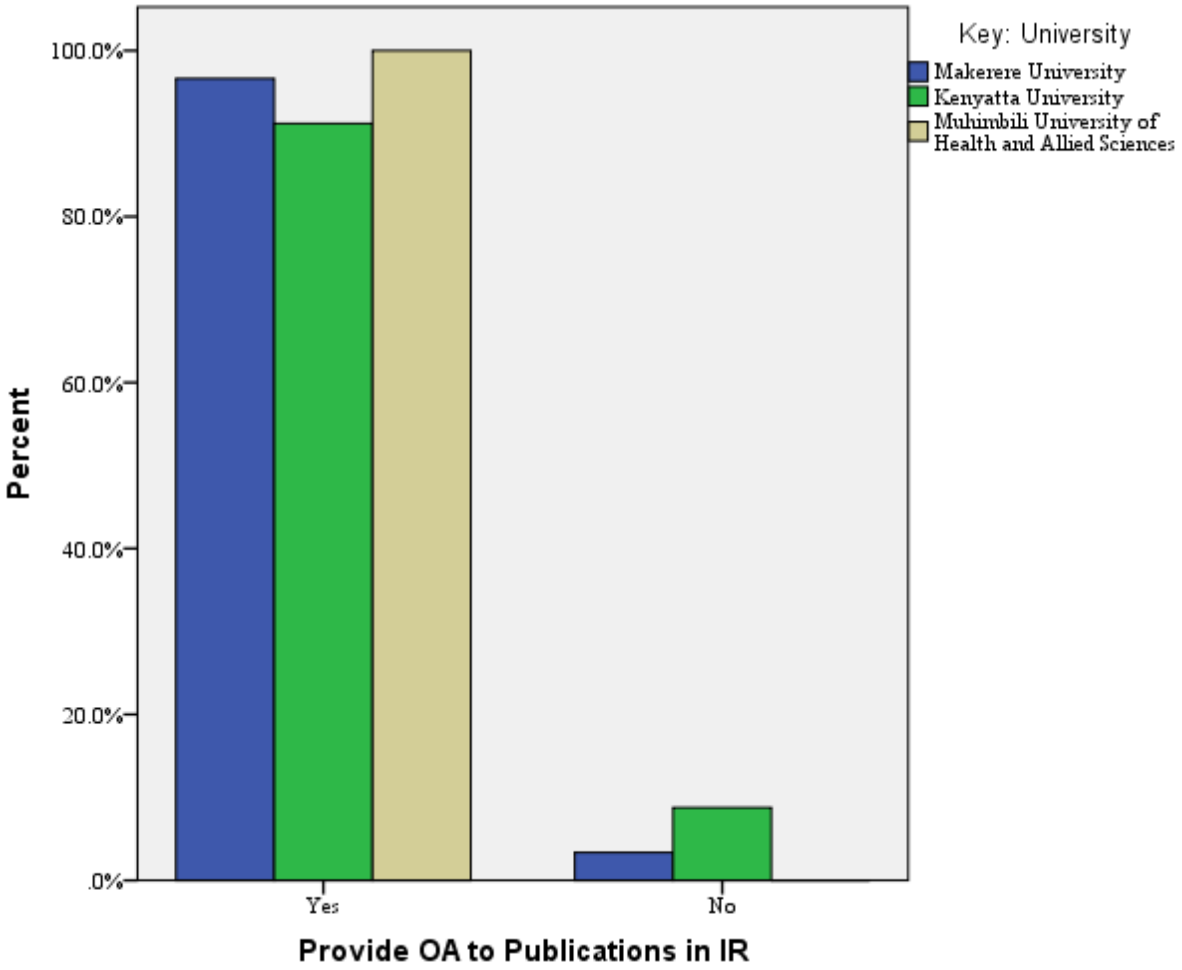


Figure 4.7: Providing open access to publications in the institutional repository

(Source: Author's field data)

The respondents who said no to this question were prompted for a reason. Out of the 6 who responded to this question, only 3 had clearly stated reasons and these were as follows:

"*There could be implications involving the publishers, although, for purely scholarly educational purposes, this may not be a problem*"

"*Because they were not meant for open access. Institutional repository is for public good and keeps information on behalf of the public for future use*"

"*Sometimes the deposited work is pending publication with publishers outside the institution, the intention prevents pre-empting the research*"

Sometimes, researchers are requested to provide publications for depositing into the institutional repository and they avail (most times by e-mail) only the publisher's version or the published PDF, whether it conforms to the publisher's policies or not. To establish the level of awareness building about copyright issues in repositories by universities, the respondents were asked whether their institution offered guidance on copyright issues for materials deposited in the institutional repository. As shown in Table 4.17, there were distinct variations in the awareness about the level of copyright guidance provided in the three universities. At Makerere University, the majority (48%) said there was no copyright guidance offered, while at Kenyatta University (77%) and MUHAS (52%), the majority said there was copyright guidance offered to the researchers about materials deposited into the institutional repository. There were some who were not sure.

Table 4.17: Copyright guidance about publications deposited in the IR (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Copyright Guidance	1 Yes	30 (34%)	44 (77%)	19 (52%)	93 (51%)
	2 No	43 (48%)	12 (21%)	9 (24%)	64 (35%)
	3 Not sure	16 (18%)	1 (2%)	9 (24%)	26 (14%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

4.4 Challenges encountered in managing institutional repositories

A number of institutions on the African continent had positively responded to the emerging global trend of addressing access to scientific literature through open access ventures such as institutional repositories, but they were still encountering challenges in fully providing the full-text online. This section addresses some of the challenges universities in East Africa were facing in managing institutional repositories. The challenges emerged from both the survey and interview responses of this study.

The respondents to this study were provided with some of the known challenges to depositing content in institutional repositories and they were requested to select all those that applied to their situation. The responses are summarised in a multiple response table.

Table 4.18: Distribution of respondents who selected factors limiting deposits in institutional repositories (N = 183)

Factors limiting deposits in institutional repositories

		Responses	Percent of Cases
		n	(N =183)
Factors Limiting Deposit-Q39[a]	Researchers unaware	159	86.9%
	Not mandatory	122	66.7%
	No time to deposit	64	35.0%
	Plagiarism	115	62.8%
	Non-peer reviewed	70	38.3%
	Contradicts publishers' rights	62	33.9%
	Co-authors disagreement	71	38.8%
	Own website preference	43	23.5%
	E-mail preference	29	15.8%
	Repositories non-citable	65	35.5%
	Subject repository preference	51	27.9%
	Repository permanence	91	49.7%

Note. Assessment is based on the valid cases (i.e. the number of respondents).

(Source: Author's field data)

As shown in Table 4.18, the most highly expressed reasons were three, namely, the researchers being unaware about the repository, the process not being mandatory, and the fear of plagiarism. One of these reasons: "the researchers being unaware" was expressed in other questions and was further explained in the sections below.

4.4.1 Limited awareness among researchers

Although numerous efforts had been put in place to ensure that the university communities at Makerere, Kenyatta and MUHAS were informed about open access and institutional repositories through advocacy and training, the outreach had not been wide enough to reach all the researchers. Table 4.19 shows the highly expressed need (92%) for awareness

building about open access and institutional repositories by the survey respondents of this study. This was also supported by the high number of survey respondents (87%) who selected researcher's being unaware as one of the factors limiting the deposit of publications in institutional repositories as illustrated in Table 4.20. The survey respondents further made the same recommendation (building awareness) in the suggestions towards improving the management of institutional repositories in these universities as reported in section 4.5.

Table 4.19: The need for awareness building in the university about open access and institutional repositories (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
OA & IR Awareness need	1 Yes	81 (91%)	56 (98%)	32 (86%)	169 (92%)
	2 No	7 (8%)	1 (2%)	5 (14%)	13 (7%)
	3 Not sure	1 (1%)	0 (0%)	0 (0%)	1 (1%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

Table 4.20: One of the factors limiting the deposit of publications in institutional repositories (N = 183)

		University			Total
		1 Makerere University	2 Kenyatta University	3 MUHAS	
Researchers unaware	0 Not ticked	11 (12%)	8 (14%)	5 (14%)	24 (13%)
	1 Ticked	78 (88%)	49 (86%)	32 (86%)	159 (87%)
Total		89 (100%)	57 (100%)	37 (100%)	183 (100%)

(Source: Author's field data)

4.4.2 Insufficient digitization facilities

Except for Makerere University Library, which had acquired a variety of scanners to handle different tasks such as book scanning, flatbed and sheet-feed scanning, microfilm and microfiche scanning; Kenyatta University, and Muhimbili University of Health and Allied Sciences (MUHAS) had only flatbed scanners used to scan bound thesis and dissertations. This limited the speed of scanning and therefore how much of what could be included in the institutional repository. From the site observations, MUHAS was not doing any digitization

because their scanners had broken down. However, almost every item in their repository was accessible in full-text, meaning they were almost fully implementing open access. Makerere University, on the other hand, had enough equipment, however, most of the items in the repository had the full-text attached but with restricted access.

4.5 Strategies recommended by the respondents and key informants

To improve the management and archiving rates of scholarly information in the institutional repositories in East African universities, a number of suggestions were made by the survey respondents and interview informants of this study. These were as presented below:

4.5.1 Creating awareness:

Creating awareness was the most echoed suggestion among the respondents who proposed a remedy towards the management of institutional repositories in East Africa. To be exact, 45 out of 183 of the respondents mentioned awareness building as the remedy to improving the rate of depositing content in the institutional repository. This clearly indicated that a big proportion of the researchers were not aware of the institutional repository, how it would benefit them and the university as a whole.

4.5.2 Training and sensitization through seminars and workshops:

Training seminars and workshops to sensitise and educate the larger community of students and staff within the university featured highly as a recommendation to get more researchers to self-archive scholarly information in the institutional repositories at Makerere University, Kenyatta University and at MUHAS. This would allay some of the fears and misconceptions about institutional repositories. The researchers noted that stressing the importance or advantages of self-archiving in repositories, their role in widely disseminating scholarly information, and to the visibility of individuals and the institution was important for researchers to get to use them. Building the researchers' confidence and trust in depositing their work in repositories would market them further as they influence each other within their social groups. Guiding the researchers on how to self-archive their work or offering to do it for them would yield more content into the repositories.

4.5.3 Publicity and marketing:

The respondents also stressed that more information should be communicated to the researchers about the availability of institutional repository services, noting that it was lack of awareness of the services and their benefits that were limiting active use. One of the researchers said that "*the institutional repository should be promoted in different ways so as to make it a part of institutional culture*". More adverts marketing and promoting the service were needed to increase its visibility.

4.5.4 Policy formulation and making it mandatory:

Twenty-five (25) of the researchers echoed the need to make it mandatory for researchers to deposit their research output in the institutional repository.

4.5.5 Incentives:

A number of the respondents to the questionnaire tool noted that providing an incentive for those who deposit work in the institutional repository could encourage more researchers to self-archive their work. Such incentives could be crediting value for promotion or consider having deposited publications presented for promotion as one of the promotion criteria. This could encourage those publishing to keep updating their work in the institutional repository.

4.5.6 Mediated depositing:

As noted in Table 4.9 presented in chapter four, 54% of the respondents to the questionnaire tool preferred depositing research output in the IR themselves, while 46% needed someone to deposit on their behalf. Mediated depositing also featured in the recommendations towards improving the management of OA IRs. Four of the respondents further emphasized that there should be staff committed to deposit for those who were unable to deposit for themselves, and some library staff should be assigned the responsibility of keeping track of publications by liaising with authors so that they are deposited in the IR.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0 Introduction

In this chapter, the main findings of this study were discussed. The aim of this section was to highlight the issues that led to the low level of open access to scholarly information in institutional repositories in the selected universities in East Africa and relate the findings to the existing literature.

To the librarians who had experienced the difficulties of subscribing to electronic resources, institutional repositories seemed to provide an avenue of obtaining access to scholarly works easily and free of subscriptions. Giesecke (2011) however noted that the challenge that existed then was identifying articles that were available in full-text from institutional repositories. Universities around the world had developed institutional repositories to simplify accessing research produced in those institutions. The developed world had achieved providing open access through institutional repositories, second to having access to much of the journal collection where they published research. The developing world, especially Sub-Saharan Africa, whose research hardly got published in renown international journals would have benefited more by providing open access through institutional repositories (Chisenga, 2006). However, they were instead making it visible on the Internet through institutional repositories by providing abstracts, with no full-text. What was the problem? The overall research question to this study was: "how could access to scholarly information in institutional repositories in East Africa be increased?" The sections that follow provide useful pointers to the factors that affect providing open access to scholarly information in institutional repositories that other universities in East Africa could note as precautions as they manage their repositories.

5.1 Management of, and access to scholarly information in IRs

5.1.1 IR management initiation phase and the need for policies

Although universities in East Africa have managed to setup institutional repositories, they have done so in nations devoid of open access policies or government support. Babu, Kumar, Shewale and Singh (2012) while writing about the challenges of institutional repository

development in India recognised the fact that the flourishing of repositories required some government support, just like it was in the UK. According to Chan and Costa (2005), the UK House of Commons Committee on Science and Technology, on realising the need for access to scientific publications, released a report on 20th July 2004 recommending among other things, the government providing funds to all UK universities to launch OA institutional repositories; and all authors of articles based on government-funded research to deposit copies in their institutional repositories. Such government support was what enabled open access in the UK to reach its maximum in almost all institutions of higher learning. On top of this, the Joint Information Systems Committee (JISC) in the UK ensured that the implementers of institutional repositories were skilled enough before initiating repositories by providing support infrastructure under the Repositories Support Project (Pennock & Lewis, 2007). All these efforts had direct implications on the management of institutional repositories, especially the collection development processes followed for the content in institutional repositories, and the access policies, which in most cases promoted open access. For the case of East Africa, Kenyatta University and Makerere University started implementing their repositories before instituting OA policies and IR policy guidelines, and in the absence of government or national OA policies, ending up with the dilemma of how to encourage researchers to self-archive and provide open access to the content deposited in their repositories.

The universities in this study relied on the existing IPM policies of the institution while implementing their IRs, but these policies did not appropriately define the copyright issues that got to affect the content deposited in the IR. This could have directly affected the researcher's/depositor's willingness to participate in self-archiving or providing their research output for inclusion in the IR for open access. The absence of institutional copyright policies could have also contributed to the ambiguity of what to disseminate as open access in the institutional repositories at Kenyatta University, Makerere University and Muhimbili University of Health and Allied Sciences. A number of universities in the Western world, for example, the University of Toronto in Canada provide their copyright policies online for the research community to know what is required of them when self-archiving or providing content for mediated archiving. This mitigates some of the issues that hinder researchers from self-archiving in the institutional repository.

Educating researchers about the creative commons licenses and how to use them within their documents (especially for theses and dissertations) could also help them in applying that knowledge as they publish in whatever avenue that they choose, the IR inclusive. There was acknowledgement of knowledge about the creative commons licenses acquired through training among the researchers but this had not been put into practice, except for some of the KU librarians who had declared the general status of the creative commons licenses on the IR website, but not on the individual items in the repository. The effectiveness of the creative commons licenses is achieved when applied to each item in the repository. This could be spelt out in the metadata of each item and included on the cover page of each item to remind the end user how to re-use whatever is downloaded from the repository.

It is widely known that open access enables the accessibility of scholarly information by eliminating the restrictions on access. However; Lee, Burnett, Vandegrift, Baeg and Morris (2015) argued that the mere presence of an item within an institutional repository does not guarantee that it is accessible. Universities in East Africa have been mindful of having numbers (more items of records visible online) than providing open access to the content in institutional repositories. This problem could be traced from the way institutional repositories were developed in the universities in this study. As noted in section 2.3.1 of this dissertation, "many institutions committed the mistake of planning for institutional repositories according to the software workflow process. Learning from institutions that used similar software, they observed how the workflow was conducted and used that as the basis to start their own institutional repositories". This was noted in the findings of how the institutional repositories at Makerere University and Kenyatta University were developed. The submission and editorial workflow processes of the DSpace system could, however, be used to align self-archiving of research output in the IR with the university workflow practices.

5.1.2 Institutional repository objectives in universities

The goal of initiating the then Uganda Science Digital Library (USDL), which later became Uganda Scholarly Digital Library, and then Makerere University's institutional repository, was to make scientific literature produced in the country more accessible digitally. However, the procedures that were adopted to achieve this goal were not systematic enough to provide open access directly, in that most of the items in the repository had full-text but with restricted access. Depositing items in the repository without author consent procedures or

policies had largely contributed to the limited access to the scholarly information in Makerere University's Institutional Repository. Makerere University was, however, not alone in this. There were some similarities to how DigiNole Commons, the institutional repository at Florida State University was developed, accounting for the inaccessibility of some items in this repository. Although the goal of DigiNole Commons was to provide open access to the materials in its collection, Lee, Burnett, Vandegrift, Baeg and Morris (2015) reported that

> As the development of DigiNole Commons was on-going, there were cases where metadata was entered to demonstrate the institutional repository's functions and value to a department or faculty member, with the goal of submitting the full text of the articles at a later date following subsequent individual outreach (p. 14).

This report shows that some items in DigiNole remained without full-text in the repository. Similarly at Kenyatta University, abstracts of theses and dissertations extracted from the DATAD project were uploaded in the institutional repository at the beginning, and although retrospective scanning of the theses and dissertations was on-going, the metadata only content accounted for the limited access to the scholarly information of this repository. The aforementioned challenge of having metadata only records or records with restricted full-text was not peculiar only to universities in East Africa, but noticeably in Canada as well. Shearer (2006, p. 169) while writing about the Canadian Association of Research Libraries (CARL) collaborative institutional repository project noted that the participating institutions were not applying the same scope of collection policies, making it difficult for the harvesting process. Some IRs were used as publishing platforms for journal issues, while "others allowed authors to restrict access to the material they deposited" or collected only metadata records without links to the full-text. This challenge was however, noted in the first surveys that CARL undertook while monitoring the collaborative IR project, and it could have been addressed later. For the case of IRs in East Africa, this problem was still persistent years after implementing these repositories.

5.1.3 Management models and services in institutional repositories

According to Swan (2008):

> Repository services are one of the main keys to success for repositories. Useful, popular services can really boost the use of repositories, both by information creators and information seekers. Repository managers need to ensure the content of their

> repository is fully visible and harvestable by service providers who will drive the use of that content as a result (p.3).

While explaining the service oriented IR management model, Armstrong (2014) noted that librarians could create and utilize this management model to ensure the delivery of various types of IR services (elaborated by Swan (2008) as: digitisation services, IPR / copyright advisory / information services, open access advisory / information services, metadata creation services, metadata enhancement services, access and authentication services, usage data services, research monitoring and analysis services, personalisation services and publishing services). The service oriented IR management model could help in achieving the "desirable infrastructure to engage more with the researchers and assist them throughout their scholarly communication life cycle" (p. 43).

As stipulated in the theoretical framework of this study, university libraries as innovators had been hailed for initiating and managing institutional repositories by adapting their traditional collection development practices (Bjork, 2004) that had for years been known to be systematic enough to ensure user satisfaction. However, these practices did not seem to have been adequately utilised in institutional repositories of the universities in this study. Ideally, following the copyright licensing procedures, the consent of an author was essential for any item solicited for deposit in an institutional repository, and this could have been achieved through developing policy guidelines for collection development at the beginning of initiating repositories in universities. All these universities had policies on the depositing of physical/print theses and dissertations to the library, and they took advantage of centrally housing the theses and dissertations by digitising and uploading them in the institutional repository, prior to obtaining the authors' consent. With this practice, where it was not clear to the person performing mediated depositing of theses and dissertations in repositories whether to make them open access or not, the end result was to make the metadata visible and the full-text restricted or not attached at all. Genoni (2004) acknowledged the fact that although repositories were meant to support open access, there were some categories of content for which unrestricted access may not be provided. In the case of theses and dissertations collected by the library before the initiation of institutional repositories, the associated open access policies developed often specified the starting date for which depositing of electronic theses and dissertations would be enforced, with procedures of how

retrospective digitisation of print theses and dissertations would be undertaken (if it was a prioritised collection for inclusion in the institutional repository).

The mediated archiving management model where the librarians collected publications either directly from the researchers or sourced for them online and deposited them in the institutional repository on behalf of the researchers was the common practice done in the three universities in this study. The respondents in this study were asked whether they would do the depositing of the publications themselves or they would need someone to do it on their behalf. Slightly more than half (54% as shown in Table 4.11) of the respondents preferred depositing publications in the institutional repository on their own provided they were guided on how to do it. MUHAS however had less than half of the respondents (46%), meaning most of them preferred mediated archiving. The results for Makerere University and Kenyatta University agree with Abrizah (2009) and Singeh, Abrizah and Karim (2013) where the respondents preferred self-archiving materials in the institutional repository themselves.

Xia and Sun (2007) who did a study on nine eprints repositories selected from Australia, Italy, Sweden and the UK noted that the majority of the documents had been deposited by either a librarian or an administrative staff, implying that mediated archiving was being used in these repositories; and the rate of full-text availability was relatively low, except for Australian repositories. There, therefore, might be a relationship between mediated archiving and open access to materials in institutional repositories. Abrizah (2009) was of the view that when librarians collect and deposit materials into the institutional repository without the author's knowledge, it contributes to the level of unawareness since most of them would not know that their work was deposited there. Abrizah reported that almost two-thirds of the respondents to a study that was done in a research intensive university in Malaysia were not aware that their institution had an institutional repository; and attributed this unawareness to mediated archiving.

Bjork's (2004) perspective of mediated archiving where only the restricted publisher's version that the librarians might have access to is deposited; relates to Xia and Sun's (2007) findings. Comparing institutional repositories to subject-based repositories (pre-print archives); Bjork further noted that "it was the author of the work who voluntarily put up a copy of their scientific publication on the server, and not a third party as is the case in many institutional repositories. Having mediated archiving in institutional repositories was where the legal issues prominently came in especially when the mediator only had access to a copy

of the publisher's restricted version." It was, therefore, good practice for the authors or researchers to archive materials in the institutional repository themselves; however, research has shown that authors do not always practice what they say. Chan, Kwok and Yip, (2005, p. 269) noted that "the real world is always very different. Researchers may support the project in principle, but very few take action voluntarily" Although open access was not always the end result of mediated archiving, librarians may still have to practice it, adopting proactive strategies like those undertaken by the librarians at the University of Glasgow (Ashworth, 2004; Mackie, 2004) and at the Hong Kong University of Science and Technology (HKUST) (Chan, Kwok and Yip, 2005); where follow-up was done to collect the versions that were accepted for deposit in the institutional repository by the publishers, from the authors.

Therefore, the process followed while conducting mediated archiving was very essential in content collection for institutional repositories to ensure open access. Watson's (2007) study showed that QUEprints (the institutional repository at Cranfield University) had over 1,600 items, with 26% of them being preprints or postprints that were open access, requested from the authors and deposited in the repository by Library staff via a mediated deposit service. In Korea, the managers of the dCollection, a nation-wide repository developed by the Korea Education & Research Information Service (KERIS) received online agreement for copyright from the authors of theses before uploading them in the repository (Shin, 2010). Makerere University was in the right direction when it designed consent agreements for student dissertations and theses, and for authors of journal articles. The problem that limited using those consent agreements was that they were part of the IR policy document that had not yet been approved by the university administration. Chan, Kwok and Yip (2005) elaborated how consented collection development was done at the Hong Kong University of Science and Technology (HKUST) institutional repository; ensuring that whatever was deposited in the IR was open access. Examples of the procedures that they took are shown below:

For journal articles:

> We did not stop at the ROMEO site. We searched the web for publishers not analysed on ROMEO, and identified their policies and requirements. If we could not trace the policies of certain publishers, we wrote to them to ask for permission, usually with a defined list of articles that we wished to archive. (Chan, Kwok & Yip, 2005, p. 273)

"Our Collection Development manager negotiated with 40 publishers last year, and successfully obtained approval from 19 of them for 120 journal and conference papers." Scanning departmental and personal web sites for full-text research publications: … "The University librarian e-mailed them and obtained permission to post about 150 documents in the IR" (Chan, Kwok & Yip, 2005, p. 275).

For PhD theses: … "Our colleagues in Acquisitions contacted PhD alumni to secure their consent. In total, we added more than 300 open access theses to our IR." For conference papers: … "*For those proceedings published in-house*, copyright belongs to the university. We targeted those papers authored by HKUST members and e-mailed them for permission" (Chan, Kwok & Yip, 2005, p. 276).

These are good examples of proper collection development for the institutional repository that where not being practiced in the universities in this study. The lesson learned, therefore, was that proper collection development procedures should be put in place for the institutional repository before embarking on actual implementation and web-presence to be able to provide open access.

5.1.4 Stakeholder involvement in institutional repository activities

The activities of the institutional repositories in all the universities in this study were exclusively done by specific units in the library; that is, the special collections section at Kenyatta University Library, the digitisation section at Makerere University Library, and the ICT section at Muhimbili University of Health and Allied Sciences Library. Makerere University exceptionally involved the College Librarians in promoting the repository, collecting and uploading scholarly information in the repository; although a few of them actively participated in submitting research materials in MakIR.

Repository activities require substantial outreach and educational efforts campus-wide (Emmett, Stratton, Peterson, Church-Duran & Haricombe, 2011) in order to achieve success in providing open access. While implementing, maintaining and supporting an institutional repository, these roles need to be approached as a team, and this team needs to be all embracing, including all stakeholders of the university. The University of Kansas Libraries involved all categories of staff in reaching out to the researchers, soliciting for scholarly materials and involving them in alternative methods of disseminating their research, all culminating in achieving open access in the repository. Beaubien, Masselink and Tyron

(2009) asserted that training and involving liaison librarians in institutional repository activities helped build a larger pool of expertise than dealing only with a few librarians located at the central library of the university as was the case in the universities in this study. While developing the institutional repository at Grand Valley State University in Michigan, USA; the project ad hoc committee thought "it was imperative that all librarians become confident in communicating with university faculty to solicit participation in the project, in particular, liaison librarians who had already successfully integrated themselves within departmental disciplines" (Beaubien, Masselink, & Tyron, 2009, p. 98). Liaison librarians in this case could be related to College or Branch librarians in the East African universities in this study.

Involving many librarians on the institutional repository project from the very beginning builds a better sustainability group that reaches out university-wide, continuously, and helps mitigate the common myths that often hinder the provision of open access. However, before involving the librarians in the repository project, establishing their knowledge and experience levels with scholarly communication and open access were essential, in order to appropriately plan for the kind of training needed to further empower them as was done by Grand Valley State University Library. Establishing the knowledge gap of the College and Branch librarians about open access and scholarly communication in general were an area that could be explored further in the universities in East Africa as they address the challenges leading to limited open access in institutional repositories. Librarians need to continuously build their knowledge base on the changing scholarly communication arena, as they are initially guided on how to promote the institutional repository within the university. Jenkins, Breakstone and Hixson (2005) further emphasize involving library staff with different backgrounds and expertise from a variety of areas while developing and promoting the institutional repository. Involving liaison librarians or college librarians who have immerse subject knowledge in the disciplines that they work with, and who interact with researchers on a daily basis facilitates the process of collecting content into the institutional repository. The college and branch librarians were also in a better position to encourage researchers on a daily basis to negotiate with publishers to retain the right to self-archive their scholarly information in an institutional repository. This was more so where the university did not have an institutional addendum for general use by all authors or an open access policy. Direct contact with the researchers gave the college and branch librarians the opportunity to express and explain the need to provide open access to a researchers work in the institutional repository and therefore, their

knowledge and awareness about open access needed to be enhanced. Recruiting new staff to occupy the emerging positions as a result of embracing institutional repositories was an option done in the UK, Europe and USA but rarely done in the universities where this study was conducted. Palmer, Teffeau and Newton (2008) noted that:

> IR development had resulted in new responsibilities for academic librarians in planning, management, and technical development. To meet these demands, some established positions had been modified; additional technical lines, such as research programmers, had been added; and new types of positions had been created, such as repository coordinator, intellectual property specialist and data research librarian (p. 15).

Besides enhancing the skills of librarians in general, the college and branch librarians need to position themselves as change agents as stipulated in the diffusion of innovations theory, while promoting the institutional repository and persuading researchers to use it. Buehler and Boateng (as cited in Wireman, 1998) pointed out that as change agents, librarians need to possess the five major characteristics of "creativity, courage, visibility, perseverance and driving motivation" because the task of promoting the institutional repository included encountering resistance, which slows down the process of garnering content into the repository. Chan, Kwok and Yip (2005) added patience, flexibility and persistence to the list of characteristics that IR librarians need to have. Bell, Foster and Gibbons (2005) found out that researchers were slow in depositing content in the institutional repository because they were not aware of the benefits of doing so. Researchers only became willing content contributors in the repository after librarians had provided individualized information and direct support. This called for the active involvement of the college and branch librarians in the universities in this study, who were in direct contact with the researchers and could help in reaching a wider audience of the researchers in the university.

Palmer, Teffeau and Newton (2008) noted that "unlike other aspects of repository building, liaison networks with faculty were already a functioning part of library operations" (p. 29) and were already serving as essential human infrastructure in IR development in Europe, an aspect that needed more attention in the East African region. As institutional repositories evolve, liaison librarians should be involved more in "communicating IR development interests to faculty to influence their scholarly communication practices" (p. 29). College librarians in East Africa if appropriately trained could perform liaison roles (in comparison to

librarians in Europe) "to inform planning and policy decisions, to identify potential early adopters, and to communicate the mission of the repository to faculty" (p. 29). "The issue raised is that IR innovators must endeavour to identify all IR innovation stakeholders and provide avenues for negotiating collective IR innovation objectives that are acceptable to all of them" (Utulu & Ngwenyama, 2017, p. 9).

5.2 Researchers' participation in OA activities and the accessibility of IRs

5.2.1 Researchers' awareness, participation & use of OA facilities

In this study, 81.4% of the respondents were in favour of the open access principle, while more than 50% were aware of the institutional repository in their university. Researchers' awareness and support of open access are essential for the provision of full-text materials in institutional repositories that are freely available to the public. While addressing the issue of open access to scientific publications, Bjork (2004) concluded that "general awareness of the advantages of open access publishing was naturally a prerequisite for scientists choosing to use OA channels both for primary and secondary publishing and much remained to be done to achieve this". In other words, a lot still needed to be done way back in 2004 as far as broadening the researchers' knowledge about open access, and institutional repositories in particular, for them to actively use them. Although the majority of respondents in this study were in support of the open access principle, they had not yet put it in use, since the full-text to the materials in the repositories in this research were either not attached or restricted. This was in agreement with Bjork, that a lot still needed to be done, especially in following up with the researchers to obtain the versions of materials that were agreeable with the publisher self-archiving policies so that repositories in East African universities were more open than they currently are. Just as Swan and Brown (2005) established that most of the academic authors were not familiar with the concept of institutional repositories; Papin-Ramcharan and Dawe (2006) asserted that if authors were unaware of the existence and benefits of archives then they would not self-archive. Proudman (2007) affirmed this by noting that researchers were reluctant to post materials to an IR where the benefits were unclear. The level of awareness about institutional repositories has however been improving over the years. Creaser, et al (2010) established through literature that the acceptance of open access among researchers was increasing, and they were in particular supportive of open access repositories.

Although the level of researcher awareness about open access and institutional repositories had kept improving over the years, awareness did not necessarily equate to use as demonstrated in Watson's (2007) and Dolan's (2011) studies. In both these studies, faculty members were aware of their university's institutional repositories, but they had never used them either to deposit their own publications or retrieve information in line with supervising graduate students for the case of Dolan's study where soft copies of ETDs were in the repository but faculty preferred using the hard copies in their offices. In this study, more than 50% of the respondents were aware of the institutional repository in their university. However, when asked how they publicized their work for others to use it, only 14 respondents indicated using repositories, while 6 indicated using open access avenues. This agrees with Morris and Thorn (2009) that awareness could be at a basic level, with most of them acknowledging them in theory than in practice. Bankier, Foster and Wiley (2009) also noted that campus awareness of the IR does not always equate to participation by means of flocking to use it. Foster and Gibbons (2005) established that although faculty at the University of Rochester were aware of the institutional repository, one of the reasons why they were not rushing to put their work in the repository was because they had not recognized its benefits to them in their own terms. The respondents in this study may not have previously (before this study) been aware of the institutional repository as one of the publicity avenues for their work, because when asked where they would prefer depositing their work if offered options like a personal website, a departmental website, an institutional repository and a subject repository; 142 (out of 183) of the respondents choose institutional repositories. This indicated that once institutional repositories were well publicized and promoted in-line with how they benefit the researchers as individuals other than how they benefit the institution in general, researchers would get to deposit their work in repositories and make it open access. Therefore, awareness building was still an essential tool in getting researchers in universities to use institutional repositories.

5.2.2 Researchers' acceptance of self-archiving mandates in universities

The respondents in this study were positive about having self-archiving mandates in their universities. The majority of the respondents (68% for university mandates and 67.2% for funding body mandates) were in favour of requiring researchers to deposit research output in the institutional repositories in all the universities in this study. This corroborated with Singeh, Abrizah and Karim's (2013, p. 29) study where "the great majority (77.8%) of the

respondents were of the opinion that their university should introduce mandates to promote self-archiving." A number of studies also reported that researchers would be willing to self-archive their publications in institutional repositories if either their institutions or grant funder's required them to do so (Abrizah, 2009; Dutta & Paul, 2014; Goutam & Dibyendu, 2014; Kennan, 2007; Kim, 2007; Sale, 2006; Singeh, Abrizah & Karim, 2013; Swan & Brown, 2004; 2005; Yang & Li, 2015). Pinfield (2005) emphasized that mandates helped to quickly overcome the cultural and managerial barriers to self-archiving and that it was up to the key stakeholders and policy-makers to take up the opportunity and make open access happen in the shortest possible time. It was projected that if repositories held a large proportion of the research literature, then they would certainly create major improvements in scholarly communication.

Self-archiving mandates or policies that required researchers to deposit their published scholarly writings and/or research data in institutional repositories had contributed a lot to the provision of open access in repositories. The first university-wide open access mandate was implemented by the Queensland University of Technology, Australia in 2004; and it registered tremendous success, with many other institutions following thereafter. In Xia and Sun's (2007) study, which explored nine eprint repositories selected from Australia, Italy, Sweden, and the United Kingdom, all the four Australian IRs showed low rates of non-full-text documents, with a percentage as low as 5% or less; and this was attributed to the existence of mandate policies by Australian universities. Although it was mandatory for students at Makerere University, Kenyatta University and MUHAS to deposit paper/print or hard copy theses, dissertations and research project reports to the library, the process had not been appropriately translated and embedded in the IR workflow tasks, which could be incorporated as a recommendation of this study.

It was also widely reported how funding body mandates had raised researcher awareness and participation in OA (Dolan, 2011), and also contributed to the provision of open access in the UK, Austria, Sweden, Canada and Australia (Swan & Hall, 2010). In Abrizah's (2009) study, the respondents favoured the funding body mandates more than the university mandates. Just like Abrizah's study, this study did not establish the university's or grant funders' attitude towards self-archiving or their likelihood to introduce mandates to enforce open access. Kim (2006) noted that grant-awarding bodies and university or departmental actions could lead to researchers' decisions to support open access. Therefore, advocacy for

self-archiving in institutional repositories should also be directed at government policy makers and the international donor community, who in most cases funded research in universities in East Africa. Organisations such as SIDA and CCNY that predominantly funded research at Makerere University should require that the research findings and publications that they fund be deposited in the institutional repository for its wide visibility and accessibility by policy makers and the general public. Access to research in the developed world had been made possible by policies and mandates to self-archive by funding organizations. Universities in East Africa could greatly benefit from funding mandates, especially in situations where there were no national open access policies existing for researchers to self-archive their publications.

5.2.3 Providing OA to content in IRs

Open access to content in institutional repositories in universities in East Africa was noted to be low. However, the majority of the respondents to this study (75%) maintained copies of the post-print versions of their articles after publishing. This meant that, if the researchers were requested to provide the post-prints for depositing in the repository, these versions would be available. Furthermore, although "authors tended to have a highly restrictive view of copyright permissions relating to pre-prints and post-prints," (Creaser, et al, 2010, p. 157) the majority of the respondents to this study (86%) agreed to provide the post-print as open access in the institutional repository. This implied that the vigilance in collecting post-prints from researchers in universities in East Africa needed to be increased to have these materials deposited in the institutional repositories. However, some researchers thought putting pre-prints and post-prints in the repository was not authoritative enough since they were not the 'version of record'; and having versions of the same publication in the repository would be confusing to the users (especially students while citing such work). This called for the need of the librarians to enhance the training of citing and referencing the different types of materials found in institutional repositories.

The success of an institutional repository may be measured according to the objectives for which it was established. Some researchers considered the number of items deposited in the repository as one of the ratings of success. Xia and Sun (2007), however, regarded the rate of full-text availability in the repository as the greatest indicator of success. This was based on the fact that when users or researchers seek for information, they are interested in the full-text documents and not the metadata. Open access to the full-text documents in institutional

repositories were therefore essential success factors. The level to which this might be achieved depends on the vigilance of obtaining the versions of documents that publishers allow for self-archiving and getting the consent of the authors for other materials such as theses and dissertations if they are not mandated for open access in the repository. For journal articles, over 90% of journals (Singeh, Abrizah & Karim, 2013; Swan & Brown, 2005) allowed self-archiving either the pre-print or post-print versions in institutional repositories.

Having established how cautious researchers were about depositing post-prints in repositories from previous studies (Foster & Gibbons, 2005; Sale, 2006), repository managers could embark on educating researchers about their rights in relation to their own work for them to start negotiating for open access clauses in copyright agreements with non-open access publishers (Lee, Burnett, Vandegrift, Baeg & Morris, 2015). Literature (Armstrong, 2014) shows that it was common practice for authors to sign publisher copyright agreements without paying critical attention to the policy clauses stipulated in the agreement or retaining copies of these agreements for future reference, with the end result of "freely giving up full copyright to their publishers" (Palmer, Teffeau & Newton, 2008, p. 157). Designing addendums or adopting the SPARC addendum and educating researchers how to use them to negotiate for self-archiving rights could minimize the tendency of accepting the rigid publisher agreements as provided with fear of publishers refusing to publish one's work. Researchers should be shown how to be bold when demanding for their rights from publishers.

5.2.4 Addressing the challenges encountered while providing OA in IRs

While exploring some of the challenges that affected the deposit of materials in the IR, the respondents to this study selected researchers being unaware about the repository, the process not being mandatory, and the fear of plagiarism as the major issues, rated in that order. These challenges were expressed in other studies though not at the same rating. Austin, Heffernan and David (2008) reported that the main reasons identified by participants for not depositing an item into an institutional or other repository were a lack of awareness and uncertainty regarding copyright. Lack of awareness and confusion about copyright issues were also expressed as the known barriers to faculty participation in Dutta and Paul's (2014) study. Open access could only be achieved by depositing the right version of publications in IRs, which in most cases was successful with the authors consent. This meant that the authors had

to always be informed about their publications being deposited in the IR as mediated archiving takes place so that they provide post-prints when needed.

Worries about copyright infringement were further expressed in Allen's (2005) study, Foster and Gibbon's (2005) study, Pickton and McKnight's (2006) study, Abrizah's (2009) study, Dolan's (2011) study and Singeh, Abrizah, and Karim's (2013) study. According to Creaser, et al (2010, p. 157), "it was not clear to authors what their rights were once they had signed a Copyright Transfer Agreement with the publishers." This could still be regarded as the researchers' unawareness about their self-archiving rights. All these challenges related to providing researchers with the right information at the appropriate time, either while marketing the repository or educating them through workshops while explaining the process of self-archiving their research materials. It is advisable to use all possible avenues of reaching out to the community of researchers in the university because using one approach alone may not fit all categories or disciplines. It might be easy to miss an e-mail message or fail to attend a workshop because of one's busy schedule but be able to catch up with a newsletter article or a website message about self-archiving work in a repository. These were strategies that were lacking in the universities in this study.

Kenyatta University, Makerere University and MUHAS mainly used sending e-mail messages and conducting workshops as the means to promote the institutional repository, which were not sufficient in reaching all the researchers in their universities. Websites on open access and how it applied to individual institutions could be a good and permanent source of information and easy pointer for those who might not be able to attend face-to-face workshops. Dulle (2010) recommended linking open access information sources to library websites for users to access. This could be an easy way of getting researchers to find information on open access from one location, which off course could still be distributed through promotional materials like leaflets and brochures. Abrizah (2009) recommended providing FAQs (Frequently Asked Questions) covering topics such as ownership of copyright, the use of creative commons licenses while providing open access, self-archiving and the exposure of plagiarism, preservation of materials and file security, how to determine what to self-archive using the SHERPA/RoMEO list of journal publishers' self-archiving policies.

It was common practice in the developed world for the library to have a page on the institutional website devoted to open access activities in the university. On this page, open

access was clearly defined, with all the associated activities and policies spelt out for the university community to know. For instance, at Harvard University, it was presented on a website named "Office for Scholarly Communication" accessible at https://osc.hul.harvard.edu/. At the University of Bergen, a whole web page was devoted to explaining about open access for the researchers to know and participate (http://www.uib.no/en/ub/79535/open-access). In South Africa, the University of the Witwatersrand, Johannesburg had a website devoted to explaining about their institutional repository, under LIBGUIDES, accessible at http://libguides.wits.ac.za/WIREDSPACE. None of the universities in this study had a web page or website devoted to explaining open access and the activities of the institutional repository. This limited the publicity and marketing only to workshops and seminars whose coverage was often limited to a few members of the university community.

Swan and Brown (2007) reported about a survey conducted in the UK, and noted that researchers considered the library as the place where they could find help about creating and finding open access materials. Swan and Brown noted that the libraries undertook various activities to inform the researchers about open access "including running seminars and training, producing marketing and advocacy materials and using the library website to create an open access resource". These were strategies that could have been adopted by the repository managers in the universities in East Africa.

Nabe (2010, p. 71) advised repository managers to prepare a marketing plan, with clear messages for the different stakeholders. He noted that "just as the members of any institution have diverse ways of communicating information, they also had diverse preferences or styles for acquiring information. A marketing plan should reflect this diversity and incorporate a number of ways of delivering the message about the IR." Rowlands and Nicholas (2005) advised IR managers to avoid using one-size-fits-all solutions given that there are a number of disciplinary cultures that influence the researchers' attitudes. The repository managers in the universities in East Africa should be more focused with well-planned and probably documented marketing strategies for proper follow-up.

5.3 Strategies for increased open access to scholarly information in IRs

Strategies for appropriately managing repositories and informing researchers about the importance of depositing their research output in institutional repositories for open access

were the main purpose of this study and they are hereby discussed with reference to the three IR management pillars of planning, staffing and marketing:

5.3.1 Strategy on planning

The task of identifying journal articles authored by researchers in an institution is not easy because they are scattered in various journals. It is essential, therefore, to plan ahead and encourage researchers to develop Google scholar citation pages for their publications for easy follow-up by the institutional repository managers. A sample of researchers and directors/university librarians who were leading by example (with Google scholar citation pages) in the universities in this study included: Professor Maria Musoke of Makerere University, whose Google scholar citation page was accessible at https://scholar.google.com/citations?user=P2HFFZsAAAAJ&hl=en, Associate Professor E. T. Lwoga, the Director, Directorate of Library Services at MUHAS, whose Google scholar citation page was accessible at https://scholar.google.com/citations?user=jQ2AojEAAAAJ&hl=en, and Dr. George Gitau Njoroge, University Librarian, Kenyatta University, whose Google scholar citation page was accessible at https://scholar.google.com/citations?user=wpnfLjsAAAAJ&hl=en. These citation pages help in tracing the researcher's publications for inclusion in the institutional repository. The repository manager at Kenyatta University mentioned that some of the lecturers had Google Scholar citation pages from which they got publications for deposit in the institutional repository. Google Scholar citation pages are also good to have because they are an additional publicity tool for a researcher's work.

Designing policies to guide researchers and enforce depositing of scholarly information in the institutional repositories is an essential first step when developing repositories in universities. Making the process of self-archiving in the institutional repository a university requirement or making it mandatory and tagging some of the workflow processes like depositing all publications into the repository before applying for an appointment or promotion would compel researchers to abide by the rules. It could also improve on the level of awareness about the institutional repository within the university. Graduate students could also be required to submit their theses and dissertations, and publications out of their research in the institutional repository before graduating, with the graduate school and the department responsible for student research grants cross-checking this as the students submit the hard

copies of their theses and dissertations. These are some of the university work practices that could be incorporated in the IR workflow processes.

The repository managers should endeavour to develop policies & policy guidelines for each type of collection in the institutional repository and make them public for easy reference. For example, MUHAS's institutional repository policy was listed among the other university-wide policies for easy reference and access by the researchers. Encourage each funding body to adopt an open access policy and encourage self-archiving in the institutional repository. For example, RUFORUM had a repository where it deposited the research it funded, and it was mandatory for the research that they funded to be self-archived in the repository. Harvard University had a strategic approach to ensuring that all its Faculties and Schools gave the University a non-exclusive, irrevocable right to distribute their scholarly articles for any non-commercial purpose (https://osc.hul.harvard.edu/policies/). In other words, each of the schools at Harvard University had an open access policy. The strategy used was that of segmenting the community according to the disciplines, which could be related to the different adopter categories, endorsing Rogers' theory by first convincing the early adopters, and then letting the others follow later, like the late majority.

Design webpages explaining the role open access & the institutional repository play in the life of a researcher and the institution in general, with resources like the brochure provided online for easy reference could be an approach to wider communication and marketing of the IR services. For example, Harvard University Library under the Office of Scholarly Communication (https://osc.hul.harvard.edu/) clearly explained to the researchers what services were provided under open access, with procedures of getting their research deposited in DASH – Digital Access to Scholarship at Harvard, the university's open access repository. Jenkins, Breakstone and Hixson (2005) noted that even hand-outs used during meetings should also be made available online for future reference. To ease the librarians' IR training and promotion work, the University of Rochester designed an internal document for the liaison librarians to use while responding to common questions raised by researchers, thus empowering even the inexperienced librarians to promote the IR in ways that capture the attention and interest of researchers (Bell, Foster & Gibbons, 2005).

Design or adapt addendums (Appendix 4) that researchers could use to negotiate for self-archiving rights with publishers. Efforts towards promoting green open access by encouraging authors to negotiate retaining their copyright or rights that enable them to self-

archive when they publish in traditional journals should be initiated. This could be done by institutions designing addendum for use by their researchers, although, this has to correspond with the institutions' open access policy.

Institutional copyright policies are essential documents in universities that should work hand-in-hand with the Intellectual Property Rights/Management policies. The absence of copyright policies in the universities in this study could have been the major cause of the limited open access to the institutional repository information resources. It is, therefore, important for universities in East Africa to endeavour to have copyright policies.

5.3.2 Strategy on staffing

The network of people advocating for self-archiving in the institutional repository was limited to the librarians directly involved in specified units or sections in the library. MUHAS could be an exception since it had an institutional repository team composed of librarians and researchers in the different schools of the university. There was need to establish an advocacy and marketing team to plan an outreach programme intended to inform all researchers about the institutional repository following a customer-driven marketing strategy, and preparing an integrated marketing plan as described in Step-2 and Step-3 of Section 6.4.3 of this chapter. This may need constituting IR committees, composed of both librarians and researchers to easily penetrate the community of researchers. This could be done through training and sensitization seminars and workshops, or through small groups or one-on-one marketing strategies. Use of adverts about the institutional repository as the training goes on would inform researchers ahead of time for their participation.

Managing institutional repositories was still new to the field of library and information science and these skills needed to be imparted to the existing library professionals. Learning from the experience in the UK, where the Repositories Support Project devoted seven years (2006-2013) training the librarians in institutions of higher learning how to manage institutional repositories, institutions in East Africa also needed to engage organisation such as EIFL that have already established some foundation within the region, to continue offering this kind of training to the librarians.

Librarians need to be re-skilled, especially those that are positioned at the colleges such as the college librarians at Makerere University, so that they actively get involved in promoting the repository to their immediate community of researchers. Besides reskilling the librarians to

be the institutional repository advocates, there was a need to also have contact researchers (selected according to Rogers adopter categories) in each school who, in collaboration with the college librarians would spearhead the word of mouth advocacy about the beauty of self-archiving research in the institutional repository. This would increase on the network of those helping to get the word out, thus increasing the awareness about the institutional repository.

Continue providing mediated depositing of publications where need be, with the consent and full knowledge of the author(s). There should be staff committed to deposit for those who are unable to deposit for themselves, and some library staff should be assigned the responsibility of keeping track of new publications by liaising with researchers so that they are deposited into the institutional repository. The libraries should also endeavour to write digital projects to handle the retrospective digitisation of library materials for the institutional repository.

5.3.3 Strategy on marketing

Lack of awareness about OA and IRs featured as the most challenging problem affecting the use of repositories and this could be addressed through good marketing strategies that embrace all the managerial roles. Just as Gierveld (2006) pointed out, developing and managing an IR is a marketing matter. Nabe (2010) recommended having a marketing plan which broadly covered awareness building of the institutional repository and open access.

This study, therefore, emphasized developing a market-oriented approach to increasing the IR stakeholders' awareness and effective participation, where the content provided could be availed as open access. In the process of providing a service to the university community, IRs first collect content, secure it, and then provide access to the scholarly information that it holds (Obiora & Ogbomo, 2013). The benefits of an IR were clearer to the librarians who managed them, but to the researchers, from whom much of the content was collected, the whole process was still far-fetched. The approach used to get them on board should, therefore, be strategic enough to achieve fruitful results.

According to Gierveld (2006), IRs were not developed in response to a market demand but initiated by librarians, who were certain of the long-term benefits: an improved exchange of scholarly communication. However, the success of IRs depended on how the researchers deposited their publications (Harnad & McGovern, 2009), yet this was something they did not ask for in the first place. Gierveld noted that this required a voluntary change of

behaviour, which could be achieved by creating an attractive environment (such as an easy to use system, requiring little effort, with clear benefits and incentives). This could be done in addition to educating the researchers and making them aware of the associated publishing issues involved, besides improving their willingness to participate in contributing to the IR.

Using marketing terminology, the institutional repository is the service that needs to attract a market, which in this case is the research community of the university. For effective management of the institutional repository, the repository managers need to think in marketing terms and position their target audience at the centre-stage. The managers also need to examine the trends and factors affecting researchers in order to know how to approach them and attract their attention and participation. Researchers do not like being distracted from their main goal of writing their publications. What the repository manager has to capitalize on is that, part of the researcher's role in writing, is being able to share their publications, and there are so many ways of doing this. Examples include using social media platforms. The repository manager has to ensure that the institutional repository features as the best option for the researcher to use. This is after clearly understanding the researchers' marketing environment.

The marketing process followed was derived from Kotler and Armstrong's (2012, p. 29) simple model, which starts with step-1: 'understanding the marketplace and customer needs and wants.' This is done through market research. It is then followed by step-2: 'designing a customer-driven marketing strategy', which is followed by step-3: 'constructing an integrated marketing program that delivers superior value', followed by step-4: 'building profitable relationships and creating customer delight' and lastly step-5: 'capturing value from customers to create profits and customer equity'. Each of these steps is explained in the sections that follow.

Step-1: Understanding the marketplace and customer needs – It is essential to serve researchers according to their varied disciplines. Activities such as user research, service development, communication, distribution, costing, and service delivery are core marketing activities that should be applied to the institutional repository as a service. In understanding the marketplace, market research is recommended and this is done on both the internal and the external marketing environment. Steven ten Have, Wouter ten Have, and Stevens, Frans (2003, p. 133) specified six factors in the marketing environment as: "economic forces, technological forces, political forces, regulatory forces, competitive forces, and societal

forces". All these need to be explored when researching about the marketplace in order to clearly understand the researchers' needs that are to be addressed by the IR.

Step-2: Designing a customer-driven marketing strategy – The repository manager's aim is to find, attract, keep, and grow target researchers by creating, delivering, and communicating a superior service that is valued by users. Kotler and Armstrong, (2012, p. 32) proposed that "to design a winning marketing strategy, the marketing manager must answer two important questions: What customers will we serve (what's our target market)? – (obtained after segmenting the market), and How can we serve these customers best (what's our value proposition)?"

When marketing a repository, it is better done dealing with portions of the research community and satisfying their needs well, then use them as examples to demonstrate to others later as the marketing moves to the rest of the community. These are what are regarded as the early adopters of the repository. The approach used in communicating to the different categories of researchers in the university about the institutional repository should also be in relation to their discipline. This in marketing terms is known as segmentation. Segmentation is the subdivision of the target market into homogeneous groups for which specific sets of benefits are directed. Kingsley (2008) cautions that repository managers should bear in mind disciplinary differences while advocating for the use of institutional repositories among academic researchers. Kingsley noted that:

> "disciplines are markedly different from one another, in terms of their subject matter, the speed of publication, information-seeking behaviour and social norms. These all have bearing on the likelihood a given group will adopt deposit into an institutional repository as part of their regular work practice" (2008, p. 204).

Kingsley further clarified that rather than the whole academic community being considered as a single social system during advocacy, "academics consist of a series of small, disparate groups with distinct differences. It is for this reason that a uniform advocacy or 'roll-out' program for a given institutional repository is unlikely to succeed" (2008, p. 209), thus the need for segmentation when marketing.

After selecting the target group, the focus should then be on selecting the value proposition to be used to differentiate and position the institutional repository so that it stands out as the service that researchers choose to use when sharing their publications worldwide. Such value

propositions should differentiate the institutional repository from other sharing platforms like e-mail and social media. Repository managers must design strong value propositions that give them the greatest advantage in their target markets. For example, "the institutional repository is positioned as the central archiving location for each researcher, where publications are permanently preserved for future accessibility within and outside the institution". Makerere University uses the slogan: "Sharing research knowledge to build for the future" on its brochures, and this in itself promotes the depositing of scholarly information in the institutional repository.

In explaining the marketing strategy, Steven ten Have, Wouter ten Have, and Stevens, Frans (2003, p. 133) specified three factors: "target market selection, competitive advantage, and product positioning". Segmentation is the process of grouping the researchers in groups based on their needs, and this may be in relation to their disciplines. Targeting is the process of marketing to a particular segment of the market and that is why the researcher groups that are going to be targeted are selected. Positioning is the development of messaging (value propositions) for a particular segment of the market. Positioning enables the repository managers to determine how to best communicate to the different groups of researchers for them to deposit their scholarly information in the institutional repository. Positioning is meant to make the institutional repository occupy a distinct position, (relative to other publication sharing media) in the mind of the researcher.

Step-3: Preparing an integrated marketing plan and program – Now the repository manager develops an integrated marketing program that actually delivers the intended service to the researchers. This is an action tool, and it consists of the institutional repository's marketing mix, the set of marketing tools that the repository manager uses to implement the marketing strategy. The marketing mix is a set of marketing tools that work together to satisfy customer needs and build customer relationships (Kotler & Armstrong, 2012, p. 29). Kotler and Armstrong (2012, p. 36) noted that "the major marketing mix tools are classified into four broad groups, called the four Ps of marketing: product, price, place, and promotion". These are also spelt out by Steven ten Have, Wouter ten Have, and Stevens, Frans (2003, p. 133). To deliver the proposed value proposition, the repository manager must first ensure that there is a need-satisfying market offering (the repository service – which is the product in this case). Price in terms of the institutional repository service is considered in terms of the time or effort spent depositing materials (Gierveld, 2006). The lower the effort, the more likely

researchers will accept to participate. In most cases, repository managers offer mediated-archiving, that is, depositing the scholarly information in the institutional repository on behalf of the researchers, to reduce the effort they have to put in, and encourage them to provide their publications. The place is the repository service's access point, its accessibility, its friendly use, with clear information and contact details. This should be a dedicated web page with clear information of how the researchers can participate in sharing their publications through the institutional repository, with a link to the repository service. Finally, it must communicate with the target researchers about the repository service and persuade them of its merits. This is the act of promoting the service. This can be done through various avenues: by circulating brochures, through training and awareness building, by displaying posters, by communicating through the mail, by engaging one-on-one advocacy within the departments, and many others.

One of the most essential procedures an institutional repository manager needs to undertake to attain efficient and effective marketing is to prepare an appropriate marketing plan. Market planning is done by documenting the current state of the IR stakeholders, that is an assessment of the IR market environment or the IR stakeholder environment, and the marketing strategy that will be taken for a specific period of time. The plan off course should have a goal. If the goal, for instance, is to increase content recruitment by 40% from the current state, then the market plan has to clearly show what steps or actions will be taken to obtain that goal. Market planning, therefore, involves making decisions on what marketing strategies will be undertaken to achieve the overall IR objectives. The marketing plan guides in allocating marketing resources, especially money and personal time. If this is done with the library's strategic plan, then there would be a marketing plan annually to be followed and achieved. The market plan should focus on where the IR needs to be at some point in the future. Some of the essential things to do when developing a market plan include:

Market research: This involves collecting and organizing information about the IR stakeholders, who actually constitute the market, the IR external environment, and whether the existing marketing strategies are achieving their goals. Analyse the researchers' dynamics, patterns, and establish how best content can be retrieved from them. Marketing research findings are important in designing marketing strategies. They give an insight of how the marketing concept will be pursued. Without this insight, it may be difficult to effectively implement a marketing plan.

Competition: Knowing that a researcher's time is competed for by so many other things, the marketing plan should specifically spell out how the IR issues will stand out from the rest of the competition.

Market plan strategies: Prepare marketing and promotion strategies that the IR will use throughout the year. For instance, strategies like displaying colourful posters about the IR all over campus, accompanied by training programmes, with an OA & IR informative or publishing website.

Marketing plan budget: The strategies specified above may be limited by the budget. The repository manager needs to present the marketing budget early enough for inclusion or review for the financial year in order to enable the specified activities to take place. For the institutional repository to carry more weight within the institution, it should have a specific budget dedicated to its activities, to ensure that they happen as scheduled and not taken over by other events. Having a budget would facilitate the outreach and digitisation activities in all these three universities, which would enable an adequate flow of content in the repository.

Marketing goals: The marketing plan should have quantifiable goals that are achievable.

Monitor the marketing plan results: Specify the times when a review of the marketing strategies will be done to establish those that are working and those that are not. Following the established marketing goals, the repository manager can be in a better position to assess whether the efforts are generating results through reviews and evaluation of the whole process.

Step-4: Building librarian-researcher relationships – Obtaining scholarly information from researchers all culminates from building good relationships with the academic staff of the university. Kotler and Armstrong (2012) noted that customer relationship management could be the most important concept of modern marketing. It includes aspects of acquiring, keeping, and growing customers. The key to building lasting repository-researcher relationships is by ensuring that all the researchers are aware of the benefits of the repository. Researchers satisfied with the services of the institutional repository are more likely to be loyal depositors. Ensuring that the repository service is valuable to the researchers in comparison to all other publication sharing platforms is very important in this case. It is important to keep the early adopters of the institutional repository highly motivated so that they help in spreading the word among their colleagues. This can be done by showing

statistics of their publications in the repository and using them as a marketing tool. This involves interrelating with the researchers frequently to either market the repository or get to know whether they have scholarly information for deposit in the institutional repository. Nabe (2010) in describing the qualities of repository managers that can relate well with the researchers noted that they should be knowledgeable enough to respond to all the researchers' publication queries. They should also be bold enough to make initial contact with the researchers and introduce the repository service and explain why they should participate. They should be persuasive, persistent and flexible enough to help deposit for those who are tech savvy. Building researcher relationships therefore highly depends on how suitable and skilled the repository managers interacting with the researchers are prepared for the task.

Step-5: Capturing value from customers – The ultimate and final goal of marketing is to capture value from the customers, and in terms of the institutional repository, it is to obtain scholarly information that can be deposited in the repository and accessed as open access. In other words, the researchers should be informed enough to provide versions that are agreeable with the publishers for open access in the institutional repository, and also talk favourably about the repository to their colleagues and encourage them to self-archive in the institutional repository. It is important to build the right relationships with the right researchers (early adaptors) from the very beginning, who would help in building the chain of depositors in the repository as the years go by. In marketing, the customer is the central focus.

CHAPTER SIX

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.0 Introduction

This chapter covered the summary of this study, the significance and contribution to new knowledge, the conclusions, recommendations, and the areas for further research.

This study aimed at proposing interventions that would improve access to scholarly information in institutional repositories of three East African Universities. The specific objectives of this study were to: find out how the institutional repositories in the selected universities were developed and managed; review best practices in management of institutional repositories; assess the researchers' awareness and participation in open access in general and institutional repositories in particular, in the selected universities; identify the challenges, if any, in providing open access in institutional repositories in the selected universities; and propose strategies for increased open access to scholarly information in institutional repositories in the selected universities.

The study was conducted at Kenyatta University in Kenya, Makerere University in Uganda, and Muhimbili University of Health and Allied Sciences (MUHAS) in Tanzania. Data was collected using face-to-face interviews, a self-administered questionnaire, and document and website reviews. Data was collected from six (6) informants and one hundred and eighty-three (183) respondents. Below is the summary of the findings.

6.1 Summary of findings

The development of institutional repositories in each of the universities in this study was unique in its own way. This agreed with what Barton and Waters (2004) emphasised about the setting up of institutional repositories (i.e. that each IR service was unique and dependant on the institutions culture and environment). Makerere University started with a project proposal and support from development partners from the developed world in 2006. Kenyatta University started in 2012 with support from Strathmore University, the earliest adaptor of institutional repositories in Kenya. MUHAS started with a policy for the institutional repository in 2013, a time when the Budapest Open Access Initiative (BOAI,

2012) was very clear on how institutional repositories should operate. However, there were some shared experiences in managing the institutional repositories in these three universities.

As far as planning was concerned, Makerere University followed a project proposal and benchmarking visits to the University of Tennessee, Knoxville and University of Bergen Libraries to implement its repository. Kenyatta University followed the guidance of Stratmore University and later developed a policy that guided the management of the institutional repository. MUHAS followed the policy guidelines stipulated in its institutional repository policy from the very beginning. There was some budgeting done in all the three universities although none of them shared it with the researcher as evidence. Makerere University and MUHAS had some donor support as far as acquiring equipment was concerned and therefore must have presented itemised budgets for the repository. With regards to staffing, Kenyatta University had the highest number of staff (7) dedicated to working on the repository tasks, followed by MUHAS with four (4) and Makerere University with three (3). The roles each of the staff played were more specified at Kenyatta University than at Makerere University and MUHAS.

There was mediated self-archiving in each of the three universities. The librarians working on the repository tasks also had other responsibilities assigned to them in the library in all the three universities, and therefore shared their time, although this was not strictly demarcated as is done in the developed world where they could, for instance, say 0.5 FTE (meaning the fraction of the Full-Time Equivalent employee). This meant less time could have been dedicated to the institutional repository, depending on what else the repository managers were assigned to do in the library. Marketing in all the universities in this study was done through user education programmes for students, information literacy sessions, e-mail messages on staff mailing lists, and for Makerere University, by use of brochures. The library website was only used to provide the link to the repository, with no dedicated page for open access and institutional repository activities. This limited the avenues of the researcher's finding out about the institutional repository on their own. As far as policies were concerned, only two of the universities (Kenyatta University and MUHAS) had operational institutional repository policy guidelines by the time the field study was conducted in 2014/2015, while Makerere University had a draft policy. These policies had direct implications on the accessibility of the content in these repositories. All the three universities were using the DSpace software and the library was supported by the university

IT department to implement it. All these factors had implications on how much work got done and how accessible the repository was to the general public.

The researchers' knowledge and awareness about open access and self-archiving in institutional repositories play a very big role in what gets to be provided as open access to the public in the repositories. Their awareness and participation were therefore reported as follows: The findings revealed that 43% of the respondents at Makerere University and 44% of the respondents at Kenyatta University had published in open access journals, implying that a high percentage of the respondents' publications were in traditional journals and could not be provided as open access in the repository, except for those whose journals allowed self-archiving of either the pre-print or post-print. MUHAS, on the other hand, had 70% of the respondents who had published in open access journals. More than half of the respondents in the three universities were aware of the institutional repository in their university, implying that a good number of them could be users of the repository as depositors if educated about its importance and advantages to both the researcher and the institution.

The principle of open access is that scholarly information should be made freely available to the end-user on the Internet without restrictions. The majority of the respondents in the three universities (81.4%) strongly supported the principle of open access. In line with publishing, 80% of the respondents were also strongly in agreement with institutional repositories being one of the scholarly communication models. In response to whether the respondents were willing to provide their publications as open access through the institutional repository, the majority (73%) were strongly in favour. To find out whether the respondents valued the publications deposited in institutional repositories, they were asked whether they would use these publications for their own referencing. To this effect, the majority (75%) were strongly in favour of using these publications for referencing. On a general note, therefore, these findings implied that these respondents were supportive of the activities of institutional repositories, and could easily participate if prompted to.

When the respondents were asked to indicate how they normally publicised their publications, the biggest number (35%) out of nine (9) options mentioned journals and books. This was the known traditional way of publicising one's research, most of which had restrictive access. Looking out for whether open access and repositories could feature out of the list, 7% listed repositories and 3% listed open access in general. This was a good attempt

given that this was what they practiced, implying there were some respondents actually using repositories and open access avenues to publicise their work. When prompted further with options of where they would prefer depositing their publications, institutional repositories took the highest position with 42.1%. Implying that, once educated, these respondents would actually deposit their work in repositories.

Mandating the deposit of scholarly information in the institutional repository had been found to facilitate content recruitment. On inquiring about institutional and funder mandates, the majority of the respondents, 68% for university mandates and 67.2% for funding body mandates were strongly in favour of requiring researchers to deposit research output in the institutional repositories for all the universities in this study.

Providing open access to scholarly information in repositories depended on whether the authors provided versions of publications that were in agreement with the publisher policies. Most publishers allowed self-archiving post-prints. When the respondents were asked whether they usually kept their post-prints and whether those post-prints could be provided in institutional repositories as open access, the responses were highly positive for both the questions (with 86% for keeping the post-prints and more than 90% allowing to provide the post-prints as open access). This implied that the repository managers and librarians needed to be more vigilant in soliciting for post-prints from researchers in the universities in this study.

A number of challenges were noted from the survey, but the most prominent were the limited awareness among the researchers about open access and institutional repositories. This called for more vigilance, awareness and marketing strategies to enable wide coverage of the universities in this study.

A number of strategies were also generated from the respondents about how best institutional repositories could be managed to effectively provide open access. These included: creating awareness, providing training and sensitisation through seminars and workshops, improving the marketing of IRs, developing policies and mandates that govern the repository, providing some incentives for depositing, and providing mediated depositing for the researchers.

6.2 Significance and contribution to new knowledge in the LIS field

In addition to the future research propositions made later in this chapter, this study has made five major contributions to the literature on open access institutional repositories and the Library and Information Science (LIS) field in general.

First, research on the concept of open access in institutional repositories in East Africa was still limited, with researchers in universities still adjusting to the new model of scholarly communication. Studies had been conducted on open access in other regions of the world, especially in the developed world, with a few conducted independently in Kenya and Tanzania. In Kenya, Wanyenda (2015) evaluated the state of institutional repositories in Kenya, specifically reviewing the content types, the policies and the usage of the repositories. The usage statistics available in Wanyenda's study were for the most viewed items, and these were mainly abstracts of theses. In Tanzania, Dulle (2010) investigated the factors affecting the adoption of open access in research activities within Tanzanian public universities; whereas Lwoga & Questier (2014) investigated the factors that affect the adoption and use of open access in Tanzanian health sciences universities. However, no previous study on open access had comparatively examined open access in institutional repositories in the East African region. In Uganda, it was the first in-depth study on open access. This study, therefore, significantly added to the body of knowledge generated on open access for further utilisation and development of institutional repositories in East Africa. It specifically provides useful pointers to the factors that affect providing open access to scholarly information in institutional repositories that other universities in East Africa and beyond could take note of as they manage their repositories. Some of these pointers include: lack of government and funder support for OA, content collection workflows with limited author permission to self-archive and few librarians vigilantly following up the collection of post-prints for self-archiving. The framework proposed in section 6.3 incorporates a number of workflows that could be adopted to increase self-archiving/mediated archiving and open access content in the repositories of universities in East Africa.

Second, the methodology adopted in this study adds to the existing body of knowledge used to investigate the cause of limited open access in IRs. A previous study in this area (Prost & Schopfel, 2014) only stopped at reviewing the websites of IRs to establish the degrees of openness. Besides reviewing the websites of the IRs in three universities in East Africa, this study went further and investigated the cause of the low level of OA in the individual

universities, yielding views from the repository managers and the researchers. The mixed methods approach used helped in addressing the question posed by Prost and Schopfel (2014) as to whether the limited access to the full-text in IRs was temporary or permanent. This study highlights the actual causes of the limited accessibility of content in the three institutional repositories in East Africa, with a predictable future of more open access, once the recommendations suggested in this study are adopted. Some of the causes of the low open access in IRs established by this study include the absence of mandates that require researchers to self-archive their research output in the institutional repository, researchers being in possession of post-prints but not aware of depositing them in the institutional repository and the limited number of librarians vigilantly following up researchers for their consent on the mediated deposits contributed to the institutional repository.

Third, universities are not only teaching and training a workforce for the nation, but also conducting research based on local problems, whose solutions could lead to society/community development or advance the knowledge of other researchers. If the findings of the research (made visible in IRs) are not readily accessible (downloadable full-text), then the impact on applying that knowledge for development is reduced. The availability of research output of universities made accessible on the Internet through institutional repositories, therefore, makes it easy for anyone, including policy makers to retrieve and put it to use. As Trotter, Kell, Gray and King (2014) pointed out, providing OA in IRs gives the university's research output a higher chance of being discovered and used by scholars, government, industry and civil society personnel who would leverage it for development. The university and its scholars/researchers also benefit by being more visible worldwide. According to Olsbo (2013), the openness (freely downloadable rich files) of a university's IR plays an important role in the university's success in the worldwide/continental/national ranking of universities and in attracting talented (staff and students) and funding, and IR openness was highly linked to the effectiveness of open access publishing, self-archiving and open access policies of the university. One of the key findings of this study was that researchers supported mandates that require self-archiving in the IR. They also maintained copies of post-prints, which they were willing to provide as OA versions in the IR. With the highlighted importance of open access policies and mandates while managing repositories, one of the study implications for the university and library administration is the need to develop and implement open access policies and mandates where possible, with strong recommendations for self-archiving that ensure the acquisition of

content that is open access in the IR. For published content, writing addendums that emphasize the university's policy on open access through self-archiving in the institutional repository would help authors to be more aggressive while signing publishing agreements by demanding for the ability to use the post-print versions that most of them claimed to maintain, but not made available anywhere for purposes of open access.

Fourth, the conceptual framework of this study emphasized the need for strategies of improving access to scholarly information in IRs in East Africa. Having established through the literature reviewed that there were various models of how IRs could be developed, the IRs investigated in this study did not use any of these models directly, but some of the procedures followed could only be linked to aspects mentioned in the model guidelines. The findings and the discussion of this study established that there were some challenges that were directly related to how institutional repositories in the three universities were developed, affecting how they were being managed. There was need, therefore, to reinforce the aspect of managing IRs in the processes that universities in East Africa often follow (since most of them learn from each other) and modify some of the existing IR development models with guidelines that reflect the proposed IR management recommendations of this study. The proposed model framework, therefore, contributes to the existing literature that could be used to improve and increase open access to the information resources of IRs in East Africa.

Fifth, this study could serve as a resource for upcoming IRs in East Africa, capturing the history of the development of repositories at Kenyatta University, Makerere University and MUHAS, the key strategic choices made within each institutions affordable means, the critical success factors, and the barriers that have limited their success. The study also provides recommendations and an IR development and management model of best practice simplified to fit the East African context.

6.3 Framework for the development and management of open access IRs

6.3.1 IR development phase

A successful open access institutional repository starts with good management and this begins with appropriate planning and implementation. At the initiation stages, it is essential to first establish the university's needs. This helps in the identification of the type of content that will be included in the institutional repository, with specification of the objective the IR is meant to serve. With this at hand, a proposal or a white paper about the need for an

institutional repository can then be prepared and presented to the university administration for institutional buy-in. This is also the beginning of advocating for the institutional repository within the university. Swan (2008) provided useful insights of what could be included in the proposal (or business case) to the university administration, with details such as:

> "the appropriate advantages of the repository to the institution …, expected expenditure over a number of years …, with emphasise that the payoff is not measured in financial terms: instead, payoff will be measured by:
>
> - Improved visibility of the institution
> - Improved impact of its outputs
> - More effective 'marketing' of the institution
> - Better management of the institution's intellectual assets
> - Easier assessment of what the institution is producing and creating
> - Facilitation of workflow for researchers and teachers
> - Facilitation of collaborative research (p. 31).

Once the institutional repository has been accepted by the university administration, then the details of how the content would be collected, provided and accessed could be enumerated, with policy statements for each type of content, stating the licenses and copyright management issues. For published content, designing addendums that help the researchers to be able to retain rights to self-archive their publications would be an aspect that emphasizes the importance of open access to the university. Once all the policy documents are ready, a work plan of how the activities of the institutional repository would be carried out, with procedures of how the content would be acquired could then be prepared.

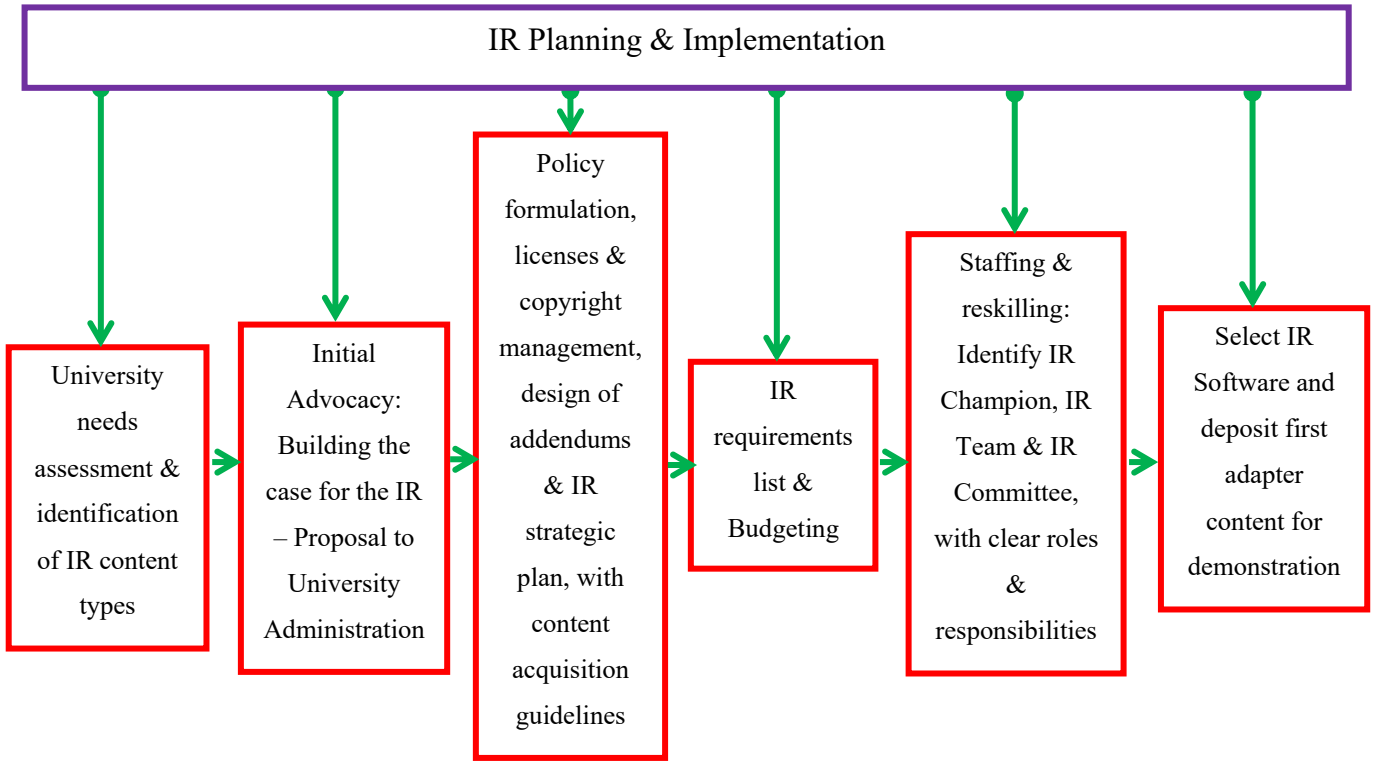
Once the collection development procedures are in place, then the institutional repository requirements list and an associated budget could be prepared. This includes preparing for the institutional repository taskforce. Identify members of staff/students (identified from a variety of the IR stakeholders, with emphasis on the researchers and graduate students as the key stakeholders) who would drive the institutional repository project and embark on re-skilling them into repository managers and advocates of open access through the IR within the university. It would be a good strategy to identify individuals within each department or school to champion the objectives of the institutional repository from the very beginning. These, with the managers spearheading the activities of the institutional repository, would

constitute the institutional repository committee that would work together to promote the repository campus-wide. Activities such as workshops could be conducted to orient this taskforce into advocating and promoting the institutional repository. Once an appropriate taskforce has been built, involving them in the selection of an institutional repository software (depending on the available technical staff and funding resources) would be appropriate, done hand-in-hand with collecting sampled content for piloting the IR project. This would initiate what Allard, Mack and Feltner-Reichert (2005) identified as the actual management of the IR to start. The activities and/or concepts that Allard, Mack and Feltner-Reichert identified in the literature included "marketing the IR to the authors of intellectual property, encouraging the authors to participate by adding their materials, and addressing costs associated with keeping the IR running" (p. 331).

6.3.2 IR management phase

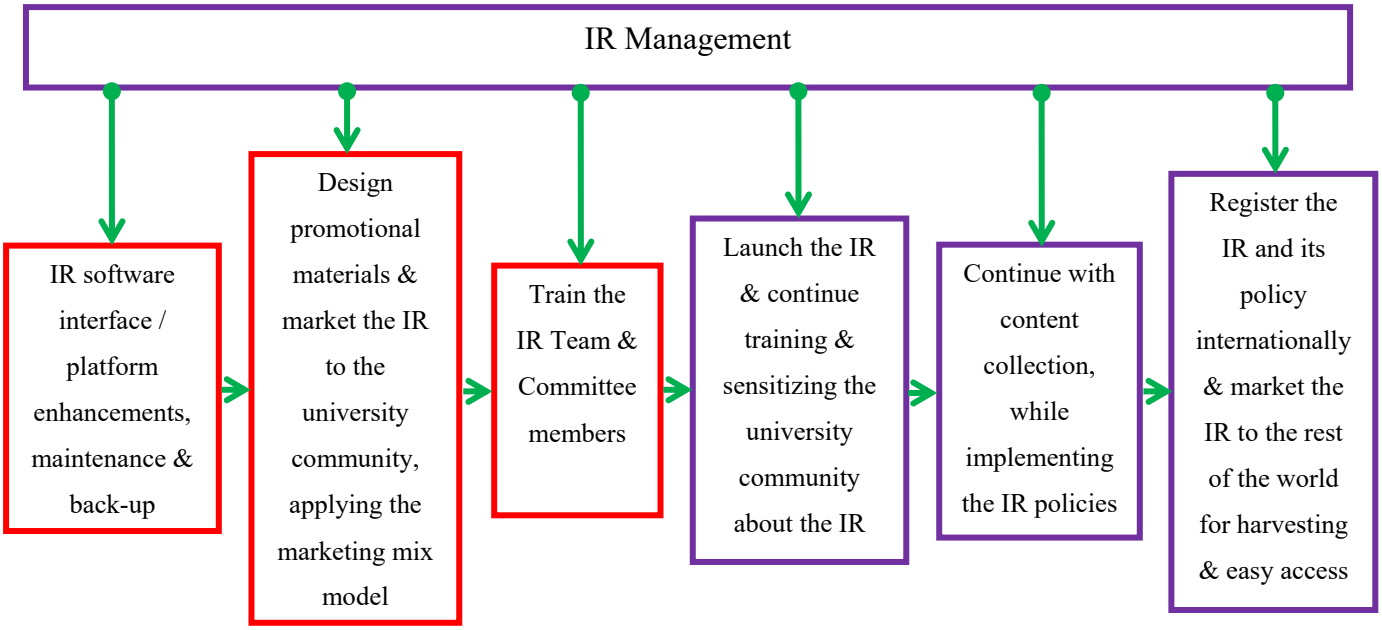
Once the software has been demonstrated and agreed upon, the technical staff could then institutionalise the IR by working on the interface and other platform enhancements where there is need, and also plan for system maintenance and back-up. The task force could then design promotional materials and start marketing the IR to the rest of the university community, applying the marketing mix model. The IR task force could first be taken through special training on how to promote and market the repository, and equipped with the materials to use. This could include launching a web page to publicize the role of the repository in the university, with promotional materials deposited there for easy reference and access by anyone on the internet. The repository could then be officially launched in the university, as the repository task force continues with the acquisition of content, training and sensitisation of the university community about the IR, while implementing the IR policies. Once there is some content to share with the rest of the world, the IR could then be registered internationally for access by anyone on the internet. With clearly spelt out policies, content could be directly open to the public or (partially) closed, but with access procedures clearly spelt out (what Stevan Harnad referred to as "almost open access"). The proposed framework is presented in two phases: the IR Development phase and the IR Management phase.

IR Development Phase



(Source: Author)

IR Management Phase



(Source: Author)

Figure 6.1: Framework for the Development and Management of Open Access IRs

6.4 Conclusions

As universities continue setting up institutional repositories as one of their storage, preservation and dissemination avenues, more emphasis should be geared at managing them effectively to ensure appropriate access to the content of this important resource.

With reference to the stakeholder theory that was applied to this study, the library's collaboration with the academic departments should stand out prominently as far as the IR activities are concerned. The study revealed that MUHAS exhibited a more practical involvement of the departments, with committees that included having a representative from each school in the IR activities. The rest of the universities had an informal procedure of coordinating with the academic departments, which needed to be formalised in order to penetrate each unit and actively promote the repository. Having contact persons in the departments or departmental representatives on the institutional repository committee helps in having coordinated programmes when it comes to outreach activities. This called for the need to revisit the IR workflow processes and appropriately incorporate them in the universities and researchers' work practices.

The success of a freely accessible institutional repository is dependent on a policy and clearly laid out advocacy and marketing strategy. Nabe (2010) proposed that a persistent and aggressive outreach effort should consume the lion's share of the personal commitment of the repository managers in order to achieve the required results. The institutional repository committee should have independent programmes of reaching out to the academic departments throughout the year, with dedicated websites of how open access is applied within the university, spelling out the advantages to both the researchers and the institution in general. Librarians in charge of repositories should try as much as possible to exhaust all the avenues of collecting content and also train as many librarians as possible to enhance the manpower reaching out to all researchers.

Having a policy (that is, a national, funder and institutional policy) for the institutional repository affirms its existence and carries more weight when marketing the repository to the researchers. Researchers in universities that have policies take the repository more seriously than where there is none. It is, therefore, essential at whatever stage the institutional repository is, to have a policy governing its existence. Including policy guidelines that make it mandatory for researchers and students to deposit their scholarly information in the

institutional repository would ensure that the content actually gets collected, especially with appropriate implementation procedures, and accessible after obtaining the consent of the authors.

There was also need to initiate contact with the funding bodies in the universities, so that they are involved in the soliciting for publications by means of implementing policies for the IR.

6.5 Recommendations

Repositories registered in the Directory of Open Access Repositories (OpenDOAR) are meant to provide open access to their content. Of the three universities in this study, MUHAS had achieved an open access level of 98% by 2014 compared to Makerere University and Kenyatta University that had open access levels of 22% and 32% respectively. In order for the public to utilise the information in IRs at Makerere University, Kenyatta University and MUHAS for further research and development, it is recommended that the level of open access should be improved. This study revealed that the low level of open access in the IRs of the three universities was indeed managerial, and action was required from the repository managers, the institution administration and the government. On this basis, the following recommendations were proposed:

6.5.1 Incorporate self-archiving of research output in the university workflow processes

For researchers to continuously deposit research output in the institutional repository without doing it only after being requested by the librarians or repository managers, it is recommended that a number of the researchers' work practices be aligned with the IR workflow processes so that self-archiving becomes part of the activities done while informing others/colleagues about a new publication (similar to publicity on social media platforms such as academia and researchgate), when requesting for promotion, and so forth. Self-archiving in the IR should be rewarded with points for researchers requesting for promotion for the activity to be embraced and acknowledged in academia.

In addition to enforcing IR workflow processes, it is also recommended that, repository manager's work towards improving the researchers' perceptions of open access and the IR in order for them to appreciate the advantages associated with self-archiving in repositories.

6.5.2 Institutional copyright policies for universities in Kenya, Tanzania and Uganda

Providing open access is done with the consent of the copyright owners, whether they are the publishers or the authors. In order to achieve open access, therefore, it is recommended that universities endorse policies that claim for or retain copyright ownership in the research papers published by the students, staff, researchers and all the academic affiliates of the university. Such policies could be spelt out in institutional copyright policies (aligned with the existing intellectual property management policies), with addendums derived for use while signing publishing agreements.

Gadd, Oppenheim and Probets (2003) noted that self-archiving was not best supported by copyright transfer to publishers and recommended that universities assert their interest in copyright ownership (as could be spelt out in the institutional copyright policies), while the researchers retain rights to be able to self-archive (claimed using addendums).

6.5.3 National open access policies for Kenya, Tanzania and Uganda

Nations around the world have initiated digital strategies for a variety of information communication formats such as the broadcasting and print media, with some of the content freely accessible to the public. Governments have also been sensitized about open data and they have embarked on publishing open data online. The open data is, however, biased to open government data (Broad, Smith, Duhaney & Carolan, 2015), and yet public data – that is, all the information that public bodies produce, collect or pay for (European Commission, 2011) includes examples such as geographical information, statistics, weather data, data from publicly funded research projects, and digitised books from libraries, which embrace the open access phenomenon. In East Africa, plans and discussions for open data policies have been on-going, but with minimal coverage of open access to the information or publications that would be derived from the data that would be declared open. The BOAI (2012) recommended that "the worldwide campaign for OA to research articles should work more closely with the worldwide campaigns for OA to books, theses and dissertations, research data, government data, educational resources, and source code". It is, therefore, recommended that as policies on open data are enacted in Kenya, Tanzania, and Uganda; national policies on open access should also be enacted and endorsed. There is need for fully-fledged national open access policies for publicly funded research in Kenya, Tanzania and Uganda. A leaf could be borrowed from the African countries (such as Ethiopia) that

have so far adopted national open access policies. Funding bodies, although situated within higher institutions of learning such as universities, they all operate under the umbrella of a specific government, and therefore qualify to be regarded as public funds. It is, therefore, also recommended that clauses be included in the national open access policies to cater for funding of research projects by non-government organisations and other foreign funding bodies or donors.

6.5.4 Institutional open access policies for universities in Kenya, Tanzania and Uganda

Although there were repository policies operational in all the three universities in this study, they were not institutional open access policies per say, but institutional repository policy statements and guidelines. It is, therefore, recommended that universities in Kenya, Tanzania and Uganda enact and endorse institutional open access policies.

6.5.5 Incorporate open access and the management of repositories in the Library and Information Science (LIS) training program

All of the repository managers and librarians in charge of institutional repositories in Kenya, Tanzania and Uganda did not acquire the knowledge they are using to manage repositories through formal training but through continuous professional development programs. Institutional repositories emerged in the early 2000's and have now accumulated enough literature to incorporate into university Library and Information Science (LIS) training programs. It is, therefore, recommended that universities in Kenya, Tanzania and Uganda incorporate open access and the management of repositories in the Library and Information Science (LIS) training programs.

6.6 Areas for further study

1. It took long for universities in Uganda to adopt IRs as compared to Kenya and Tanzania. There was only one university-based institutional repository registered in the Directory of Open Access Repositories in Uganda by the time this study started in 2013. By 2017, a number of universities had initiated institutional repositories with training support under the EIFL-SPIDER project, although they were not yet registered in the Directory of Open Access Repositories. There is, therefore, need to explore the adoption of institutional repositories in Uganda using the diffusion of innovations theory in comparison to how institutional repositories have been adopted by universities in Kenya and Tanzania.

2. The findings in this study indicated limited use of the IRs as a dissemination tool by the respondents of the survey, meaning most of them where not self-archiving in the IRs of their universities. Although unawareness was noted as one of the challenges of managing IRs in the selected universities in East Africa, it may not be the dominant reason why researchers were not self-archiving in the IRs. It is, therefore, important to investigate why researchers in universities in East Africa (or a specific university) rarely use IRs to self-archive or publicise their research output/findings/scholarly information.

REFERENCES

Abrizah, A. (2009). The cautious faculty: Their awareness and attitudes towards institutional repositories. *Malaysian Journal of Library & Information Science, 14*(2), 17-37.

Adler, E. S., & Clark, R. (2011). An invitation to social research : How it's done (4th ed.). Australia: Wadsworth, Cengage Learning.

Ahmed, S. S. & Al-Baridi, S. (2012). An overview of institutional repository developments in the Arabian Gulf Region. *OCLC Systems & Services: International Digital Library Perspectives, 28*(2), 79-89.

Ahuja, R. (2003). *Research methods*. New Delhi: Prem Rawat.

Allard, S., Mack, T. R. & Feltner-Reichert, M. (2005). The librarian's role in institutional repositories: A content analysis of the literature. *Reference Services Review,* 33(3), 325-336.

Allen, J. (2005). *Interdisciplinary differences in attitudes towards deposit in institutional repositories* (Unpublished master's thesis), Manchester Metropolitan University, UK. Retrieved on 10th April 2017 from http://eprints.rclis.org/6957/

Alzahrani, S. (2010). *The role of editorial boards of scholarly journals on the green and the gold road to open access*. (PhD), The University of British Columbia, Vancouver.

ARL (n.d.). Association of Research Libraries. Retrieved on 3rd July 2014 from http://www.arl.org/focus-areas/scholarly-communication

Armstrong, M. (2014). Institutional repository management models that support faculty research dissemination. *OCLC Systems & Services*, 30(1), 43-51. doi: 10.1108/OCLC-07-2013-0028

Ashworth, S. (2004). The DAEDALUS project, developing institutional repositories at Glasgow University: The story so far. *Library Review*, 53(5), 259-264.

Austin, A., Heffernan, M. & David, N. (2008). *Academic authorship, publishing agreements and open access: Survey results*. Brisbane, Australia: Queensland University of Technology.

Australian Open Access Support Group, (2013). Centrally supported open access initiatives in Australia. Retrieved on 14th June 2014 from

http://aoasg.org.au/2013/03/19/centrally-supported-open-access-initiatives-in-australia/

Babu, P. B., Kumar, K. S., Shewale, N. A. & Singh, A. K. (2012). Rationale of institutional repository categories and IR development challenges in India. *Library Review, 61*(6), 394-417.

Bailey, C. W. (2006). *Institutional repositories*. Washington, DC: Association of Research Libraries. (SPEC Kit 292).

Bankier, J.-G., Foster, C., & Wiley, G. (2009). Institutional repositories: Strategies for the present and future. *The Serials Librarian,* 56(1-4), 109-115.

Barton, M. R. & Waters, M. M. (2004). *Creating an institutional repository: LEADIRS workbook.* Massachusetts: MIT Libraries

Beaubien, S., Masselink, L. & Tyron, J. (2009). *Recasting the role of comprehensive university libraries: Starting points for educating librarians on the issues of scholarly communication and institutional repositories*. Paper presented at the ACRL Fourteenth National Conference.

Bell, S., Foster, N. F. & Gibbons, S. (2005). Reference librarians and the success of institutional repositories. *Reference Services Review, 33*(3), 283-290.

BioMed Central (Producer) (2010). Open access and institutional repositories in research and academic institutions [DVD]. Retrieved on 23rd July 2014 from http://www.biomedcentral.com/developingcountries/events/openaccessafrica2010

Bjork, B.-C. (2004). Open access to scientific publications: An analysis of the barriers to change? *Information Research, 9*(2), Paper 170.

Blaikie, N. (2010). Designing social research : The logic of anticipation (2nd ed.). Cambridge: Polity Press.

Blythe, E., & Chachra, V. (2005). The value proposition in institutional repositories. EDUCAUSE Review Articles.

BOAI (2002). Budapest Open Access Initiative. Retrieved on 8th July 2014 from http://www.budapestopenaccessinitiative.org

BOAI (2012). Budapest Open Access Initiative. Retrieved on 8th July 2014 http://www.budapestopenaccessinitiative.org/boai-10-recommendations

Broad, E., Smith, F., Duhaney, D. & Carolan, L. (2015). *Open data in government: How to bring about change*. Open Data Institute

Bryman, A. (2012). *Social research methods* (4th ed.). Oxford: Oxford University Press.

Bryman, A. (2004). *Social research methods* (2nd ed.). Oxford: Oxford University Press.

Bustos-Gonzalez, A., Fernandez-Porcel, A. & Johnson, I. M. (2007). *Guidelines for the creation of institutional repositories at universities and higher education institutions*. Valparaiso, Chile: Alfa Network Babel Library.

Callan, P. (2004). *The development and implementation of a university-wide self-archiving policy at Queensland University of Technology (QUT) : Insights from the frontline.* Paper presented at the Institutional Repositories: The Next Stage. Workshop presented at SPARC and SPARC Europe, November 18-19, Washington DC. http://eprints.qut.edu.au/archive/00000573/01/callan_sparc.PDF

Campbell-Meier, J. (2008). *Case studies on institutional repository development: Creating narratives for project management and assessment* (Unpublished doctoral dissertation). University of Hawaii, USA.

Campbell-Meier, J. (2011). A Framework for Institutional Repository Development, in Delmus E. Williams, & Janine Golden (Eds.) *Advances in Library Administration and Organization (Advances in Library Administration and Organization, Volume 30) (pp.151-185)*, Emerald Group Publishing Limited.

Casey, A. M. (2012). Does tenure matter? Factors influencing faculty contributions to institutional repositories. *Journal of Librarianship and Scholarly Communication, 1*(1), eP1032.

Chan, D. L. H., Kwok, C. S. Y. & Yip, S. K. F. (2005). Changing roles of reference librarians: The case of the HKUST institutional repository. *Reference Services Review, 33*(3), 268-282.

Chan, L. (2004). Supporting and enhancing scholarship in the digital age: The role of open access institutional repositories. *Canadian Journal of Communication*, 29(3 & 4), 277-300.

Chan, L. & Costa, S. (2005). Participation in the global knowledge commons: Challenges and opportunities for research dissemination in developing countries. *New Library World, 106*(1210/1211), 141-163.

Chan, L., Kirsop, B., & Arunachalam, S. (2005). Open access archiving: The fast track to building research capacity in developing countries. Retrieved on 6th June 2014 from

http://www.scidev.net/en/features/open-access-archiving-the-fast-track-to-building-r.html

Chavez, R., Crane, G., Sauer, A., Babeu, A., Packel, A., & Weaver, G. (2007). Services make the repository. *Journal of Digital Information* 8/2. Retrieved on 8th December 2018 from http://journals.tdl.org/jodi/article/view/195/179

Chisenga, J. (2006). *The development and use of digital libraries, institutional digital repositories, and open access archives for research and national development in Africa: Opportunities and challenges*. Paper presented at the World Summit on the Information Society (WSIS) follow-up conference on access to information and knowledge for development.

Christian, G. E. (2008). *Issues and challenges to the development of open access institutional repositories in academic and research institutions in Nigeria* (pp. 1-64). Ottawa, Canada: International Development Research Centre (IDRC).

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York: John Wiley and Sons, Inc.

Cole, G. A. & Kelly, P. (2011). *Management: Theory and practice* (7th ed.). Andover: South-Western Cengage Learning.

Covey, D. T. (2008). Faculty self-archiving practices: A case study. Working paper (pp. 1-32)

Creaser, C. (2010). Open access to research outputs - institutional policies and researchers' views: Results from two complementary surveys. *New Review of Academic Librarianship, 16*(1), 4-25.

Creaser, C., Fry, J., Greenwood, H., Oppenheim, C., Probets, S., Spezi, V. & White, S. (2010). Authors' awareness and attitudes toward open access repositories. *New Review of Academic Librarianship, 16*(S1), 145-161.

Creswell, J. W. (2007). *Qualitative inquiry and research design : Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Los Angeles: SAGE

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks: SAGE Publications

Creswell, J. W. & Clark, V. L. P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Los Angeles: SAGE

Crow, R. (2002). *The case for institutional repositories: A SPARC position paper*. Retrieved on 8th July 2014 from http://works.bepress.com/cgi/viewcontent.cgi?article=1006&context=ir_research

Czerniewicz, L. & Goodier, S. (2014). Open access in South Africa: A case study and reflections. *South African Journal of Science*, 110 (9/10), 1-9.

David, M., & Sutton, C. D. (2011). *Social research : An introduction*. Los Angels: SAGE.

de Vaus, D. A. (2006). Research design in social research. London: SAGE Publications.

Dillon, A. (2007). *LIS as a research domain : Problems and prospects*. Paper presented at the Sixth International Conference on Conceptions of Library and Information Science : Featuring the Future, Boras, Sweden.

DOAJ (2014). Directory of Open Access Journals. Accessed on 28th November 2014 from https://doaj.org/

Dolan, M. (2011). *Assessing awareness of repositories and the open access movement among ETD faculty advisors*. Paper presented at the 14th International Symposium on Electronic Theses and Dissertations, Cape Town, South Africa.

Dorner, D. G. & Revell, J. (2012). Subject librarians' perceptions of institutional repositories as an information resource. *Online Information Review, 36*(2), 261-277.

Dulle, F. W. (2010). *An analysis of open access scholarly communication in Tanzanian public universities.* Unpublished PhD dissertation, University of South Africa.

Dutta, G. & Paul, D. (2014). Awareness on institutional repositories - related issues by faculty of University of Calcutta. *DESIDOC Journal of Library and Information Technology, 34*(4), 293-297. doi: 10.14429/djlit.34.5138

Elijido-Ten, E. (2004). Determinants of environmental disclosures in a developing country: An application of the stakeholder theory, *Fourth Asia Pacific Interdisciplinary Research in Accounting Conference, Singapore*, 4-6 July 2004, pp. 1-28

Elsabry, E. (2017). Claims about benefits of open access to society (beyond academia). In L. Chan & F. Loizides (Eds.), Expanding perspectives on open science: Communities, cultures and diversity in concepts and practices (pp. 34-43). Tokyo, Japan: IOS Press. doi: 10.3233/978-1-61499-769-6-34

Emmett, A., Stratton, J., Peterson, T., Church-Duran, J. & Haricombe, L. J. (2011). Toward open access: It takes a "village". *Journal of Library Administration, 51*(5-6), 557-579.

European Commission (2011). Open data: An engine for innovation, growth and transparent governance. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels

Evaluation Research Team. (2009). Data collection methods for evaluation: Document review. Evaluation Briefs (pp. 1-2). Retrieved on 24th May 2014 from http://www.cdc.gov/healthyyouth/evaluation/pdf/brief18.pdf

Ferreira, M., Rodrigues, E., Baptista, A. A. & Saraiva, R. (2008). Carrots and sticks: Some ideas on how to create a successful institutional repository. *D-Lib Magazine*, 14(1/2). Retrieved on 25th May 2015 from http://www.dlib.org/dlib/january08/ferreira/01ferreira.html

Flak, L. S. & Rose, J. (2005). Stakeholder governance: Adapting stakeholder theory to e-government, *Communications of the Association for Information Systems*, Vol. 16, Article 31.

Foster, N. F. & Gibbons, S. (2005). Understanding faculty to improve content recruitment for institutional repositories. *D-Lib Magazine*, 11(1). Retrieved on 10th June 2014 from http://www.dlib.org/dlib/january05/foster/01foster.html

Fowler, F. J. (2009). *Survey research methods* (4th ed.), Los Angeles: Sage.

Fox, M. & Hanlon, S. M. (2015). Barriers to open access uptake for researchers in Africa. *Online Information Review, 39*(5), 698-716. doi: 10.1108/OIR-05-2015-0147

Freeman, R. E. (2001). A stakeholder theory of the modern corporation. *Perspectives in Business Ethics Sie, 3*, 144.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman

Freeman, R. E. & Phillips, R. A. (2002). Stakeholder theory: A libertarian defense. *Business Ethics Quarterly*, 12(3), 331-349. Retrieved on 8th October 2013, from http://www.jstor.org/stable/3858020

Gadd, E., Oppenheim, C. & Probets, S. (2003). RoMEO studies 1 : The impact of copyright ownership on academic author self-archiving. *Journal of Documentation*, 59(3), 243-277

Genoni, P. (2004). Content in institutional repositories: A collection management issue. *Library Management, 25*(6-7), 300-306.

Gibbons, S. (2004). Chapter 3: Benefits of an institutional repository. *Library Technology Reports*, 40(4), 11-16. Retrieved on 8th October 2013, from http://alatechsource.metapress.com/content/h0757kh5137n4m6t. doi:10.5860/ltr.40n4

Gierveld, H. (2006). Considering a marketing and communications approach for an institutional repository. *Ariadne*, (49). Retrieved on 10th December 2015 from http://www.ariadne.ac.uk/issue49/gierveld/

Giesecke, J. (2011). Institutional repositories: Keys to success. *Journal of Library Administration, 51*(5-6), 529-542. doi: 10.1080/01930826.2011.589340

Gilbert, J. & Lindholm, J. (2011). Establishing an open access culture among researchers: Experiences and challenges at two academic organizations in Sweden. *Serials Review*, 37(2), 67-69. doi: 10.1080/00987913.2011.10765352

Godden, B. (2004). Sample size formulas. Retrieved on 17th December 2013 from http://williamgodden.com/samplesizeformula.pdf

Goutam, D. & Dibyendu, P. (2014). Awareness on institutional repositories - related issues by faculty of University of Calcutta. *DESIDOC Journal of Library & Information Technology, 34*(4), 293-297. doi: 10.14429/djlit.34.5138

Graham, T. W. (2000). Scholarly communication. *Serials: The Journal for the Serials Community,* 13(1), 3-11.

Guedon, J. (2003). Open access archives: From scientific plutocracy to the republic of science. *IFLA Journal*, 29(2), 129-139.

Haider, J. (2007). Of the rich and the poor and other curious minds: on open access and "development", *Aslib Proceedings*, 59(4), 449-461.

Hands, A. S. (2018). *LIS doctoral student motivation : An exploratory study of motivating factors for earning the PhD*. Unpublished PhD dissertation, Queensland University of Technology, Sydney, Australia.

Harnad, S. (2012). United Kingdom's open access policy urgently needs a tweak. *D-Lib Magazine*, 18(9/10) Retrieved on 8th October 2014, from http://www.dlib.org/dlib/september12/harnad/09harnad.html

Harnad, S. (2007). *Mandates and metrics: How open repositories enable universities to manage, measure and maximise their research assets*. Paper presented at the UUK

Resarch Information and Management Workshop, United Kingdom. Presentation retrieved from https://eprints.soton.ac.uk/265693/

Harnad, S. & McGovern, N. (2009). Topic 4: Institutional repository success is dependent upon mandates. *Bulletin of the American Society for Information Science and Technology, 34*(4), 27-31

Holderied, A. (2009). Institutional repositories provide open access to scholarly communication. *Associates: The Electronic Library Support Staff Journal, 15*(3). Retrieved on 29th November 2015 from http://associates.ucr.edu/journal/?page_id=314

Holland, M. (1997). Diffusion of innovation theories and their relevance to understanding the role of librarians when introducing users to networked information. *The Electronic Library, 15*(5), 389-394.

Holliday, A. (2007). *Doing and writing qualitative research* (2nd ed.). London: SAGE Publications.

House of Commons Science and Technology Committee. (2004). Scientific publications: Free for all? *Tenth report of session 2003-04* (Vol. I: Report, pp. 118). London: House of Commons.

Israel, G. D. (2012). Determining sample size. University of Florida, Agricultural Education and Communication Department, Retrieved on 15th July 2013 from http://edis.ifas.ufl.edu/pd006

Jain, P. (2011). New trends and future applications/directions of institutional repositories in academic institutions. *Library Review*, 60(2), 125-141

Jantz, R. & Myoung, C. W. (2008). Institutional repositories: Faculty deposits, marketing, and the reform of scholarly communication. *The Journal of Academic Librarianship, 34*(3), 186-195.

Jenkins, B., Breakstone, E. & Hixson, C. (2005). Content in, content out: The dual roles of the reference librarian in institutional repositories. *Reference Services Review, 33*(3), 312-324.

Johnson, R. K. (2002). Institutional repositories: Partnering with faculty to enhance scholarly communication. *D-Lib Magazine, 8*(11), Retrieved on 15th July 2013 from http://www.dlib.org/dlib/november02/johnson/11johnson.html

Jones, C. (2007). *Institutional repositories: Content and culture in an open access environment* (1st ed.). Oxford: Chandos Publishing.

Jones, R., Andrew, T. & MacColl, J. (2006). *The institutional repository*. Oxford: Chandos Publishing.

Kakai, M. (2009). *The challenges of advocating for open access through institutional repository building: Experiences from Makerere University, Uganda*. Paper presented at the World Library and Information Congress: 75th IFLA General Conference and Assembly, Milan, Italy. Retrieved on 25th November 2014 from http://conference.ifla.org/past-wlic/2009/105-kakai-en.pdf

Kennan, M. A. (2007). Academic authors, scholarly publishing, and open access in Australia. *Learned Publishing, 20*(2), 138-146. doi: 10.1087/174148507X185117

Kennan, M. A. (2008). *Reassembling scholarly publishing: Open access, institutional repositories and the process of change.* Unpublished PhD dissertation, University of New South Wales.

Kennan, M. A. & Kingsley, D. A. (2009). The state of the nation: A snapshot of Australian institutional repositories. *First Monday, 14*(2). Retrieved on 15th July 2013 from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2282/2092

Kenyatta University Calender 2014-2017

Kim, J. (2006). *Motivating and impeding factors affecting faculty contribution to institutional repositories*. Paper presented at the JCDL 2006 Workshop: Digital Curation and Trusted Repositories: Seeking Success, Chapel Hill, NC, available at http://www.ils.unc.edu/tibbo/JCDL2006/Kim-JCDLWorkshop2006.pdf

Kim, J. (2007). Motivating and impeding factors affecting faculty contribution to institutional repositories. *Journal of Digital Information*, 8(2).

Kim, J. (2011). Motivations of faculty self-archiving in institutional repositories. *The Journal of Academic Librarianship, 37*(3), 246-254.

Kim, H. H., & Kim, Y. H. (2006). An evaluation model for the National Consortium of Institutional Repositories of Korean Universities. Proceedings of the American Society for Information Science and Technology, 43(1), 1-19. doi:10.1002/meet.1450430176

Kingsley, D. (2008). The effect of scholarly communication practices on engagement with open access: An Australian study of three disciplines. (PhD), Australian National University.

Kingsley, D. (2008). Those who don't look don't find: Disciplinary considerations in repository advocacy. *OCLC Systems & Services: International Digital Library Perspectives, 24*(4), 204-218. doi: 10.1108/10650750810914210

Kothari, C. R. (2004). *Research methodology : Methods and techniques* (2nd. Rev. ed.). New Delhi: New Age International Publishers.

Kotler, P. & Armstrong, G. (2012). *Principles of marketing* (14th ed.). Boston: Pearson Prentice Hall

Kumar, R. (2005). *Research methodology: A step-by-step guide for beginners* (2nd ed.). London: SAGE Publications.

Leary, M. R. (2008). *Introduction to behavioural research methods* (5th ed.). Boston: Pearson.

Lee, J., Burnett, G., Vandegrift, M., Baeg, J. H. & Morris, R. (2015). Availability and accessibility in an open access institutional repository: a case study. *Information Research,* 20(1), paper 661. Retrieved on 23 March 2017 from http://InformationR.net/ir/20-1/paper661.html

Lercher, A. (2008). A survey of attitudes about digital repositories among faculty at Louisiana State University at Baton Rouge, *The Journal of Academic Librarianship*, 34(5), 408-415

Lwoga, E. T. & Questier, F. (2014). Faculty adoption and usage behaviour of open access scholarly communication in health science universities. *New Library World, 115*(3/4), 116-139. doi: 10.1108/NLW-01-2014-0006

Lynch, C. (2003). Institutional repositories: Essential infrastructure for scholarship in the digital age. *Portal: Libraries and the Academy*, 3(2), 327-336.

Macha, A. & Jager, K. D. (2011). *A comparative overview of the development of the institutional repositories at the University of Cape Town and at the University of Pretoria*. Paper presented at the 14th International Symposium on Electronic Theses and Dissertations, Cape Town, South Africa. Retrieved on 25th November 2014 from http://dl.cs.uct.ac.za/conferences/etd2011/papers/etd2011_macha.pdf

Mackie, M. (2004). Filling institutional repositories: Practical strategies from the DAEDALUS project, *Ariadne*, 39, Retrieved on 15th July 2013 from http://www.ariadne.ac.uk/issue39/mackie

Management. (2015). In *Business Dictionary*. Retrieved on 31st August 2015 from http://www.businessdictionary.com/definition/management.html

Mark, T. & Shearer, K. (2006). *Institutional repositories: A review of content recruitment strategies*. Paper presented at the World Library and Information Congress: 72nd IFLA General Conference and Council, Seoul, Korea. Retrieved on 28th July 2014 from http://www.ifla.org/IV/ifla72/papers/155-Mark_Shearer-en.pdf

Markey, K., Rieh, S. Y., Jean, B., Kim, J. & Yakel, E. (2007). *Census of institutional repositories in the United States, MIRACLE project research findings*. Washington, D.C.: Council on Library and Information Resources, Retrieved on 15th July 2013 from http://www.clir.org/pubs/reports/pub140/pub140.pdf.

Materu-Behitsa, M. (2004). *The Database of African Theses and Dissertations (DATAD).* Paper presented at the Conference on Electronic Publishing and Dissemination, Dakar, Senegal. Retrieved on 24th September 2014 from http://codesria.org/spip.php?article752&lang=en

McCord, A. (2003). Institutional repositories: Enhancing teaching, learning, and research. EDUCAUSE Evolving Technologies Committee white paper. Retrieved on 15th July 2013 from http://sitemaker.umich.edu/dams/files/etcom-2003-repositories.pdf

McDowell, C. S. (2007). Evaluating institutional repository deployment in American Academe since early 2005: Repositories by the numbers, Part 2. *D-Lib Magazine, 13*(9/10). Retrieved on 15th July 2013 from http://www.dlib.org/dlib/september07/mcdowell/09mcdowell.html

Mercieca, P. (2008). *Publication patterns of Australian academics and the impact on open access publishing*. Paper presented at the Libraries - Changing Spaces, Virtual Places, VALA 2008, 14th Biennial Conference and Exhibition, Melbourne, Australia. Retrieved on 24th June 2014 from http://www.valaconf.org.au/vala2008/papers2008/47_Mercieca_Final.pdf

Mertens, D. M. (2012). Ethics in qualitative research in education and the social sciences. In S. D. Lapan, M. T. Quartaroli & F. J. Riemer (Eds.), *Qualitative research: an introduction to methods and designs* (pp. 19-39). London: Sage.

Moller, A. M. (2006). *The case for open access publishing, with special reference to open access journals and their prospects in South Africa*. (PhD), University of the Western Cape, South Africa

Morris, S. & Thorn, S. (2009). Learned society members and open access. *Learned Publishing, 22*(3), 221-239. doi: 10.1087/2009308

MUHAS Prospectus (2015). Muhimbili University of Health and Allied Sciences prospectus 2014/2015.

Musoke, M. G. N. (2007). Access to health information: The African users' perspective. In: A. Mlambo (Ed): *African Scholarly Publishing Essays* (pp. 120-128). Oxford: African Books Collective Ltd. Retrieved on 14th June 2014 from http://www.daghammarskjold.se/wp-content/uploads/2014/08/African_scholarly_publishing_essays.pdf

Nabe, J. A. (2010). *Starting, strengthening, and managing institutional repositories: A how-to-do-it manual*. New York: Neal-Schuman Publishers.

Neuman, W. L. (2014). *Social research methods : Qualitative and quantitative approaches* (7th. ed.). Edinburgh: Pearson.

Neuman, W. L. (2011). *Social research methods : Qualitative and quantitative approaches* (7th. ed.). Boston: Pearson.

Nwagwu, W. E. (2013). Open access initiatives in Africa: Structure, incentives and disincentives. *The Journal of Academic Librarianship*, 39, 3-10

Obiora, N. & Ogbomo, E. F. (2013). Awareness of lecturers in South-South federal universities in Nigeria of institutional repositories. *Journal of Library & Information Science, 3*(1), 116-133.

Ochs, M., Aronson, B. & Wu, J. (2004). HINARI and AGORA: Revolutionizing access to scientific information in the developing world. *Serials*, 17(2), 175-182.

Okerson, A. S. & O'Donnell, J. J. (Eds.). (1995). *Scholarly journals at the crossroads: A subversive proposal for electronic publishing*. Washington, DC: Association of Research Libraries. Retrieved on 14th June 2014 from http://babel.hathitrust.org/cgi/pt?id=mdp.39015034923758;view=1up;seq=5

Olsbo, P. (2013). Does openness and open access policy relate to the success of universities? *Information Services & Use,* 33, 87-91. doi: 10.3233/ISU-130707

OpenDOAR (2014). Directory of Open Access Repositories. Retrieved on 8th July 2014 from http://www.opendoar.org/

Oppenheim, A. N. (1992). *Questionnaire design, interviewing and attitude measurement* (New ed.). London: Continuum.

Palmer, C. L., Teffeau, L. C., & Newton, M. P. (2008). *Identifying factors of success in CIC institutional repository development : Final report*. New York: The Andrew W. Mellon Foundation.

Palmer, C. L., Teffeau, L. C. & Newton, M. P. (2008). Strategies for institutional repository development: A case study of three evolving initiatives, *Library Trends*, 57(2), 142-167

Papin-Ramcharan, J. & Dawe, R. A. (2006). The other side of the coin for open access publishing: A developing country view, *Libri*, 56, 16-27.

Parahoo, K. 1997. Nursing research: Principles, process and issues. London: MacMillan Press.

Paschal, D. B. (2010). Implementing an institutional repository using DigiTool: The Colorado State University experience. In J. A. Nabe (Ed.), *Starting, strengthening, and managing institutional repositories* (pp. 111-120). New York: Neal-Schuman Publishers.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). London: SAGE Publications.

Pennock, M. & Lewis, S. (2007). Institutional repositories: The new university challenge, *ALISS Quarterly*.

Pickard, A. J. (2013). *Research methods in information* (2nd ed.). London: Facet Publishing.

Pickton, M. & McKnight, C. (2006). Research students and the Loughborough institutional repository. *Journal of Librarianship and Information Science, 38*(4), 203-219.

Pinfield, S. (2005). A mandate to self-archive? The role of open access institutional repositories. *Serials*, 18(1), 30-34.

Pinfield, S. (2003). Open archives and UK institutions: An overview. *D-Lib Magazine*, 9(3). doi: 10.1045/march2003-pinfield

Poynder, R. (2013). Open access: Emerald's green starts to fade? Retrieved 19th June, 2013, from http://poynder.blogspot.com/2013/06/open-access-emeralds-green-starts-to.html

Prosser, D. C. (2003). Scholarly communication in the 21st century – The impact of new technologies and models. *Serials*, 16(2), 163-167.

Prost, H. & Schopfel, J. (2014). Degrees of openness: Access restrictions in institutional repositories. *D-Lib Magazine*, 20.

Proudman, V. (2007). The population of repositories. In K. Weenink, L. Waaijers, & K. van Godtsenhoven (Eds.), *A DRIVER's Guide to European Repositories* (pp. 49-101). Amsterdam: Amsterdam University Press.

Punch, K. (2006). *Developing effective research proposals*. London: Sage Publications.

Repanovici, A. (2010). *Marketing strategies for digital repositories: Promotion and visibility of scientific production through open access*. Verlag, German: Lambert Academic Publishing.

Ritchie, J., Lewis, J. & El am, G. (2003). Designing and selecting samples. In J. Ritchie & J. Lewis (Eds.), *Qualitative research practice: A guide for Social Science students and researchers*. London: SAGE Publications.

Roach, A. K. & Gainer, J. (2013). On open access to research: The green, the gold, and the public good. *Journal of Adolescent & Adult Literacy*, 56(7), 530-534.

ROARMAP (2014). The Registry of Open Access Repository Mandates and Policies. Retrieved from https://roarmap.eprints.org

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Rossi, P. H., Wright, J. D. & Anderson, A. B. (1983). *Handbook of survey research*. New York: Academic Press.

Rowlands, I. & Nicholas, D. (2005). Scholarly communication in the digital environment: The 2005 survey of journal author behaviour and attitudes. *Aslib Proceedings, 57*(6), 481-497.

Royster, P. (2010). DigitalCommons @ University of Nebraska-Lincoln. In J. A. Nabe (Ed.), *Starting, strengthening, and managing institutional repositories* (pp. 155-162). New York: Neal-Schuman Publishers.

Sale, A. (2006). The acquisition of open access research articles. *First Monday,* 11(9), Retrieved on 10th April 2017 from: http://eprints.utas.edu.au/388/1/FirstMondayOct06.pdf

Sale, J. E. M., Lohfeld, L. H. & Brazil, K. (2002). Revisiting the quantitative-qualitative debate: Implications for mixed-methods research. *Quality and Quantity*, 36(), 43-53.

Sarantakos, S. (2005). *Social research* (3rd ed.). New York: Palgrave MacMillan.

Scholl, H. J. (2001). Applying stakeholder theory to e-government: Benefits and limits. *Proceedings of the 1st IFIP Conference on E-Commerce, E-Business, and E-Government (13E 2001), Zurich, Switzerland*.

Scott, M., Golden, W. & Hughes, M. (2004). *Implementation strategies for e-government: A stakeholder analysis approach*. Paper presented at the 12th European Conference on Information Systems, Turku, Finland.

Shampa, P. (2012). Institutional repositories : Benefits and incentives. *The International Information & Library Review,* 44, 194-201.

Shearer, K. (2006). The CARL institutional repositories project: A collaborative approach to addressing the challenges of IRs in Canada. *Library Hi Tech, 24*(2), 165-172.

Shearer, K. M. (2003). Institutional repositories: Towards the identification of critical success factors. *The Canadian Journal of Information and Library Science*, 27(3), 89-108.

SHERPA Document, (2008). Institutional repositories: Staff and skills set. Accessed on 5th September 2014 from http://www.sherpa.ac.uk/documents/staffandskills2008.pdf

Shin, E-J. (2010). The challenges of open access for Korea's national repositories. *Interlending & Document Supply*, 38(4), 231-236.

Shreeves, S. L. & Cragin, M. H. (2008). Institutional repositories: Current state and future. *Library Trends, 57*(2), 89-97.

Singeh, F. W., Abrizah, A. & Karim, N. H. A. (2013). What inhibits authors to self-archive in open access repositories? A Malaysian case. *Information Development, 29*(1), 24-35. doi: 10.1177/0266666912450450

Smart, R. (2019). What is an institutional repository to do? Implementing open access harvesting workflows. *Publications*, 7(37), 1-10. doi: 10.3390/publications7020037

SPIDER, (2015). Open access: Knowledge sharing and sustainable scholarly communication in Kenya, Tanzania, and Uganda. Retrieved on 25th November 2015 from http://spidercenter.org/projects/project-overview/open-access-knowledge-sharing-and-sustainable-scholarly-communication-in-kenya-tanzania-and-uganda-1.149779

Stazano, L. (2016). A librarian's process for building an institutional repository. San Diego: Elsevier.

Steven ten Have, Wouter ten Have, & Stevens, F. (2003). *Key management models: The management tools and practices that will improve your business*. London: Financial Times Prentice Hall.

Suber, P. (2012). *Open access*. Cambridge, Massachusetts: The MIT Press.

Suber, P. (2015). Open access overview: Focusing on open access to peer-reviewed research articles and their preprints. Accessed on 31st December 2015 from https://legacy.earlham.edu/~peters/fos/overview.htm

Swan, A. (2008). The business of digital repositories. In K. Weenink, L. Waaijers & K. van Godtsenhoven (Eds.), *A DRIVER's Guide to European Repositories*. Amsterdam: Amsterdam University Press.

Swan, A. & Brown, S. (2004). Authors and open access publishing. *Learned Publishing, 17*, 219-224.

Swan, A. & Brown, S. (2005). *Open access self-archiving: An author study*. UK: Key Perspectives Limited.

Swan, A. & Brown, S. (2007). *Researcher awareness and access to open access content through libraries: A study for the JISC Scholarly Communications Group* (pp. 1-49). London: Key Perspectives Ltd. Retrieved on 20th November 2015 from http://eprints.soton.ac.uk/264412/

Swan, A. & Chan L. (2012). Funders policy on open access. Accessed on 15th July 2013 from http://www.openoasis.org/

Swan, A. & Hall, M. (2010). Why Open Access can change science in the developing world. *Public Service Review: International Development Online* (17), 1-2. Retrieved on 4th November 2014 from http://eprints.soton.ac.uk/271550/

Swan, A., Willmers, M., & King, T. (2014). Costs and benefits of open access: A guide for managers in Southern African Higher Education. Cape Town, South Africa: Scholarly Communication in Africa Programme.

Thibodeau, K. (2007). If you build it, will it fly? : Criteria for success in a digital repository. Journal of Digital Information, 8(2). https://journals.tdl.org/jodi/index.php/jodi/article/view/197/174

Thomas, G. (2007). Evaluating the impact of the institutional repository, or positioning innovation between a rock and a hard place. *New Review of Information Networking*, 13(2), 133-146. http://dx.doi.org/10.1080/13614570802105992

Thomas, C., & McDonald, R. H. (2008). In search of a standardized model for institutional repository assessment or how can we compare institutional repositories? , 1-14. https://escholarship.org/uc/item/9w1910rv

Trochim, W. M. K. (2006). Ethics in research. Retrieved on 9th October 2015 from Research Methods Knowledge Base website: http://www.socialresearchmethods.net/kb/ethics.php

Trotter, H., Kell, C., Willmers, M., Gray, E. & King, T. (2014). *Seeking impact and visibility: Scholarly communication in Southern Africa*. Cape Town, South Africa: Scholarly Communication in Africa Programme (SCAP), University of Cape Town.

USDL project proposal (n.d.) Uganda Science Digital Library project proposal: Collaboration programme between the libraries at University of Bergen and Makerere University. Retrieved on 14th June 2014 from http://www.ub.uib.no/avdeling/fdok/Visits/maklib/USDL%20project%20proposal.pdf

Utulu, S. C. A., & Ngwenyama, O. (2017). *Rethinking theoretical assumptions of the discourses of the institutional repository innovation discipline*. Paper presented at the African Conference for Information Systems and Technology, Rondebosch, Cape Town, South Africa.

Van Deventer, M. & Pienaar, H. (2008). South African repositories: Bridging knowledge divides. *ARIADNE,* 55. Retrieved on 25th November 2014 from http://www.ariadne.ac.uk/issue55/vandeventer-pienaar/

Van Teijlingen, E. R. & Hundley, V. (2001). The importance of pilot studies. *Social Research Update,* (35). Retrieved on 9th October 2015 from http://sru.soc.surrey.ac.uk/SRU35.html

VanderStoep, S. W., & Johnston, D. D. (2009). *Research methods for everyday life : Blending qualitative and quantitative approaches*. San Francisco: Jossey-Bass.

Waller, A., & Morrison, H. (2004). Open access : Basics and benefits. *Letter of the LAA (Library Association of Alberta)*, 17-18.

Walliman, N. (2006). *Social research methods*. London: SAGE Publications.

Wanyenda, C. (2015). Green open access in Kenya: A review of the content, policies and usage of institutional repositories. *Mousaion, 33*(3), 25-54.

Ware, M. (2004). Institutional repositories and scholarly publishing. *Learned Publishing*, 17(2), 115-124.

Wasiwasi, J. M., & Zaipuna, O. Y. (2014). Design and development of a web based digital repository for scholarly communication: A case of NM-AIST Tanzania. International Journal of Knowledge Content Development & Technology, 4(2), 97-108. doi: 10.5865/IJKCT.2014.4.2.097

Watson, S. (2007). Authors' attitudes to, and awareness and use of, a university institutional repository. *Serials, 20*(3), 225-230.

Westell, M. (2006). Institutional repositories: Proposed indicators of success. *Library Hi Tech*. 24(2), 211-226.

What is scholarly information? http://library.unimelb.edu.au/information-futures/strategy/what_is_scholarly_information

Wildemuth, B. M. (2009). *Applications of social research methods to questions in information and library science*. Westport: Libraries Unlimited.

Wilkinson, D., & Birmingham P. (2003). Using research instruments : A guide for researchers. London: RoutledgeFalmer.

Williams, M. & May, T. (1996). *Introduction to the philosophy of social research*. London: UCL Press Limited.

Wireman, B. O. (1998), "Characteristics of change agents", *Vital Speeches of the Day*, Vol. 65 No. 5, pp. 152-155.

Wolfe, R. & Fisher, C. (2006). *A snapshot of the information and communication for development environment in Cameroon*. Brighton, UK: Institute of Development Studies at the University of Sussex.

Xia, J. (2007). Assessment of self-archiving in institutional repositories: Across disciplines. *The Journal of Academic Librarianship, 33*(6), 647-654.

Xia, J., Gilchrist, S. B., Smith, N. X. P., Kingery, J. A., Radecki, J. R., Wilhelm, M. L., . . . Mahn, A. J. (2012). A review of open access self-archiving mandate policies. *Portal: Libraries and the Academy, 12*(1), 85-102. Accessed on 14th June 2014 from http://muse.jhu.edu/journals/pla/summary/v012/12.1.xia.html

Xia, J. & Sun, L. (2007). Assessment of self-archiving in institutional repositories: Depositorship and full-text availability. *Serials Review, 33*(1), 14-21.

Xu, H. (2008). The theory analysis of faculty participation in institutional repositories: Review of reviewed item. *CALA Occasional Paper Series, No. 1.* http://www.cala-web.org/files/ops/OPSMarch08.pdf

Yang, Z. Y. & Li, Y. (2015). University faculty awareness and attitudes towards open access publishing and the institutional repository: A case study. *Journal of Librarianship and Scholarly Communication, 3*(1). doi: 10.7710/2162-3309.1210

Yin, R. K. (2009). *Case study research: Design and methods*. London: SAGE Publications.

Young, P. (2009). *The serials crisis and open access: A white paper for the Virginia Tech commission on research* (pp. 1-17). Blacksburg, VA: Virginia Tech. Retrieved on 14th June 2014 from http://scholar.lib.vt.edu/faculty_archives/YoungP/OAwhitepaper.pdf

APPENDICES

Appendix 1A: Interviewee consent form

I thank you for taking the time to meet with me today. My name is Miriam Kakai, a PhD student of Information Science enrolled at Makerere University. I would like to get your views about the institutional repository at your university. Specifically, I would like to devise means of how best institutional repositories can be managed in universities in East Africa.

This interview should take less than an hour. I will be voice recording the session because I do not want to miss any of your comments. Although I will also be taking some notes during the session, I cannot possibly write fast enough to get everything down. As I am doing a voice recording, I request you to speak up so that I do not miss any of your comments.

Your interview responses will only be used for academic purposes, and I will ensure that any information that I will include in the dissertation does not identify you as the source.

If there are any questions before we proceed, please let me know.

Personal data

1. University affiliated to

   [ ] Makerere University [ ] Kenyatta University

   [ ] Muhimbili University of Health and Allied Sciences

2. Gender [ ] Male [ ] Female

3. Age group

   [ ] 20-29 [ ] 30-39 [ ] 40-49 [ ] 50-59 [ ] 60 & above

4. Highest academic qualification

   [ ] Bachelors Degree [ ] Masters Degree [ ] PhD

5. Professional rank at the university

   _____

6. Name of the library _____

Appendix 1B: Interview schedule for librarians

Note: *Many universities around the world have set up "online archives of materials" often called "institutional repositories". Institutional repositories are therefore online databases for collecting, preserving, and disseminating, in digital form, the intellectual output of an institution. They contain materials like research articles, thesis, and dissertations, etc. normally produced within a university.*

Activities carried out during the development of the institutional repository (IR):

1. When did you start working on the IR project (i.e. when was it initiated, and when was it launched?)
2. What motivated you to set up an IR?
3. What was the over-riding objective of setting up an IR in your university?
4. Who initiated the IR idea in your university?
5. What did the process of setting up the IR entail?
6. What activity did you start off with when setting up your IR?
7. How did you select the software you are using?
8. What types of documents are in your IR?
9. How were these documents decided on?
10. Did you conduct a needs assessment before deciding on the documents in the IR?
11. What is the process for collecting and depositing the materials in the IR? (How are the publications in the IR collected?)
12. How many staff were working on the IR project initially before the launch?
13. Do you have any policies governing the IR?

Management of institutional repositories:

14. Does your IR provide open access?
15. Do you promote/market the IR? If yes, how? If no, why not?
16. Are the researchers aware of their role in the IR?
17. Do you have any collaborative link with the departments/persons where the publications originate to know whether they have materials for the IR ready? (If yes, explain)
18. Who supports the IT requirements of the software that you are using? (E.g. configuring the system, making additions/upgrades to the system, etc.)
19. How do you provide for the IR requirements financially? Do you have a specific budget for the IR?
20. Does the library have any equipment for digital conversion of materials? If yes, what equipment?
21. How many staff members are devoted to the IR activities now and what roles do they play?
22. How has the library built capacity to manage the institutional repository?

23. Does the library provide any guidance on copyright issues for materials deposited in the IR?
24. Do you have a strategic plan for the IR or is it included in the overall library strategic plan?

Researchers' awareness and participation:

25. In your view, are researchers aware of the institutional repository in the university? Explain your answer.

Challenges in managing institutional repositories:

26. What challenges does the library face in collecting publications for the IR?
27. How do you find using the IR software that you are using? (Any problems or challenges)
28. Any other challenges experienced in managing IRs?

Strategies for developing and managing institutional repositories:

29. What strategies do you have for the development and management of IRs in your university?

30. Any other comments related to open access or institutional repositories are welcome.

Appendix 2: Questionnaire for researchers

My name is Miriam Kakai, a PhD student of Information Science enrolled at Makerere University. I would like to get your views about the institutional repository at your university. Specifically, I would like to devise means of how best institutional repositories can be managed in universities in East Africa. This is to request you to respond to the following questions please. All responses will be kept confidential and only used for academic purposes.

Instructions: Tick the option of your choice and/or fill in the blank spaces

Personal Data:

1. What university are you affiliated to?

   [ ] Makerere University [ ] Kenyatta University

   [ ] Muhimbili University of Health and Allied Sciences

2. What is your gender? [ ] Male [ ] Female

3. Which age group do you belong to?

   [ ] 20-29 [ ] 30-39 [ ] 40-49 [ ] 50-59 [ ] 60 & above

4. What is your highest academic qualification?

   [ ] Bachelors Degree [ ] Masters Degree [ ] PhD

5. What is your academic rank at the university?

   [ ] Teaching Assistant [ ] Assistant Lecturer [ ] Lecturer [ ] Senior Lecturer [ ] Associate Professor [ ] Professor [ ] _____

6. What college/faculty/school do you belong to?

   _____

   _____

   _____

   _____

   _____

Participation and Awareness:

Note: *Open access enables users of information to retrieve research publications from the Internet without having to pay a subscription, login restrictions, or request for permission. Information is made available free for re-use to the public. The publishers' costs are diverted to some other source. Institutional repositories are one of the tools through which open access materials are made available.*

7. Have you ever attended any lecture/seminar/workshop on open access?

   [ ] Yes [ ] No

8. Have you ever published in an open access journal? [ ] Yes [ ] No

9. If your response is "No" in question 8, why not?

   _____

   _____

10. Have you ever deposited any of your research in an institutional repository?

    [ ] Yes [ ] No

11. If your response is "No" in question 10, why not?

    _____

    _____

12. Have you ever used the Directory of Open Access Journals (DOAJ)?

    [ ] Yes [ ] No

13. If your response is "No" in question 12, why not?

    _____

    _____

14. Do you need some awareness building about open access and institutional repositories in your university?

    [ ] Yes [ ] No

Note: *Many universities around the world have set up "online archives of materials" often called "institutional repositories". Institutional repositories are therefore online databases for collecting, preserving and disseminating, in digital form, the intellectual output of an institution. They contain materials such as research articles, thesis and dissertations, usually produced within a university. The aim is to increase the visibility and accessibility of these materials.*

15. Are you aware of the institutional repository in your university? [ ] Yes [ ] No

16. If your response is "Yes" in question 15, how did you get to know about the institutional repository in your university?

_____

_____

_____

17. If your response is "Yes" in question 15, what kinds of publications are in your institutional repository?

_____

_____

_____

18. What additional publications would you recommend for deposit/collection in an institutional repository?

_____

_____

_____

Support to open access:

In questions 19-22, tick the appropriate box.

No.	Question	Strongly in favour	Mildly in favour	Neither	Mildly against	Strongly against
19	Given that with open access, information is provided free of charge to the public, do you support the principles of open access?					
20	Do you support institutional repositories being one of the models of scholarly communication?					
21	Would you provide your publications as open access through institutional repositories?					
22	As a researcher, would you use materials retrieved from an institutional repository for referencing?					

23. In what ways do you publicize your publications to others for them to easily use them?

_____

_____

24. Given the available options, where would you prefer depositing (self-archiving) your publications? (Tick as many as applicable).

[ ] Personal website [ ] Departmental website [ ] Institutional repository
[ ] Subject repository

No.	Question	Strongly in favour	Mildly in favour	Neither	Mildly against	Strongly against
25	Would you support the depositing of research output in an institutional repository being made a mandatory requirement for all researchers in your university?					
26	Would you support research funding agencies to compel researchers whom they fund to deposit publications in institutional repositories?					

27. How would you prefer depositing your work in an institutional repository?

[ ] I prefer depositing on my own

[ ] I prefer someone to deposit on my behalf

28. In the process of producing a journal article for publication, do you normally keep in the institutional repository your own copy of the manuscript, i.e. the version called the final draft or pre-print? This is a version identical to the published version in all other respects except for the final layout and logo's.

[ ] Yes [ ] No [ ] I have never published

29. Would it be acceptable to you that the post-print be held in an institutional repository, if the publisher's policies were in favour? [ ] Yes [ ] No

30. If your response is "No" in question 29, why not?

_____

_____

31. Would you agree to provide open access to the publications deposited in the institutional repository? [ ] Yes [ ] No

32. If your response is “No” in question 31, why not?

_____

_____

_____

33. It is generally acknowledged that developing countries contribute insignificantly to the global scholarly literature because most of the research output from such countries is documented in publications with limited circulation (such as conference proceedings, theses and dissertations, etc.)

No.	Question	Strongly agree	Mildly agree	Neither	Mildly disagree	Strongly disagree
33	To what extent do you agree or disagree with the above observation as far as dissemination of research output from your university is concerned?					

Development of institutional repositories:

In question 34, tick the appropriate box

No.	Question	Very important	Slightly important	Neither	Slightly unimportant	Very unimportant
34	How would you rate the importance of the institutional repository in your university?					

35. Does your university library provide guidance on copyright issues for materials deposited in the institutional repository?

[ ] Yes [ ] No

36. Would you support the establishment of a policy that requires lecturers to deposit all their research output in an institutional repository?

[ ] Yes [ ] No

37. If your response is “No” in question 36, why not?

_____

_____

_____

38. As a researcher, which unit would be better placed to set up and manage an institutional repository in your university? (Please justify)

_____

_____

_____

Challenges:

39. What could be the factors limiting researchers from depositing their work(s) in the institutional repository at your university? (***Tick as many as applicable***)

(a) Researchers are not aware of the process [ ]

(b) It is not mandatory to deposit work in the repository [ ]

(c) Researchers do not have the time to deposit work in the repository [ ]

(d) Researchers are worried about plagiarizing their work [ ]

(e) Researchers consider repositories to contain non-peer reviewed work [ ]

(f) Depositing in the repository contradicts the publishers' rights [ ]

(g) Co-authors might not agree to depositing in a repository [ ]

(h) Researchers prefer depositing on their own websites [ ]

(i) Researchers prefer communicating their research through e-mail or social media [ ]

(j) Researchers do not trust citing work from repositories [ ]

(k) Researchers prefer subject repositories to institutional repositories [ ]

(l) Researchers are not sure of the permanence of repositories [ ]

Suggestions:

40. What should be done to promote the management of open access institutional repositories in your university?

_____

_____

_____

_____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Appendix 3: MakIR consent agreement

Agreement between Makerere University and Students (Authors of Thesis / Dissertations)

1. The author is a student of Makerere University and author of the thesis / dissertation entitled:

……

……

……

……

2. The author grants to the university:
   a. The right to deposit the electronic version of the Thesis into Makerere University Institutional Repository (M aakIR);
      and
   b. The right to store the thesis / dissertation in MakIR and make it permanently available to the general public via the Internet at no cost to the general public after a grace period (if any is specified). Tick one of the two options below:
   c. The Author may opt for immediate open access to the public ……
   d. Or Restrict access for two years until the thesis / dissertation is published ……

3. The author warrants that to the best of the author's knowledge and belief:
   a. The thesis / dissertation is an original work;
   b. The author is the owner of all the intellectual property in the thesis / dissertation;
      or
   c. The Author is entitled to deal with the intellectual property in the thesis / dissertation by publishing it on the Internet
   d. The Author has the right, power and authority to enter into this Agreement and to grant the University the rights contained in this Agreement; and
   e. The University's use of the article pursuant to this Agreement will not infringe the intellectual property rights of any third party.

4. The Author acknowledges and agrees that the University is not responsible or liable for any breach of the intellectual property rights in the thesis / dissertation, in particular, any breach of copyright, as a result of the use of the thesis / dissertation pursuant to this Agreement.

5. The University acknowledges that the rights granted by the Creator in clause 2 of this Agreement, do not cause any transfer or assignment of any proprietary rights in the intellectual property in the article to the University.

Signed by the Author as confirmation that the Author has read and accepted the terms of this Agreement:

Name: _____

College/School: _____ Department: _____

(Tick) Type of Degree: (Undergraduate / Masters / PhD), Reg. No.: _____

Tel No.: _____ E-Mail: _____

Signature: _____ Date: _____

Appendix 4: Addendum to publication agreement

ADDENDUM TO PUBLICATION AGREEMENT

1. THIS ADDENDUM hereby modifies and supplements the attached Publication Agreement concerning the following Article:

_____
(manuscript title)

_____
(journal name)

2. The parties to the Publication Agreement as modified and supplemented by this Addendum are:

_____(corresponding author)
_____
_____
_____
(Individually or, if one than more author, collectively, Author)

_____
(Publisher)

3. This Addendum and the Publication Agreement, taken together, allocate all rights under copyright with respect to all versions of the Article. The parties agree that wherever there is any conflict between this Addendum and the Publication Agreement, the provisions of this Addendum are paramount and the Publication Agreement shall be construed accordingly.

4. **Author's Retention of Rights.** Notwithstanding any terms in the Publication Agreement to the contrary, AUTHOR and PUBLISHER agree that in addition to any rights under copyright retained by Author in the Publication Agreement, Author retains: (i) the rights to reproduce, to distribute, to publicly perform, and to publicly display the Article in any medium for non-commercial purposes; (ii) the right to prepare derivative works from the Article; and (iii) the right to authorize others to make any non-commercial use of the Article so long as Author receives credit as author and the journal in which the Article has been published is cited as the source of first publication of the Article. For example, Author may make and distribute copies in the course of teaching and research and may post the Article on personal or institutional Web sites and in other open-access digital repositories.

5. **Publisher's Additional Commitments.** Publisher agrees to provide to Author within 14 days of first publication and at no charge an electronic copy of the published Article in a format, such as the Portable Document Format (.pdf), that preserves final page layout, formatting, and content. No technical restriction, such as security settings, will be imposed to prevent copying or printing of the document.

6. **Acknowledgment of Prior License Grants.** In addition, where applicable and without limiting the retention of rights above, Publisher acknowledges that Author's assignment of copyright or Author's grant of exclusive rights in the Publication Agreement is subject to Author's prior grant of a non-exclusive copyright license to Author's employing institution and/or to a funding entity that financially supported the research reflected in the Article as part of an agreement between Author or Author's employing institution and such funding entity, such as an agency of the United States government.

7. For record keeping purposes, Author requests that Publisher sign a copy of this Addendum and return it to Author. However, if Publisher publishes the Article in the journal or in any other form without signing a copy of this Addendum, such publication manifests Publisher's assent to the terms of this Addendum.

AUTHOR

_____
(corresponding author on behalf of all authors)

_____(Date)

PUBLISHER

_____

_____(Date)

Neither Creative Commons nor Science Commons are parties to this agreement or provide legal advice. Please visit www.sciencecommons.org for more information and specific disclaimers.

SPARC (the Scholarly Publishing and Academic Resources Coalition) and the Association of Research Libraries (ARL) are not parties to this Addendum or to the Publication Agreement. SPARC and ARL make no warranty whatsoever in connection with the Article. SPARC and ARL will not be liable to Author or Publisher on any legal theory for any damages whatsoever, including without limitation any general, special, incidental or consequential damages arising in connection with this Addendum or the Publication Agreement.

SPARC and ARL make no warranties regarding the information provided in this Addendum and disclaims liability for damages resulting from the use of this Addendum. This Addendum is provided on an "as-is" basis. No legal services are provided or intended to be provided in connection with this Addendum.

science commons
Access-Reuse 1.0
www.sciencecommons.org

SPARC
SPARC Author Addendum 3.0
www.arl.org/sparc/

Appendix 5: Letters

MAKERERE UNIVERSITY
P. O. Box 7062, Kampala - Uganda.
E-mail: info@cis.mak.ac.ug
URL: http://cis.mak.ac.ug
Tel: +256 - 414 - 540 628 / 534 560 / 1 - 97
Fax: +256 - 414 - 540 620
twitter: @cocismak
facebook: www.facebook.com/cocismak
COLLEGE OF COMPUTING & INFORMATION SCIENCES

October 20, 2014

The Vice Chancellor
Makerere University

Dear Prof. John Ddumba-Ssentamu,

RE: INTRODUCTION LETTER – MIRIAM KAKAI REG NO. 2010/HD05/3168U

This is to introduce to you the above named student of East African School of Library and Information Science under the College of Computing and Information Sciences, Makerere University offering Doctor of Philosophy in Information Science.

As part of the degree programme, she is required to carry out a research which she intends to do in your organization. The topic of her research is entitled, ***"The Development and Management of Open Access Institutional Repositories in Selected Universities in East Africa".***

The purpose of this communication is to request you to offer her the necessary assistance required.

Please note that all information obtained shall be for academic purposes only.

Yours Sincerely,

Dr. Sarah Kaddu
AG. HEAD OF DEPARTMENT
LIBRARY & INFORMATION SCIENCE

MAKERERE UNIVERSITY
P. O. Box 7062, Kampala - Uganda.
E-mail: info@cis.mak.ac.ug
URL: http://cis.mak.ac.ug
Tel: +256 - 414 - 540 628 / 534 560 / 1 - 97
Fax: +256 - 414 - 540 620
twitter: @cocismak
facebook: www.facebook.com/cocismak

COLLEGE OF COMPUTING & INFORMATION SCIENCES

October 20, 2014

The Vice Chancellor
Kenyatta University
Kenya

Dear Prof. Olive Mugenda,

RE: INTRODUCTION LETTER – MIRIAM KAKAI REG NO. 2010/HD05/3168U

This is to introduce to you the above named student of East African School of Library and Information Science under the College of Computing and Information Sciences, Makerere University offering Doctor of Philosophy in Information Science.

As part of the degree programme, she is required to carry out a research which she intends to do in your organization. The topic of her research is entitled, ***"The Development and Management of Open Access Institutional Repositories in Selected Universities in East Africa".***

The purpose of this communication is to request you to offer her the necessary assistance required.

Please note that all information obtained shall be for academic purposes only.

Yours Sincerely,

Dr. Sarah Kaddu
AG. HEAD OF DEPARTMENT
LIBRARY & INFORMATION SCIENCE

KENYATTA UNIVERSITY

OFFICE OF THE DEPUTY VICE-CHANCELLOR (ACADEMIC)

Tel: (+254-20) 8710901-19 Ext 57481,cisco 3055
Fax: (+254-20) 8711380
Website: www.ku.ac.ke

P.O. Box 43844-00100
Nairobi, Kenya
E-mail: dvc-acad@ku.ac.ke

Ref: KU/DVCACAD/DVC(RIO/VOL1(18)

21st November, 2014

Miriam Kakai
Makerere University
m$kakai@mulib.ma.ac..ug
mkakai@mail.com

Dear Ms. Kakai,

REF: REQUEST TO CONDUCT RESEARCH IN KENYATTA UNIVERSITY – MIRIAM KAKAI REG.NO. 2010/HDO5/3168U

Reference is made to your email to the Vice-Chancellor, dated 22nd October 2014 on the above subject.

Your request for permission to pilot your tools at Kenyatta University on your research titled: **"The Development and Management of Open Access Institutional Repositories in Selected Universities in East Africa"** has been approved.

On completion of your research, you are expected to submit a hard and soft copy of your preliminary report to our Deputy Vice-Chancellor (Research, Innovation and Outreach).

Kindly liaise with the Deputy Vice-Chancellor (Research, Innovation and Outreach) before commencing any data collection for further guidance.

Thank you.

PROF. WANGARI MWAI
AG. DEPUTY VICE-CHANCELLOR (ACADEMIC)

KENYATTA UNIVERSITY
P.O. BOX 43844 - 00100 NAIROBI
21 NOV 2014
OFFICE OF DEPUTY VICE CHANCELLOR (ACADEMIC)

c.c. Vice-Chancellor
Deputy Vice-Chancellor (Research, Innovation and Outreach)

WM/gnm

MAKERERE UNIVERSITY
P. O. Box 7062, Kampala - Uganda.
E-mail: info@cis.mak.ac.ug
URL: http://cis.mak.ac.ug
Tel: +256 - 414 - 540 628 / 534 560 / 1 - 97
Fax: +256 - 414 - 540 620
twitter: @cocismak
facebook: www.facebook.com/cocismak
COLLEGE OF COMPUTING & INFORMATION SCIENCES

October 20, 2014

The Vice Chancellor
Muhimbili University of Health and
Applied Sciences
Tanzania

Dear Prof. E. Kaaya,

RE: INTRODUCTION LETTER – MIRIAM KAKAI REG NO. 2010/HD05/3168U

This is to introduce to you the above named student of East African School of Library and Information Science under the College of Computing and Information Sciences, Makerere University offering Doctor of Philosophy in Information Science.

As part of the degree programme, she is required to carry out a research which she intends to do in your organization. The topic of her research is entitled, ***"The Development and Management of Open Access Institutional Repositories in Selected Universities in East Africa".***

The purpose of this communication is to request you to offer her the necessary assistance required.

Please note that all information obtained shall be for academic purposes only.

Yours Sincerely,

Dr. Sarah Kaddu
AG. HEAD OF DEPARTMENT
LIBRARY & INFORMATION SCIENCE

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

P.O. BOX 65001
DAR ES SALAAM
TANZANIA.

Website: http://www.muhas.ac.tz

Tel: +255-022-2150302/6 Ext: 1016
Telefax:+255-022-2152489
E-mail: *drp@muhas.ac.tz*

Ref. No.2015-01-27/AEC/Vol.IX/58

27th January, 2015

Ms. Miriam Kakai,
PhD student,
Makerere University,
Kampala,
UGANDA.

Re: Approval for Ethical Clearance for a PhD elective study titled "The Development and Management of Open Access Institutional Repositories in Selected Universities in East Africa"

Reference is made to the above heading.

I am pleased to inform you that the Chairman has on behalf of the Senate, approved ethical clearance of the above mentioned study, on recommendation of the Expedited Review Sub-Committee of the Senate Research and Publications Committee meeting held on 21st January, 2015.

The validity of this ethical clearance is one year effective from 21st January, 2015 to 20th January, 2016. The Committee has also recommended for you to seek research permit from the Commission for Science and Technology (COSTECH).

You will also be required to apply for renewal of ethical clearance on a yearly basis if the study is not completed at the end of this clearance. You will also be expected to provide six monthly progress reports, adverse events reports where applicable and final project report upon completion of your study.

Permission to publish your study findings should be sought from the appropriate authorities at MUHAS.

Prof. Mainen J. Moshi
Chairman, Senate Research and Publications Committee

c.c. Director, Library Services, MUHAS.

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY (COSTECH)

Telephone: (255 - 022) 2775155 - 6, 27003456
Director General: (255 - 022) 2700756&2775315
Fax: (255 - 022) 2775313
Email: rclearance@costech.or.tz

Ali Hassan Mwinyi Road
P.O. Box 4302
Dar es Salaam
Tanzania

RESEARCH PERMIT

No. 2015-58-NA-2015-40 **19th February 2015**

1. Name : **Miriam Kakai**
2. Nationality : **Ugandan**
3. Title : **The Development and Management of Open Access Institutional Repositories in selected Universities in East Africa**
4. Research shall be confined to the following region(s): **Dar es Salaam**
5. Permit validity from: **19th February 2015** to **18th February 2016**
6. Contact /Collaborator: **Dr. Rehema C. Mallya, Directorate of Library Services, MUHAS, P.O. Box 65001, Dar es Salaam**
7. Researcher is required to submit progress report on quarterly basis and submit all Publications made after research.

M. Mushi

for: **DIRECTOR GENERAL**