UTILISATION OF OPEN ACCESS INSTITUTIONAL REPOSITORIES IN ZIMBABWE'S PUBLIC UNIVERSITIES

BY

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DECLARATION

I, Mass Masona Tapfuma, declare that:

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ABSTRACT

Despite the establishment of institutional repositories (IRS) in Zimbabwe's public universities, content for these repositories remains untangible. The purpose of this study was to explore the utilisation of IRs in the universities. The Unified Theory of Acceptance and Usage of Technology (UTAUT) model was used to understand individuals behaviours' towards acceptance of technologies. The pragmatist paradigm guided the study employing the mixed methods research (MMR) approach combining quantitative and qualitative approaches. Triangulation was used to obtain a deeper understanding of the research problem. Eight public universities were surveyed including all levels of academics, research directors, library directors and IR/faculty librarians. A census, stratified and systematic sampling techniques were adopted to constitute the sample of the study. A survey was carried out aided by questionnaires and interviews. Document analysis (policies and so forth) and bibliometric analysis were also employed including attending a Zimbabwe University Libraries Consortium (ZULC) workshop. The findings of the study revealed a high awareness of OA/IRs by the academic community but content deposits were very low despite the existence of research and OA/IR policies (in some of the universities) which mandated deposit of research funded by the universities. A national repository was also established by the Research Council of Zimbabwe to link all repositories in the country while ZULC was lobbying for the development of a national OA policy. The study concluded that Zimbabwe's university libraries faced numerous challenges in marketing and promoting of repositories, therefore, the concept of IRs remains in the infancy stage. It was recommended that: the libraries should intensify OA/IR education efforts; incentivise scholars/academics and library staff; resolve IPR issues and strengthen deposit mandates. The study would contribute to practice in the establishment, running, management and promotion of repositories and policy makers will be informed and guided in the development and implementation of OA policies and regulatory frameworks leading to the establishment of the requisite infrastructure for OA/IR establishment in all academic institutions in the country, the national repository and the national content harvesting systems. Further research to probe the causes of low deposit rates and why scholars prefer depositing elsewhere is recommended.

DEDICATION

I dedicate this thesis to my family; especially my husband, Paul, children, Takunda, Rejoice and Michael and, nephew, Tatenda who loved, supported and encouraged me beyond measure and allowed me the time to work on this PhD. You mean the world to me; to my parents, Johnsayi and Torrence Gwati my source of inspiration for hard work; my father-in-law, Peter and my late mother-in-law, Cecilia, you gave me strength to soldier on. How I wish mom (Cecilia) had lived to see this PhD to fruition.

"Rejoice in the Lord Always: and again I say, Rejoice." Philippians 4:4

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS AND ACRONYMS

BOAI   Budapest Open Access Initiative

BSOA   Bethesda Statement on Open Access Publishing

BUSE   Bindura University of Science Education

CC-BY   Creative Commons Attributions 3.0 license

CUT   Chinhoyi University of Technology

DOAR   Directory of Open Access Repositories

EM   Extrinsic Motivation

FTP   File Transfer Protocol

GZU   Great Zimbabwe University

HIT   Harare Institute of Technology

IDT   Innovations Diffusion Theory

IPR   Intellectual Property Rights

IR   Institutional Repository

LIS   Library and Information Science

LSU   Lupane State university

MMR   Mixed methods research

MSU   Midlands State University

NUST   National University of Science and Technology

OA   Open Access

OAI   Open Access Initiative

QUAL   Qualitative

QUAN   Quantitative

ROAR   Registry of Open Access Repositories

SARUA   Southern African Regional Universities Association

SHERPA-RoMEO   Securing a Hybrid Environment for Research Preservation and Access -
                Rights MEtadata for Open Archiving

SPARC   Scholarly Publishing and Academic Resource Coalition

TAM   Technology Acceptance Model

TPB   Theory of Planned Behaviour

TRA   Theory of Reasoned Action

UTAUT   Unified Theory of Acceptance and Use of Technology

ZIMCHE   Zimbabwe Council for Higher education

ZOU   Zimbabwe Open University

ZULC   Zimbabwe University Libraries Consortium

ZUVCA   Zimbabwe University Vice-Chancellors Association

CHAPTER I: INTRODUCTION TO THE STUDY

1.1 Introduction

Academics and researchers play a significant role in scholarly communication through publication and sharing of their research findings. Various channels of disseminating research results exist and these include conferences, workshops, scholarly journals, monographs, theses, dissertations and online platforms. Ruiz-Conde and Calderon-Martinez (2004:1283) posit that changes in the traditional system of scholarly communication have forced universities to adopt new ways of accessing and communicating research results developed by their academic staff. Universities, colleges and research institutions around the world, Zimbabwe included, have been unable to afford journal subscriptions due to the ever increasing subscription fees against the dwindling budget allocations for libraries to provide access to the much needed research literature (Islam and Chowdhury 2011:507; Kocken and Wical 2013:140).

Institutional repositories (IRs) are fast becoming an option for institutions of higher learning, to publish and showcase their research output thereby increasing their visibility and contribution to the spread of scientific knowledge on the global arena. Universities worldwide, including Zimbabwe have established IRs but their functionality is a cause for concern. This study is concerned with exploring the utilisation of IRs for scholarly communication in Zimbabwe's public universities and suggest strategies that can be adopted in policy and practice to increase acceptance and usage of IRs and ultimately enhance visibility of the institutions' and the country at large's research output generated by the researchers and scholars. In this introductory chapter, the background and outline of the research problem are highlighted

1.2 Background and outline of the research problem

This section will present the background to the problem of the study and outline the research problem.

1.2.1 Background to the problem

Zimbabwe has sixteen universities (ten public universities and six private universities), as shown in Table 1.1 below, and several polytechnics, teacher's training colleges and research institutions. Observations have shown that the institutions have very little research output to showcase to the world. Even though there is very little research being conducted in this area (Kotecha and Perold 2010:40), the results of the few researches conducted are not sufficiently visible. As of March 2014, five institutions had registered their institutional repositories (IRs) with the Directory of Open Access Repositories (DOAR). Four are public/state universities and one is a private organization, namely, National University of Science and Technology (NUST), Bindura University of Science Education (BUSE), University of Zimbabwe (UZ), Zimbabwe Open University (ZOU) and the Africa Capacity Building Foundation (ACBF). However, this study only focused on eight public/state universities and excluded the University of Zimbabwe (refused to participate, see Appendix 18), Gwanda State University (still at its infancy at the time of this study), private universities, polytechnic colleges and teacher training colleges.

Table 1.1: Zimbabwean universities

State/Public universities	Private universities
Bindura University of Science Education (BUSE)	Africa University (AU
Chinhoyi University of Technology (CUT)	Ezekiel Guti University
Great Zimbabwe University (GZU)	Reformed Church in Zimbabwe University (RCZU)
Gwanda State University (GSU)	Solusi University (SU)
Harare Institute of Technology (HIT)	The Catholic University of Zimbabwe CUZ)
Lupane State University (LSU)	Women's University in Africa (WUA)
Midlands State University (MSU)	
National University of Science and Technology (NUST)	
University of Zimbabwe (UZ)	
Zimbabwe Open University (ZOU)	

Source: Field data (2016)

Sichel (1997) cited Venkatesk and Davis (2000:186) lamented that "low usage of installed systems has been identified as a major factor underlying the 'productivity paradox' surrounding lackluster returns from organizational investments in information technology." Zimbabwe's research output is not visible on the global arena yet it is known that research is taking place within the institutions. Is this research supposed to remain invisible and or inaccessible and should institutions boast of ghost repositories? Public funds have been used to fund research for which results should be published, but at what cost? Kotecha and Perold (2010:40) in their needs analysis study of Zimbabwe's public universities found that:

> In the case of research, the most common priority listed was the need for the Zimbabwe universities to secure research funding. The respondents indicate that in the absence of funding, very little research is currently being conducted… The third priority focuses on increasing research output through publications, journals and collaboration…

Statistics of research output from Zimbabwe' universities provided by Kotecha, Wilson-Strydom and Fongwa (2012:121) are shown in Table1.2 below. According to this report the University of Zimbabwe and Great Zimbabwe University did not provide statistics. Therefore, the statistics presented are not a true reflection of research activity in the institutions. In comparison with South African universities' research output, as shown in Table 1.3 below, the visibility of Zimbabwe's research output is limited as shown in Table 1.2.

Table 1.2: Zimbabwe's research output

Category of research output	2008	2009	2010
Peer-reviewed journal articles	100	116	146
Peer-reviewed books	9	17	22
Peer-reviewed book chapters	12	45	50
Patents	1	0	1

Source: HEMIS data (2010) cited in Kotecha, Wilson-Strydom and Fongwa (2012:121)

Table 1.3: Research output of South African universities

Category of research output	2008	2009
Peer-reviewed journal articles	7 638	8 257
Peer-reviewed books and book chapters	266	377
Patents	no data	no data
Other: proceedings	449	476

Source: HEMIS data (2010) cited in Kotecha, Wilson-Strydom and Fongwa (2012:83)

However, it is important to note that Zimbabwe suffered from a serious brain drain during the economic meltdown experienced between 2005 and 2009. This period saw a massive exodus of experienced academics and researchers in search of greener pastures in neighbouring countries like South Africa thereby resulting in the loss of institutional memory (Kotecha and Perold 2010:42; Machawira 2009 cited in Garwe 2014:5). The University of Zimbabwe used to employ over 1,000 professors and lecturers, but by 2007 only 627 faculty staff remained, resulting in the closure of some departments. The hyperinflation and poor remuneration packages being offered by the universities have made them unable to attract equally experienced lecturers and researchers as replacements for staff who have left their university posts (Kotecha and Perold 2010:38). This unfortunate development cannot be ignored when assessing the state of institutional repositories of the universities since it impacts upon the scholarly publishing output and deposits to the institutional repositories. The academics that fled the country could have left before some of their research output had been captured by the institution.

Kotecha and Perold (2010:38-39) posit that:

> without donor support, research in Zimbabwe[s] higher education
> institutions is severely constrained, both in respect of access to the
> latest scientific equipment and in keeping abreast of international
> scholarship trends and publications.

As a result, researchers and academics struggle to fund their research and where they succeed they face obstacles in publishing it. A study by the Scholarly Communication in Africa Programme (SCAP) to explore the state of scholarly communication in Southern Africa found that lack of funding among others is an obstacle to open access in Africa (Swan, Willmers and King 2014:2).

In research conducted by Kotecha and Perold (2010:40), one of the priorities listed by universities as a research need was on increasing research output through publications, journals and collaboration, and the institutions' limited access to equipment and ICT. Academics and researchers in universities are required to publish in renowned international peer-reviewed journals but find themselves in an unfortunate predicament that as contributors of articles to these journals they are unable to access them unless they subscribe to the journals. This limits accessibility of the articles and visibility of the authors. Publishing in peer-reviewed journals is not 'smooth sailing' as most scholars, more often, find their papers being rejected, thereby reducing their chances of being visible and gaining a reputation in the scholarly communication network. The Open Access (OA) movement has presented a welcome opportunity for developing countries to access the once inaccessible research information as well as to showcase their national research in the international arena. Academics, whose papers would have been rejected for publication in peer reviewed journals, can take advantage of the institutional repository to publish their works. Kennan and Cecez-Kecmanovic (2007:1) admit that scholarly publishing is experiencing rapid transformation which has been instigated by the internet and open access systems which include IRs. IRs make information freely available and accessible to the public and increase the visibility of both the researcher and the institution.

It is, therefore, against this background that this study explored the utilisation of institutional repositories (IRs) for scholarly publishing in Zimbabwe's public universities and sought to establish strategies that can be adopted to overcome challenges that inhibit acceptance and use of the repositories in order to increase the sharing and exchange of locally generated knowledge while simaultaneoulsy increasing visibility of the country's research output on the international sphere.

1.2.2 Outline of the research problem

According to Connaway and Powell (2010:26) a research problem is the issue that needs to be investigated or known. It is the 'heart' of the study. Despite the establishment of institutional repositories by the universities, content for these repositories remains elusive (Kocken and Wical 2013:153). It is quite important to ensure that the potential submitters of content understand fully what open access involves before university librarians can expect the repositories to flourish. Even though there is increasing pressure from government and academic institutions to enable public

access to research in order to expand knowledge and encourage discourse (Pappalardo et al. 2008:1), research carried out in the United Kingdom (UK) revealed that in the absence of a mandate, most researchers are reluctant to upload papers onto institutional or subject repositories, (Albert 2006) and deposit rates are generally low (Creasar et al. 2010:145).

1.3 Research problems and objectives: key questions to be asked

The purpose and key questions of the study will be discussed in this section.

1.3.1 Purpose of the study

The purpose of the study was to explore the acceptance and usage of institutional repositories, as open access platforms, in Zimbabwe's public universities so as to establish strategies that can be adopted in policy and practice by the institutios to enhance usage of the repositories and ultimately obtain a return on investment. Therefore, this study's main objectives are to assess the utilisation of institutional repositories in Zimbabwe's public universities, and ascertain the reasons why scholars are not depositing their works to their IRs.

1.3.2 Key questions to be asked

1. What categories of documents are included in the IRs?
2. What is the role of the academic librarian in promoting the institutional repository?
3. How has the institution contributed to the promotion of OA?
4. What are the attitudes and concerns of academics towards IRs?
5. What challenges do the academics and librarians face in contributing to and managing the IRs?
6. What strategies can be employed to overcome the challenges?

Table 1.4: Mapping objectives, research questions with sources of data

Objective	Question	Source of data
1. Assess the utilisation of institutional repositories in Zimbabwe's public universities	1. What categories of documents are included in the IRs?	Questionnaires/interviews/University OA/IR policy/OpenDoar
	2. What is the role of the academic librarian in promoting the institutional repository?	Questionnaires/interviews/literature review
	3. How has the institution contributed to the promotion of OA?	Interviews/University websites/OA/IR policy documents
2. Ascertain the reasons why scholars are not depositing their works to their IRs.	4. What are the attitudes and concerns of academics towards IRs?	Questionnaires/interviews
	5. What challenges do the academics and librarians face in contributing to and managing the IRs?	Interviews/Questionnaires
	6. What strategies can be employed to overcome the challenges?	Interviews/Questionnaires/Literature review

1.3.3 Justification and significance of the study

The OA movement's agenda is for researchers and scholars to provide open access to their research findings by publishing them either in online open access journals or by depositing their work in institutional repositories which enable free availability of their content over the Internet (Pappalardo et al. 2008:1). Zimbabwe's nine public universities have established repositories in response to this call which should assist them in circumventing the unaffordable subscription journals (Islam and Chowdhury 2011:507; Kocken and Wical 2013:140) and be able to preserve

and conserve the institutions' intellectual property. However, the state of the institutional repositories remains unclear in the sense that the researchers are not depositing their research to the repositories as they are unconvinced of the importance of repositories (Quinn 2010:67). Visibility of research output from developing countries is also affected by lack of indexing in major international databases such as Science Citation Index (Chisenga 2006:2). Swan, Willmers and King (2014:4) state that, "the small size of many higher education institutions in Southern Africa and the low potential for growth… have been serious obstacles to institutions asserting publishing identities, thus affecting visibility". In addition, Ruiz-Condo and Calderon-Martinez (2014:1285) in their analysis of the top 100 universities repositories, lament that there is lack of consensus on the functions of these repositories and a debate is raging on the type of materials that should be stored in the repositories.

The Global Research Report puts Africa's research output by 2008 at 27,000 papers (Adams 2010 cited in Mpinganjira 2011:33), 10,000 of these publications were by 14 Southern African Development Community (SADC) member countries with South Africa in the lead. The report concludes that Africa's research output is smaller than expected if the potential contribution of its researchers is to be realized for the benefit of its populations (Mpinganjira 2011:33). Nyambi and Maynard (2012) carried out a qualitative survey entitled: *An investigation of institutional repositories in state universities in Zimbabwe.* They identified challenges and enablers for institutional growth and also evaluated operational issues that could have been affecting the setting up of IRs in the country. They interviewed library directors, the International Network for the availability of Scientific Publications (INASP) project team and the AuthorAid team but excluded the scholars and researchers who contribute content to the repositories. Their findings showed the state of repositories in Zimbabwe was largely influenced by economic and political challenges and that partnerships established between the institutions and INASP contributed significantly in the establishment of IRs and in supporting research. However, it is worthwhile to note that it is one thing to establish a repository and another for it to be functional. One could ask, are they active and do they have current and or up-to-date information or they are ghost repositories? This study, therefore, seeks to unveil these issues by establishing the attitudes and concerns of academics in these universities towards the development of the IRs. It will also unveil the challenges that are faced in managing and developing the repositories. At the time of Nyambi and Maynard's (2012) study, one university had registered its repository on the Directory of Open Access Journals

(DOAJ), a factor which could impact on the visibility of Zimbabwe's research publication output. However, the number of registered IRs, as of March 2014) had since increased to four public universities.

Several universities in Zimbabwe have established institutional repositories as one of the open access publishing models (Kusekwa and Mushowani 2014). A study was done by Kusekwa and Mushowani (2014) entitled: *Open Access landscape in Zimbabwe: the case of university libraries in ZULC*. The qualitative study sought to map progress made by institutions in the Zimbabwe University Libraries Consortium (ZULC) in establishing IRs and promoting OA in Zimbabwe. ZULC has a membership of 12 university libraries which include both private and public institutions; only eight institutions participated in the study. Of the eight university libraries, only two libraries had functional IRs (on the internet) and the others were only available on the intranet; three had OA policies and research deposit rates were quite low. Kusekwa and Mushowani (2014) only sought the views of IR creators/managers relying on their assumptions on scholars' attitudes and disregarded the voice of the content contributors (scholars and researchers). Therefore, the conclusions of their study cannot be regarded as representative of the true situation in Zimbabwe's universities. This study sought the views of the content contributors and Research Directors as the policy makers.

Observations by the researcher showed that academics at these universities were not very keen to embrace the use of these IR's to upload their research papers. They viewed IRs with scepticism and if a meeting was called pertaining to this subject, most lecturers absconded.

This study is significant in that, globally, the concept of OA has been embraced. So, the study is expected to help Zimbabwean scholars and researchers realise and acknowledge the value of open access institutional repositories in scholarly publishing and communication of research findings in order to attempt to solve the Zimbabwean research access and visibility problems with a Zimbabwean generated solution. Through the study, even the leadership of the universities should work together with the libraries in motivating the academics and scholars to utilize IRs as a way of increasing visibility of their research output which would impact on the ranking of their institutions worldwide. Policy makers in both government and the universities will also be guided on pertinent issues to consider in IR policy formulation and develop measures that will enable them to motivate and retain experienced staff so that there is lifelong mentoring of researchers and

publishing skills will be passed on to emerging scholars and researchers. Therefore, the study seeks to help to improve theory, policy and practice in this area.

1.3.4 Assumption and delimitation of the study

The study relied on the assumptions that:

1. Sholars familiarity with OA and IRs will increase acceptance and use of OA and IRs in Zimbabwe's public universities.
2. Involvement of scholars, as depositors and users, in the planning and implementation of IRs contributes to the success of the innovation.

Zimbabwe has a total of 15 universities and severals polytechnics and teachers' colleges. However, this study focused on universities. Of the 15 universities ten are public and five are private. So, the study excluded private universities and two public universities (UZ and GSU) and focused on eight public universities (NUST, CUT, GZU, MSU, BUSE, LSU, ZOU and HIT). The UZ refused to participate in the study. These institutions have a mandate to account for the use of public funds while private universities only report to their funders. The eight universities are scattered around the country in different provinces. The focus of the study was on the utilisation of IRs for scholarly communication in Zimbabwe's public universities and establishing strategies that could be adopted by the universities to foster the acceptance and use of IRs. Academics, researchers, library directors, academic librarians, librarians in charge of the repositories and university management participated in the study.

1.4 Definition of key terms and concepts used in the study

This section will provide the conceptual and operational definitions of terms that will be used in the study.

1.4.1 Institutional repositories (IRs): An institutional repository is described as "a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members" (Lynch 2003 cited in Giesecke 2011:530). Giesecke (2011:529) regards IRs as online archives of scholarly works produced at the local level for purposes of preserving and disseminating scholarly output.

1.4.2 Open Access (OA): The term open access is defined by the Budapest Open Access Initiative (BOAI) as "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" (Anderson 2013:82). The idea of OA originated from the fact that most research undertaken across the globe is primarily supported by public money as the money provided to various government agencies by government is raised from the public mostly in the form of taxes; as such the public has every right to know about the research results without paying for it (Gul, Wani, and Majeed, 2008 cited in Pandita and Ramesha 2013:48).

1.4.3 Public University: A public university is defined by Wikipedia (2014) "as a university that is predominantly funded by public means through a national or subnational government, as opposed to private universities."

1.5 Principal theories upon which the research project is constructed

A theory is described as "a set of interrelated constructs [concepts], definitions, and propositions that presents a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena" (Kerlinger 1970 cited in Cohen, Manion and Morrison 2007:13). The traditional scholarly communication models have since moved to the open access models due to the changes in the information communication technology (ICT) landscape. Inevitably, universities have to adopt the use of ICT and information systems being used for storage, access and dissemination of information. Returns on investments in information technology by organizations are just not encouraging at all largely due to low usage of installed systems (Venkatesh and Davis 2000:186). "The question of why university academicians decide to accept or reject a particular technology continues to be an issue" (Oye, A.iahad and Ab.Rahim 2012:957) which needs further probing. This study was premised on the Unified Theory of Acceptance and Use of Technology (UTAUT) whose roots are in the Technology Acceptance Theories that have been developed over time. Technology acceptance is concerned with how people accept and adapt some technology to use (Oye, A.iahad and Ab.Rahim 2012). The studies

that have been done pertaining to technology acceptance seek to examine how to encourage usage and analyse what interrupts acceptance and usage of technologies (Sichel 1997 cited in Kripanont 2007).

This model was ideal for this study since its objective was to examine the acceptance and usage of open access institutional repositories in Zimbabwe's public universities.

> Since systems that are not used cannot be effective, no matter what their technical merit, it is important to understand how people decide whether they will use the particular Information System (Mathiesen 1991:176).

Eight theories/models have been developed and continue to be reviewed and they include, Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM) and Technology Acceptance Model 2 (TAM2), Motivational Model (MM), Social Cognitive Theory (SCT), combined TAM and TPB (C-TAM & TPB) and the Model of PC Utilisation (MPCU). In this section only the UTAUT will be discussed and the rest of the theories from which it was developed will be discussed in Chapter 2.

1.5.1 The Unified Theory of Acceptance and Use of Technology (UTAUT) model

This model was developed by Venkatesh et al. (2003) based on the similarities among eight technology acceptance models (see Figure 2.15). The model provides a refined view of how determinants of intention and behaviour evolve over time and its goal is to understand usage as a dependent variable. This theory, according to Venkatesh et al. (2003:425), is:

> ideal for managers needing to assess the likelihood of success of new technology introductions and help them understand the drivers of acceptance in order to proactively design interventions (including training, marketing etc.) targeted at populations that may be less inclined to adopt and use new systems.

Therefore, the theory is ideal for this study as it seeks to address some of the objectives and questions of the study. Library and research directors of Zimbabwe's public universities will be in a position to assess the success of their IRs. UTAUT compresses the eight models into four key predictors or determinants of usage intention and behaviour. The determinants include, performance expectancy, effort expectancy, social influence and facilitating conditions. The

control variables or mediators of the determinants of technology usage behaviour were identified to be age, gender, experience and voluntariness.

Performance expectancy refers to the degree that the user (Academics and researchers) believes that using the system will help him or her to attain gains in job performance. This construct is the strongest predictor of behavioural intention in both voluntary and mandatory settings. Gender and age variables will moderate the relationship between performance expectancy and behaviour intention and the influence is stronger for men, especially young men (Vankatesh et al. 2003:450).

Effort expectancy refers to the extent to which the system is easy to use. The theory postulates that effort expectancy despite being significant in both mandatory and voluntary situations is only significant in the early stages (post training) and gets slower over time. Academics', researchers', IR and academic librarians' behavioural intentions will be influenced by this construct. It hypothesizes that the influence of effort expectancy on behavioural intention will be moderated by gender, age and experience but the effect is stronger for women, especially the young women in the early stages of experience (Vankatesh et al. 2003:450).

Social influence refers to the degree to which an individual believes members of a reference group (for example, workmates or the academic community) believe s/he should use the new system. The influence of social influence on behavioural intention is moderated by gender, age, experience and voluntariness. The effect will be stronger for women especially in mandatory settings in the early stages of experience.

Facilitating conditions refer to the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system. The model hypothesises that a) facilitating conditions will not have significant influence on behavioural intention; and, b) the influence of facilitating conditions on usage will be moderated by age and experience to the extent that the effect will be stronger for older workers, especially with increasing experience (Venkatesh et al. 2003). The developers of the model commend that UTAUT studies complex organisational technologies and employees in organisations undergoing technological changes, a trait which renders it more suitable for this study. The model also studies both voluntary and mandatory usage participants. This study assumed that some universities have policies that make usage of IRs mandatory while others do not.

1.6 Research methodology and methods

Research methods refer to techniques and procedures used in the process of data gathering, while methodology aims to describe approaches to, kinds and paradigms of research (Kaplan 1973 cited in Cohen, Manion and Morrison 2007:47). Connaway and Powell (2010:32) further postulate that "while the term method refers to specific means of collecting data, methodology refers to the strategies surrounding the use of multiple methods of data collection as required by different types of data attempts to achieve higher degrees of reliability and validity." Therefore, the aim of this section is to explain the processes and procedures that were followed in collecting data for the study.

1.6.1 Paradigm

This study was guided by the pragmatist paradigm. A paradigm is a "worldview, complete with the assumptions that are associated with that view" (Mertens 2003:139 cited in Teddlie and Tashakkori 2009:4). Feilzer (2010:7) complements this definition by referring to a paradigm as an "organising structure, a deeper philosophical position relating to the nature of social phenomena and social structures". Pragmatism places emphasis on the research problem and makes use of all available approaches to understand the problem (Teddlie and Tashakkori 2009:10). The researcher is not constrained by the prescriptive nature of positivism and constructivism, but has the flexibility of selecting methods, techniques and procedures of research that will help the researcher to find out what s/he want[s] to know.

1.6.2 The approach

Having discussed the paradigm above it is apparent that mixed methods research (MMR) goes well with this worldview and will be used for this study. Bazeley (2008:133 cited in Ngulube 2010:254) describes mixed methods research as a term that:

> has developed currency as an umbrella term applying to almost any
> situation where more than one methodological approach is used in
> combination with another, usually, but not essentially, involving a
> combination of at least some elements drawn from each of
> qualitative and quantitative approaches to research.

Combining quantitative and qualitative research approaches brings together the strengths of both approaches which will result in a better understanding of research problems than either approach

alone (Creswell and Garrett 2008 cited in Ngulube 2010:253). In Library and Information Science (LIS), it is not yet known if and how MMR has shaped research (Fidel 2008:265) and there is no significant discourse around the use of MMR in LIS research discourse in Sub-Saharan Africa (Ngulube 2010:253).

Qualitative research is concerned with collecting descriptive data and is inductive while quantitative research focuses on numeric data collection and is deductive. The emphasis of MMR is the use of multiple research methods (qualitative and quantitative approaches) in tandem and philosophical assumptions (Ngulube 2010:254; Creswell 2009:4) that guide the collection and analysis of data in research and facilitates understanding of a phenomenon or problem. It was therefore, hoped that the use of this method in this study would assist in understanding the issues around the acceptance and use of institutional repositories for scholarly publishing in Zimbabwe's public universities.

> The motivation to mix methods in research is the belief that the quality of a study can be improved when the biases, limitations, and weaknesses of a method following an approach counterbalance each other (Fidel 2008:265).

LIS researchers have often used triangulation (tests the validity and accuracy of a study), a typology of MMR.

> Triangulation seeks convergence and corroboration of findings through the use of more than one method of gathering and analyzing data about the same phenomenon in order to eliminate the inherent biases associated with using only one method (Johnson, Onwuegbuzie, and Turner, 2007; Onwuegbuzie and Leech, 2006 cited in Ngulube 2010:255).

This typology was used for the purposes of this study in assessing influencers of behavioural intentions amongst researchers, scholars, policy makers and the guardians (librarians) and promoters of open access institutional repositories in public universities. This approach enabled the researcher to have a deeper understanding of the research problem.

1.6.3 The Population

A population is that group of people or objects about whom we want to study and draw conclusions (Babbie 2014:119). Eight Zimbabwean public universities were included in the study with a

sample size of 384 comprising six professors, seven associate professors, 39 research fellows/teaching assistants/staff development fellows, 276 lecturers, eight research directors, eight library directors, 32 academic/faculty librarians and eight IR librarians. Information was obtained from the institutions after writing to the universities requesting for statistics of their academic staff establishments.

1.6.4 Sampling method

Two types of sampling were adopted depending on the category of the population. Given the relatively small size of the population a census was conducted on the research directors, library directors and the faculty/academic and IR librarians. Probability sampling was used for the academic staff given their large numbers. Probability sampling involves:

> Selecting a relatively large number of units from a population, or
> from specific subgroups (strata) of a population, in a random manner
> where the probability of inclusion for every member of the
> population is determinable (Tashakkori and Teddlie 2003:713 cited
> in Teddlie and Tashakkori 2009:171).

The type of probability sampling used in the study is stratified sampling as this allowed each member of the study population to be assigned into a group, then a simple random sampling or systematic sampling technique was used to select participants from each group or stratum, for example, professors and lecturers.

1.6.5 Data collection

A survey was carried out with the aid of questionnaires (academics, and IR librarians), interviews (research and library directors) and document analysis (policies and so forth.), to gather data on attitudes and behavioural intentions of the stakeholders towards acceptance and use of institutional repositories in the country. Self-administered questionnaires were used and they comprised both closed and open-ended questions (to allow detailed explanations). The distribution of the questionnaires was done through colleagues based in the universities. Semi-structured interviews were done either face-to-face or by telephone depending on the availability of the participants to obtain in depth insight into the research problem. The researcher also went through the institutional repositories of the universities and OpenDOAR to obtain data on the contents of the repositories. The researcher also attended A ZULC workshop and analysed research and OA/IR policies of the

universities. To ensure validity and reliability a pre-test of the instruments was done with staff in the School of Social Sciences, College of Humanities and University of KwaZulu-Natal Pietermaritzburg campus library staff. Questionnaires were distributed to the IR and academic librarians and lecturers while interviews were conducted with the Library and research directors. Secondary sources were used to obtain the world view of IRs and general developments in OA and this information informed and guided the study.

1.6.6 Data analysis

The thematic content analysis approach was used in analysing data obtained through open-ended questions. According to Eisner (1998:104) cited in Tedlie and Tashakkori (2009:252):

> Formulation of themes within an educational criticism means identifying the recurring messages that pervade the situation about which the critic writes… in a sense a theme is a pervasive quality... [which] tend to permeate and unify situations and objects.

Questionnaires were combed for missing information and coded. The coded data was analysed using SPSS version 23 to generate frequency tables, graphs and charts.

1.7 Structure of study

Chapter 1 being the introduction provides background information to the study of scholarly publishing on open access and the state of institutional repositories of public universities in Zimbabwe. Open access publishing is a topical issue particularly the use of institutional repositories in enabling access to publicly funded research results for sustainable development of a country and to increase visibility of the universities and their research output on the global arena. It is assumed that once the researchers and users understand the concept of open access and its importance there will be increased uptake and use of institutional repositories for the dissemination of newly generated knowledge within the country. Policy makers will be able to make informed decisions in formulating policies pertaining to the preservation and dissemination of research results for the development of the country.

The following chapter (Chapter 2) focuses on the theoretical framework upon which the study is couched. This chapter discusses the theories of technology acceptance leading to the Unified

Technology Usage and Acceptance Theory (UTAUT) which forms the basis of the theoretical framework for this study. Chapter 3 reviews literature on the importance of scholarly publishing and the traditional models of publishing and the technological changes that have occurred leading to the open access movement and its gold road and green road models of publishing. Particular focus is on the green road self-archiving concept using institutional repositories in public institutions. It includes studies of a similar nature and critically appraises the findings of the studies. This is followed by Chapter 4 whose thrust is on the research methodology and methods used for the study. It identifies the population of the study including the sampling procedure, data presentation and analysis procedures.

In Chapter 5, the results of the study are presented giving detail of the responses from the various instruments, that is, questionnaires, interviews, document analysis, IR analysis and workshop. The subsequent Chapter 6 analyses and discusses the results of the study. A thematic presentation of results is made with the aid of frequency tables, charts and graphs. Finally, Chapter 7 provides a summary of the research, conclusions drawn from the results of the study and recommendations were made. Suggestions for further study were also made. Appendices are placed after the references.

1.8 Ethical considerations

When a researcher goes out to study a given population, it is prudent that one conducts themselves responsibly towards participants. The term ethics is used to refer to "a matter of principled sensitivity to the rights of others, and that 'while truth is good, respect for human dignity is better" (Cavan 1977:810 cited in Cohen, Manion and Morrison 2007:58). Permissions to undertake the study were sought from the universities involved in the study. In data collection, presentation, interpretation and analysis, anonymity of respondents and confidentiality of responses were maintained and the research ethical guidelines of the University of KwaZulu-Natal were observed. Informed consent was sought from the participants by availing a letter introducing the researcher and explaining the purpose of the study (Appendices 7-9). Informed consent refers to "the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decisions" (Diener and Crandall 1978 cited

in Cohen, Manion & Morrison 2007:52). Participants were informed that participation was voluntary and they could withdraw whenever they wished to do so.

1.9 Summary of the chapter

This chapter discussed the research problem, its purpose and key questions to the study. The study was also justified and the assumption and delimitations were described. The terms and concepts used in this study were defined. The principal theory upon which the study is constructed was identified and discussed and a brief outline of the research methodology, methods and structure of the study was given. The following chapter will provide a detailed examination of the UTAUT model.

CHAPTER II: THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents the unified theory of acceptance and use of technology (UTAUT) model which will help to explain and predict individuals' attitudes and behaviours towards intention to accept and use institutional repositories. In order to better understand the UTAUT model, the models/theories from which it was developed will be discussed highlighting the various modifications that were made to each subsequent theory and how they ultimately feed into the UTAUT model. The models/theories include, Rogers' (1983) Innovation Diffusion Theory (IDT), Social Cognitive Theory (SCT) by Bandura (1977), extended by Compeau and Higgins (1995), Ajzen and Fishbein's (1975) Theory of Reasoned Action (TRA), Ajzen's (1985,1991) Theory of Planned Behaviour (TPB), Davis' (1989) Technology Acceptance Model (TAM) extended to Technology Acceptance Model 2 (TAM2) by Venkatesh and Davis (2000), Taylor and Todd's (1995) combined TAM and TPB (C-TAM & TPB), the Motivational Model (MM) applied by Davis et al. (1992), and the Model of PC Utilisation (MPCU) by Thompson et al. (1991).

2.2 Theories

Theory is described by Kerlinger (1970), cited in Cohen, Manion and Morrison (2007:12) as "a set of interrelated constructs [concepts], definitions, and propositions that presents a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena." They try to provide explanations to observations relating to a particular incident or aspect of life. Hitchcock and Hughes (1995: 20–1) expound that:

> Theory is seen as being concerned with the development of systematic construction of knowledge of the social world. In doing this theory employs the use of concepts, systems, models, structures, beliefs and ideas, hypotheses (theories) in order to make statements about particular types of actions, events or activities, so as to make analyses of their causes, consequences and process. That is, to explain events in ways which are consistent with a particular philosophical rationale or, for example, a particular sociological or psychological perspective…

Therefore, five components of a theory can be extracted from the descriptions above, namely, assumptions, concepts/constructs, relationships/propositions, logic and units of analysis (Bhattacherjie 2012; Neuman 2011). An *assumption* is an unverified point of departure or belief in a theory that is essential in developing a theoretical explanation. It looks at the 'who', 'when' and 'where'. A *concept/construct* is an idea which can be expressed symbolically or verbally explaining the 'what' of theory (age, height, culture, attitude or character). *Relationships/propositions* refer to correlations of concepts (cause-effect relationship) and expresses the 'how' of theories (how are the constructs related) (Neuman 2011:61; Bhattacherjie 2012). *Logic* explains the why constructs are related while *units of analysis* refers to "the person, collective, or object that is the target of the investigation" (Bhattacherjie 2012:9), that is, individuals, organisations, groups, technologies and so forth.

Neuman (2011:57) underscores that theories are ever changing through modification of existing ones and evolvement of new ones. Hence, they are not static. Four approaches to theorizing have been identified, namely, i) grounded theory building, ii) conceptual analysis of a predefined framework to identify various predictors ideal to a particular occurrence, iii) extension or modification of subsisting theories to explain new context, and iv) applying subsisting theories in totally new situations based on similarities between the two situations (Bhattacherjie 2012:30). The UTAUT model was built on existing theories and models by drawing constructs from eight theories some of which are extensions and modifications of existing theories, while others, whose roots are in psychology and sociology, were applied to technology use.

2.2.1 Role of theories

Theories play the following roles in research:

i. They provide fundamental explanations of the occurrence of natural or social experiences by amplifying the key drivers and outcomes of the intended occurrence.

ii. They help in developing understanding through synthesizing earlier observed findings within a theoretical framework and resolve conflicting results by discovering dependent variables that influence the correlation between two concepts in different studies.

iii. They direct future research by assisting in identification of concepts, correlations and gaps worth investigating.

iv. They can add to increasing knowledge construction by bridging gaps between other theories and by enabling the re-examination of existing theories in a new perspective (Bhattacherjie 2012:26).

v. They help in identifying important aspects to focus on and primary questions to be answered (Powell 1997:25).

In this study, the technology acceptance theories and models are used to facilitate understanding of issues around acceptance and adoption of innovations or technologies by individuals in institutions of higher education. UTAUT was developed from a combination of eight technology acceptance theories. The theories have origins from the fields of psychology, sociology and information systems and they have been developed over time and continue to be modified. Venkatesh et al. (2003:426) felt researchers were inundated with a multitude of models from which they had to select the most appropriate one. By choosing one, it meant they would exclude contributions from the other models. So, they realized a need to synthesise the eight models to create a unified model, UTAUT.

2.3 Models

The term 'model' is usually used interchangeably with 'theory'. Bhattacherjie (2012:14) defines a model as "a representation of all or part of a system that is constructed to study that system (for example, how the system works or what triggers the system)." Theory tries to explain an occurrence while a model tries to represent an occurrence. There are various kinds of models, such as network models, mathematical models and path models. They can be normative, predictive or descriptive. A predictive model (such as a weather forecast) permits projection of future occurrences. Descriptive models are often used for representing complicated systems, imagining variables and correlations in the system. Normative models are used to direct human conduct based on established norms and practices. Unlike theories, models may be static or dynamic. This study was informed by the UTAUT model developed by Venkatesh, Morris, Davis and Davis (2003).

2.4 Innovations Diffusion Theory (IDT)

This theory was formulated in the 1960s and developed in depth by Everett Rogers (1983). It originated from sociology but Moore and Benbasat (1991) adapted the theory and modified constructs that could be used to study technology acceptance by individuals. Rogers (2003:1) postulates that some innovations take several years before they can be widely adopted from the time they become available while others take a few years. So, organizations have to speed up the rate of diffusion of an innovation, a process which poses challenges for them. This theory is said to be suitable for studying the adoption of technology in higher education and educational environments (Medlin 2001; Sahin 2006). This study focuses on acceptance and use of IRs in Zimbabwe's public universities. Therefore, the refined constructs of the theory, which were incorporated into UTAUT were useful for this study.

An innovation is described as an idea, practice or object regarded as new by an individual or other unit of adoption (Rogers 2003:11). Diffusion is the process in which an innovation is *communicated* through selected *channels* over *time* among members of a *social system* (Rogers 2003:5). The stakeholders in the adoption of the technology create and share information amongst themselves in order to have a shared understanding. The four elements highlighted in the definition play an important role in the diffusion process since they impact upon the rate of acceptance and adoption. A communication channel is a passage or way through which messages are passed from one source (individual) to the other (for example, journals (mass media), workshops interpersonal communication, memoranda). A lot of time is spent in the innovation-decision process and this determines the duration it will take for the innovation to be adopted. A social system is "a set of interrelated units engaged in joint problem solving to accomplish a common goal" (Rogers 2003: 23), for example, the different units in a university (administration, academics and the library). The norms and values of the social system can affect diffusion positively or negatively as facilitators or barriers to adoption. The presence of experts and change agents, in a social system also influences the rate of adoption (Bhattarcherjie 2012:31-32). The goal of diffusion is to effect change in the function of a social system.

The theory postulates that individuals make innovation decisions following a 5-step process involving knowledge, persuasion, decision, implementation and confirmation. A diagrammatic model of the innovation decision process is shown in Figure 2.1 below.
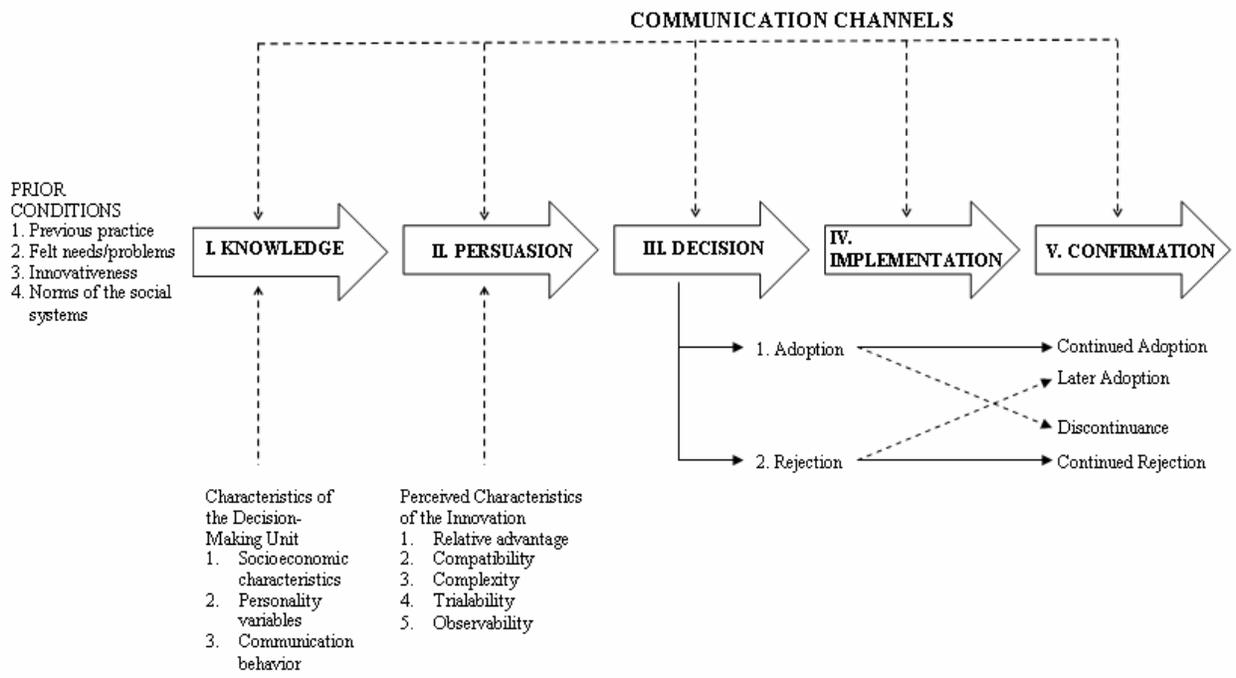
Figure 2.1: Model of five stages in the Innovation-Decision Process
Source: Rogers (2003) and Sahin (2006:15)

i)   **Knowledge** – This refers to when a person becomes aware of an innovation and understands how it functions. There are three kinds of knowledge, namely i) knowledge of the existence of a technology (awareness knowledge), ii) knowledge of how it works before trial and adoption (how-to- knowledge), and iii) principles knowledge of how and why a technology works (Sahin 2006:16). This stage is cognitive centred.

ii)   **Persuasion** – A person forms a favorable or unfavorable attitude toward the innovation. At this stage, individuals seek information about the new technology from sources believed to be credible in an endeavour to reduce uncertainties for them to be convinced to accept or reject the technology. Therefore, it is important that individuals get informed about the advantages and disadvantages of the innovation so that they are aware of all its consequences. Rogers (2003: 436) described 'consequences' as "the changes that occur in an individual or a social system due to the adoption or rejection

of an innovation." The consequences can be classified as desirable versus undesirable (functional or dysfunctional), direct versus indirect (immediate result or result of the immediate result), and anticipated versus unanticipated (recognized and intended or not). When individuals have this knowledge, they develop an attitude towards the innovation depending on the perceptions of their peers. The attitude developed leads to overt behavioural changes. Therefore, this stage is affective-centred in that it is concerned with the feelings of the adopters of the technology (Sahin 2006:16).

iii) **Decision** – This is when a person engages in activities that lead to a resolution to adopt or reject the innovation, for example, engaging in trials. Adoption refers to full use of an innovation as the best course of action available, while rejection refers to the act of not adopting an innovation (Rogers 2003: 177). Individuals prefer to trial out an innovation before they can decide to adopt or reject and, according to Rogers (2003), trials often result in fast adoption. However, rejections can occur at any stage of the innovation decision process. The rejection can either be active or passive. Active rejection is a situation where the individual considers using the innovation but at some point, decides to discontinue, while passive rejection is a situation where the individual does not bother to think about the innovation at all.

iv) **Implementation** – This follows the decision process. At this stage a person puts an innovation into use. However, uncertainties about the outcome of the innovation can be a challenge, hence the need for a change agent to be readily available to provide technical assistance to reduce uncertainties. Modifications to the innovation can be made and this is referred to as reinvention. Reinvention increases the chances of adoption and institutionalisation of the innovation (Rogers 2003; Sahin 2006).

v) **Confirmation** – An innovation-decision has already been made but the individual evaluates the results by seeking support and can reverse the decision depending on the feedback from consultations (Rogers 2003). The decision could be to adopt or discontinue with the innovation depending on the attitude of the individual. Discontinuance occurs in two forms, that is, i) replacement discontinuance – rejecting

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an innovation in order to replace it with another one perceived to be better- or ii) disenchantment discontinuance – rejecting an idea as a result of dissatisfaction with its performance (Sahin 2006).

2.4.1 Innovation characteristics that influence rate of adoption

Innovation diffusion theory (IDT) identifies characteristics of an innovation that help to explain the individuals' different rates of adoption, namely, relative advantage, compatibility, complexity, observability and trialability. Rogers (2003:221) defines *rate of adoption* as "the relative speed with which an innovation is adopted by members of a social system." It is measured by the number of individuals who adopt the technology within a specific period, for example, per year. Therefore, the rate of adoption indicates numerically the steepness of the adoption curve for a technology. The five attributes explain the variance of the rate of adoption whose range is from 49 to 87 percent. Moore and Benbasat (1991) adapted the five characteristics and polished constructs that could be used to study technology acceptance by individuals.

- *Relative advantage* refers to the extent to which an innovation is perceived to be better than the idea it supersedes and this is measured in economic terms, social factors, convenience, and satisfaction. Individuals are concerned about the benefits they derive from an innovation (Cost-benefit analysis).

- *Compatibility* refers to the extent to which the innovation is perceived to be consistent with the existing values, past experience and needs of potential adopters (Rogers 2003:15). Adoption of an innovation is slow if it is not compatible with the norms and values of a social system.

- *Complexity* refers to the degree to which an innovation is perceived to be difficult to understand and use. Simple innovations are easily adopted compared to complicated ones which would require the adopters to acquire new skills and understanding. Moore and Benbasat (1991) used the term 'ease of use' (borrowed from Davis' TAM) instead of 'complexity'. *Ease of use* refers to the extent to which an innovation is perceived to be difficult to use.

- *Trialability* is the extent to which an innovation can be experimented with. Individuals prefer to learn by doing so. A trialable innovation removes uncertainties in the individuals.

- *Observability* refers to the degree to which the results of the innovation are visible (the extent to which the system is being used by others in the organization) to others and results are demonstrable (tangible). The easier it is, the higher the chances of adoption.

Moore and Benbasat (1991) added two more constructs, that is, image and voluntariness of use (Amida 2008:21) resulting in eight perceived characteristics of innovations (PCIs), namely relative advantage, image, compatibility, ease of use, visibility, results demonstrability, trialability, and voluntariness of use (see Figure 2.2 below):

- *Image* refers to the "degree to which use of an innovation is perceived to enhance one's image or status on one's social system" (Moore and Benbasat 1991:195).
- *Voluntariness of use* refers to "the degree to which use of an innovation is perceived as being voluntary, or of free will" (Moore and Benbasat 1991:195).

In the development of UTAUT, Venkatesh et al. (2003) used the attributes adapted by Moore and Benbasat (1991) because they applied the model to information technology acceptance.
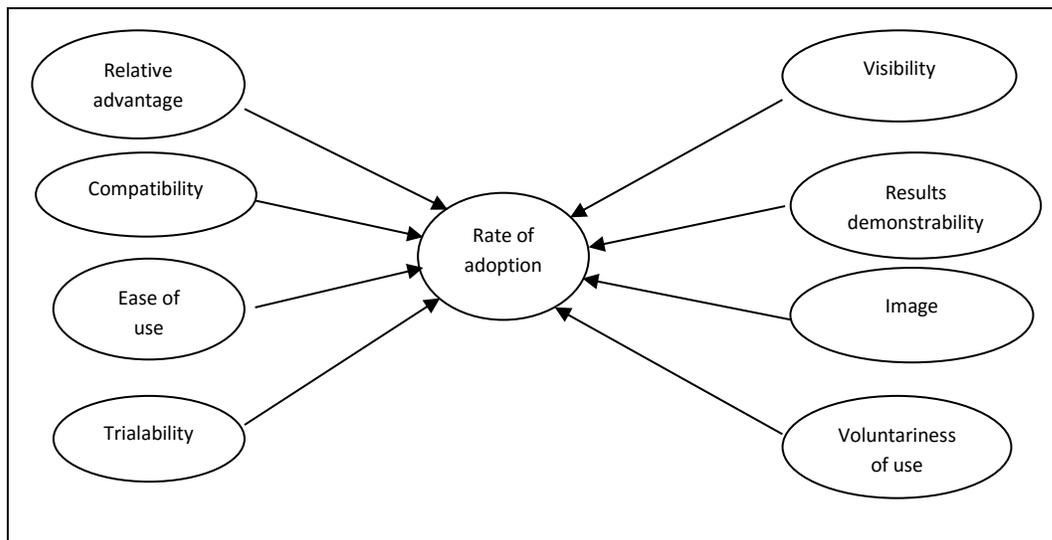
Figure 2.2: Moore and Benbasat's (1991) model adapted from IDT
Source: Amida (2008:22)

Other variables that also impact upon the rate of adoption of an innovation, in addition to the above mentioned include:

i. *Type of innovation-decision*. The decision could be collective, optional or authoritative. The fewer the people involved in the decision process, the faster an innovation is likely to be adopted. Collective decisions tend to take time.

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ii. *Nature of communication channels* diffusing the innovation at various stages in the innovation-decision process. For example, mass media (journals) or interpersonal channels (workshops).

iii. *Nature of the social system* in which the innovation is diffusing. The system may be an organisation, a community or any structure. The norms of the system and the extent of interconnectedness of the communication network structure can directly influence adoption and indirectly do so through the behaviour of individuals in the system.

iv. *Degree of change agents' promotion efforts* in diffusing the innovation. Opinion leaders exist in every social system and these play a significant role of advising and informing other members of the social system about an innovation (Rogers 2003:23-26).

2.4.2 Adopter categories

Adopter categories are the classifications of members of a social system based on their innovativeness. Rogers (2003:22) defines innovativeness as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system." Innovation adoption occurs at different rates depending on adopters' inclination towards taking risk, level of education and communication influence. Therefore, five categories of adopters were identified, namely, innovators, early adopters, early majority, late majority, and laggards (Bhattarcherjie 2012:31). Innovators are the gatekeepers who launch the new technology into the social system because of their readiness to experience new ideas. They are regarded as 'venturesome', an attribute which requires complex technical knowledge (Rogers 2003).

Early adopters are those individuals who are well respected (opinion leaders or experts) and other members of a social system look up to them for advice and information about the new innovation. Their "leadership in adopting the innovation decreases uncertainty about the innovation in the diffusion process" (Sahin 2006:19). The early majority are the individuals who adopt "the innovation just before the other half of their peers adopts it" (Sahin 2006:20) after a lot of consideration though. The late majority are individuals whose adoption decision is largely influenced by peers and economic necessity. They exercise caution as they are sceptical about the innovation while laggards are individuals who are last to adopt an innovation. They want to hold on to traditional ways of doing things (resistant to change).

> Early adopters [innovators, early adopters and early majority] are venturesome, well educated, and rely more on mass media for

information about the innovation, while later adopters [late majority and laggards] rely more on interpersonal sources (such as friends and family) as their primary source of information (Bhattarcherjie 2012:32).

Adoption rate is slow at the beginning, increases speed as more individuals join the bandwagon and slackens when almost everyone has adopted the innovation. Figure 2.3 below shows the cumulative S-curve adopter distribution pattern which represents a normal distribution.
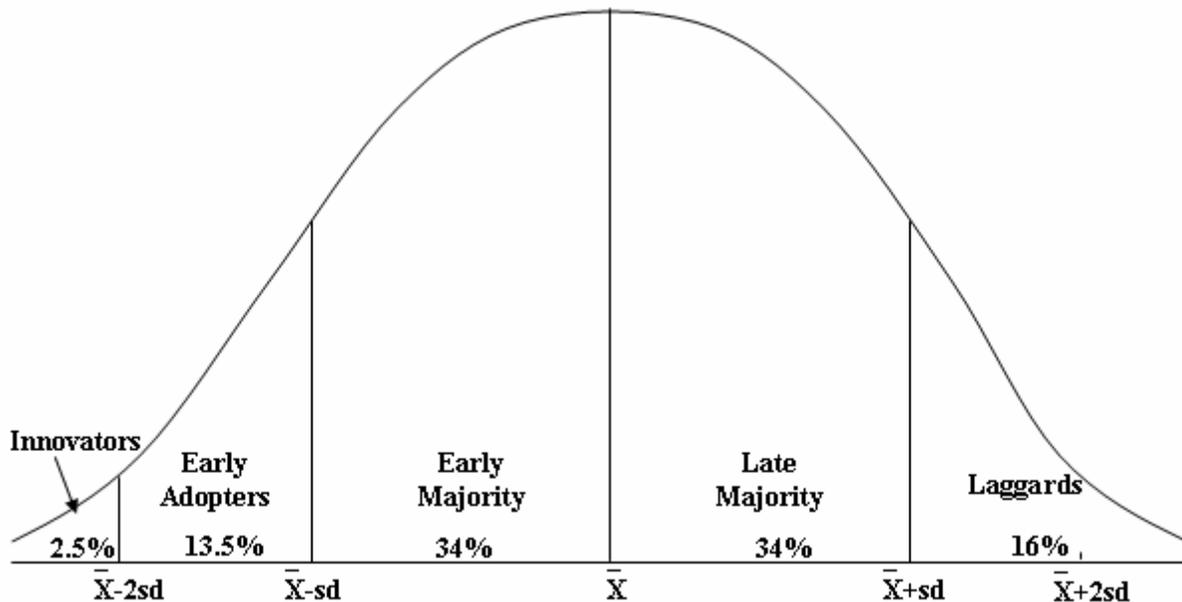
Figure 2.3: S-shaped diffusion curve of adopter categories
Source: Rogers (2003)

2.5 Social Cognitive Theory (SCT)

This theory was developed by Albert Bandura (1977) in studying human behaviour and was extended by Compeau and Higgins (1995) in their study of computer utilisation. The theory explains causes of human behaviour in a three-way reciprocal model. In this reciprocal determinism model behaviour, cognition and other personal factors, and environmental factors continually interact while they influence each other bidirectionally (Bandura 1989:2). Bandura posits that some of the sources of influence are stronger than others and these influences do not

occur concurrently. The causal factor takes time to wield its influence before activating reciprocal influences.
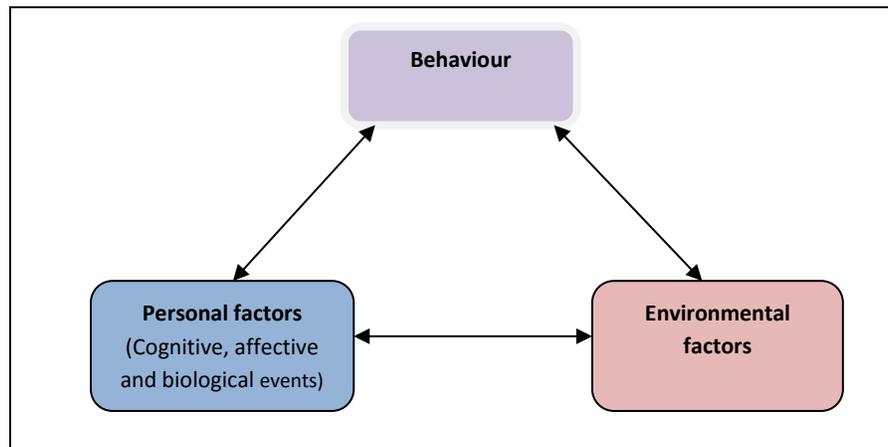
Figure 2.4: Bandura's triadal of reciprocal determinism
Source: Bandura (1989:3)

The personal factors-behaviour interaction involves an interplay between the individual's thoughts, feelings, biological properties (ethnicity and gender) and action. The thoughts, beliefs and feelings or perceptions affect the way the individual behaves. The Environment-Personal factors reciprocal causation involves the interplay between the individual's attributes and the environment. Human expectations, beliefs, feelings and cognitive competencies are developed and modified by social influences (passing on information and activating emotional reactions through modeling, instruction and persuasion). From the social environment, individuals' physical characteristics (age, size, race, sex, and physical attractiveness), social status and roles, stir up different reactions (Bandura 1989:3). The social reactions so elicited affect the recipients' conceptions of themselves and others in ways that either strengthen or alter the environmental bias (Snyder 1981; Bandura 1989). The Behaviour-Environment reciprocal causation involves a bidirectional influence between an individual's behavior and the environment. "In the transactions of everyday life, behaviour alters environmental conditions and is, in turn, altered by the very conditions it creates…, [therefore], people are both products and producers of their environment" (Bandura 1989:4). From this expose, it is clear individuals contribute to their own motivation, behaviour and development within a network of reciprocally interacting influences. Social cognitive theory (SCT) characterises individuals in terms of basic capabilities, namely, symbolising capability, vicarious capability, self-regulatory capabilities and self-reflective capability.

2.5.1 Symbolising capability

Humans can understand and manage their environment through their capacity to use symbols generated from past experiences. Symbols give meaning, form and continuity to these experiences and serve as the vehicle of thought (Bandura 1989:9). Causal relationships can be understood when individuals use symbols to manipulate information obtained from personal experiences resulting in expansion of their knowledge. Knowledge and thinking skills enable cognitive problem solving in thought, by evaluating possible solutions and considering consequences of each option before deciding to retain or discard it. Bandura (1989:10) argues that people are not always objectively rational when they base their actions on thought. Reasoning skills determine rationality, but these are not always well developed or effectively used. Faulty judgments can be made when the individual does not consider fully the consequences of the various options and when his/her reasoning is based on incomplete or erroneous information. Cognitive biases cause individuals to have misconceptions of events and the world around them resulting in them being perceived by others as behaving unreasonably or foolishly. Faulty cognitive judgements are the cause of distress in individuals because they tend to dwell on past painful experiences and nerve-wrecking imaginary futures. They dwell on thoughts that arouse anxiety, phobia and dejectedness and misconceptions about themselves (Bandura 1989:10).

2.5.2 Vicarious capacity

Human behaviour is learned by observing the behaviour of others and its consequences, in addition to individual experiences. Information (values. thoughts, attitudes and behaviours) is passed on by symbolically modeling influences over widely dispersed areas simultaneously, resulting in expanded knowledge and skills. Individuals do not necessarily have to perform the behaviours but learn through seeing and hearing (vicarious experiences), which in turn shapes their conception of social reality (Bandura 1989:22). Therefore, "modeling influences can serve as instructors, motivators, inhibitors, disinhibitors, social facilitators, and emotion arousers" (Bandura 1989:23).

There are varied forms of learning from models and these include judgemental standards, cognitive competencies, and generative rules for creating new forms of behaviour. Learning by observation is controlled by four component subfunctions, namely, attention, retention processes, motor reproduction processes and motivational processes. In attention processes individuals select

information of interest to them from the huge amounts of modeling influences and cannot be influenced by observed events they cannot remember. The process of retention involves actively transforming and restructuring the information passed on by modeled events into rules and conceptions for representation of memory. The behavioural (motor) production process involves translation of symbolic conceptions into appropriate courses of action. In motivational processes people do not execute everything they learn. Three types of incentive motivators, namely, direct, vicarious, and self-produced, influence performance of behaviour learned by observation (Bandura 1989:24). The success of others who are identical to the individual, influences them to perform the observed behaviour but they can reject behaviours they disprove.

2.5.3 Forethought capability

Forethought regulates most human behaviour because the behaviour is intentionally executed. Individuals anticipate outcomes of their planned behaviour which in turn motivates them. People anticipate possible outcomes of their prospective actions, set goals and plan courses of action that will possibly produce desired outcomes (Bandura 1989:39). Individuals are not motivated by future events but it is when they are cognitively symbolized in the present that they are motivated to act. Self-regulatory mechanisms facilitate translation of forethought into incentives and action.

2.5.4 Self-regulatory capabilities

Self-regulation is defined as "exercise of influence over one's motivation, thought processes, emotional states and patterns of behaviour" (Bandura 1994: glossary). The SCT posits that people are capable of controlling their thoughts, feelings, and actions. Self-regulatory capacity determines behavioural action and permits gradual substitution of internal controls and direction for external sanctions and mandates (Bandura 1989:46). The interaction of self-produced and external sources of influence regulates psychosocial functioning. These include, personal goals one anticipates to achieve, social morals, social values and social expectations. "Self-regulation of motivation and behaviour through internal standards distinguishes between aspiration [desired] standards and social and moral standards" (Bandura 1989:47). Motivation that is influenced by desired (aspirational) standards entails cognitive comparison of internal standards and personal achievements. According to SCT Self- motivation emanates from emotional evaluation of one's achievements, self-efficacy and readjusting goals keeping within attainable bounds (Bandura 1988; Bandura and Cervone 1983).

Self-evaluation is inspired by standards or goals that people set for themselves and would want to ensure they fulfil them and they will intensify their effort if they are displeased with substandard performance. Bandura (1994: paragraph 1) defines perceived self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives". A person's belief that she/he can accomplish set goals determines whether negative differences between internal standards and accomplishments are inspiring or disheartening. A person with self-efficacy will intensify efforts to achieve set goals and persist until they succeed but the individual with low self-efficacy gives up easily. Lastly, readjustment of individual standards against one's achievements becomes necessary when changes occur due to progress made. Either they maintain the initial standards or readjust them to suit the obtaining situation. "Eventually, timely or proximal goals are more effective than distal ones in enlisting self-motivation" (Al-Qeisi 2009:53). Social and moral standards are generated from instruction, modeling and prescription during socialization influenced by opinion leaders (people of significance in a social system), social system training on moral conduct or standards set by others (Bandura 1989:50-51). People select, weight and incorporate moral standards which suit their particular situations.

2.5.5 Self-reflective capability

Self-reflection is a construct that is unique to human beings which allows them to scrutinize their experiences and consider their thinking in order to understand themselves and their surroundings. Through self-reflection people can monitor their ideas, act on or foretell events from them, judge adequacy of the idea from the outcomes and consequently adjust them (Bandura 1989:58). Thoughts can be verified in four ways, namely, enactive, vicarious, persuasory, and logical modes. Enactive verification depends on whether thought is adequately suitable to the outcome of the actions. Observation of the behaviour of others and its consequences can be used to verify the appropriateness of one's own ideas (vicarious verification mode). Bandura (1989:59) theorises that a person's ability to control occurrences affecting their lives is central to the thoughts that affect action. Based on self-efficacy people determine behavioural action, amount of effort to exert in activities and the period they can persist when they face challenges. Self-efficacy also influences motivating or discouraging thought processes, stress level and depression experienced by the individual as she/he interacts - or looks forward to interacting - with the environment.

Individuals' opinions of their capabilities is based on four major sources of information:

a) *Performance mastery experiences:* Successes in the accomplishment of tasks develop one's self-efficacy whilst failure weakens it. Therefore, efficacy calls for experience in overcoming challenges through persistence.

b) *Vicarious experiences*: Comparison of self with social models or others similar to them persevering and succeeding to accomplish tasks despite obstacles faced. "The impact of modeling on perceived efficacy is strongly influenced by similarity to the models" (Bandura 1994: sources of self-efficacy, paragraph 3). Models provide a standard against which to evaluate one's capacities.

c) *Social persuasion:* Verbal persuasions that one has particular expert skills encourage the individual to exert more effort unlike when they doubt their efficacy. Social persuasion drives people to persevere and succeed, promote skills development and establish a feeling of personal efficacy.

d) *Physical and emotional conditions* are used to judge personal capabilities, strengths and vulnerabilities (Bandura 1989:60, 1994). Fatigue, aches and pain are regarded as signs of somatic weakness while a person's mood (positive or discouraged) can be used to determine personal efficacy. "Beliefs in personal efficacy affect life choices, level of motivation, quality of functioning, resilience to adversity and vulnerability to stress and depression" (Bandura 1994: summary).

2.5.6 The extended SCT model (Campeau and Higgins 1995)

Campeau and Higgins (1995) applied and expanded SCT to computer usage. They developed and trialed a measurement for computer self-efficacy by exploring the correlation between computer self-efficacy, the environment and information technology (IT) utilisation. Self-efficacy in their context is defined as "the judgement of one's ability to use a technology to accomplish a particular task" (Amida (2008:24). Campeau and Higgins (1995) proposed that familiarity with computers plays a significant role in self-efficacy perception (Bullington, Case and Han 2005:208). The theory posits that individuals evade activities that are beyond their capabilities but perform those they feel they are competent to perform. Outcome expectations-performance - are a result of job performance improvements. Outcome expectations-personal - are a result of the person's esteem,

rank/position, image, promotion and raises. Affect and anxiety signify the emotional reactions of use of the new technology Amida (2009:24-25).
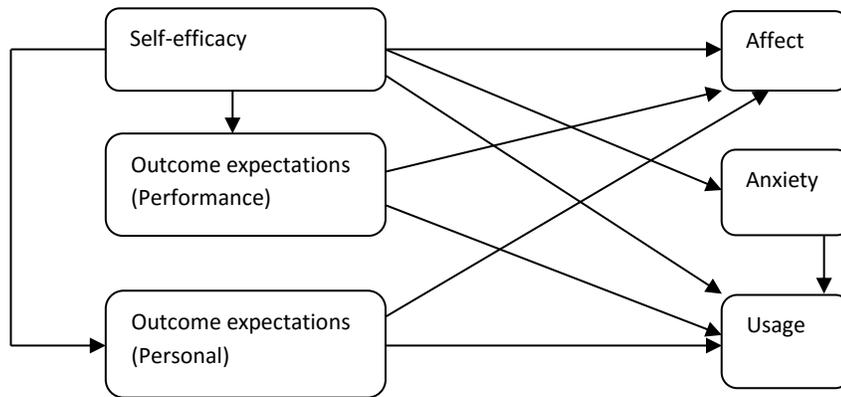
Figure 2.5: Compeau and Higgins' adapted model from SCT
Source: Compeau, Higgins and Huff (1999:147)

In the development of UTAUT, Venkatesh et al. (2003) used Campeau and Higgins' extended SCT model since their motive was to apply it to technology usage instead of sociology and psychology applications as Bandura (1977) did.

2.6 Theory of Reasoned Action (TRA)

The theory was devised by Ajzen and Fishbein in 1975 as they tried to estimate the difference between attitude and behaviour. TRA provides a useful model that could explain and predict the actual behaviour of an individual (Chuttur 2009:3). TRA theorises that a person's behavioural intention determines his or her behaviour. Behavioural intention refers to a measure of the strength of one's intention to perform a behaviour (Davis 1989:984). Intention is considered a "conative component of attitude… [which is] related to the attitude's affective component" (Fishbein and Ajzen 1975:289). TRA theorises that behavioural intention is influenced by both the person's attitude toward a behaviour, and subjective norm. Fishbein and Ajzen (1975:216) define attitude as; "a person's location on a bipolar evaluative or affective dimension with respect to some object, action or event". It symbolizes the person's positive or negative feelings toward an object (For example, favourableness or unfavourableness of a technology).
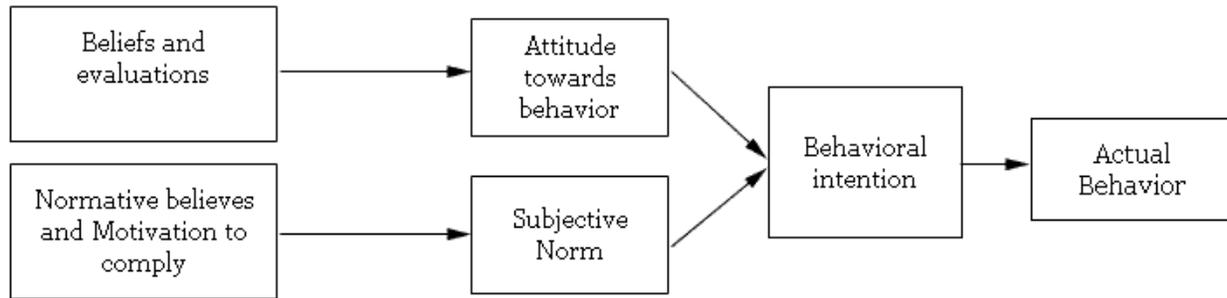
Figure 2.6: Theory of Reasoned Action
Source: Davis, Bagozzi and Warshaw (1989:984)

Attitude toward a behaviour is determined by the person's salient beliefs about the outcomes of performing a behaviour and evaluations of the outcomes. The beliefs held by the individual about the object (technology) result in the formation of an attitude toward the object. Beliefs are defined as "subjective probability of a relation between the object of the belief and some other object, value, concept, or attribute" (Fishbein and Ajzen 1975:131).

Subjective norm refers to an individual's perception that most people who are important to him or her (referent others) think s/he should or should not perform the behavior (Fishbein and Ajzen 1975:302). TRA theorises that the subjective norm is determined by perceived expectations (normative beliefs) of the referent others toward performance of a behaviour, and the individual's motivations to conform to the expectations. It is worth noting that TRA is used to predict behaviour in a voluntary context, that is, behaviour is volitional.

2.7 Theory of Planned Behaviour (TPB)

This theory was developed by Ajzen in 1985, 1991 and is a modification of the Theory of Reasoned Action (TRA). It is concerned with the relationship between an individual's beliefs and behaviour in both voluntary and mandatory situations. Central to TPB, like in TRA, is that behavioural intention determines an individual's performance of a behaviour. TPB theorises that behavioural intention is determined by three independent factors, namely, attitude toward the behaviour, subjective norms, and perceived behavioural control. Ajzen extended the TRA by adding the construct of perceived behavioural control. Attitude toward the behaviour refers to the degree to which an individual has a positive or negative evaluation or appraisal of the behaviour to be

performed (Ajzen 1991:188). Attitude is a function of behavioural beliefs and outcome evaluations (Mathieson 1991:176). Subjective norms is defined as the individual's perceived social pressure to perform or not perform the behaviour (Ajzen 1991:188). That is, one's belief that peers or a reference group (a person or group whose beliefs may be important to the individual) will approve or disapprove of the behaviour.

Perceived behavioural control refers to "the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen 1991:188). This is similar to Bandura's (1977) concept of perceived self-efficacy, defined as "judgements of how well one can execute courses of action required to deal with prospective situations" (Bandura 1982:122). Availability of requisite resources and opportunities to the individual, to some extent determine the performance of the behaviour. Perceived behavioural control is dependent upon control beliefs which are influenced by situations or actions, for example, having access to a computer as well as the ability to use the system.
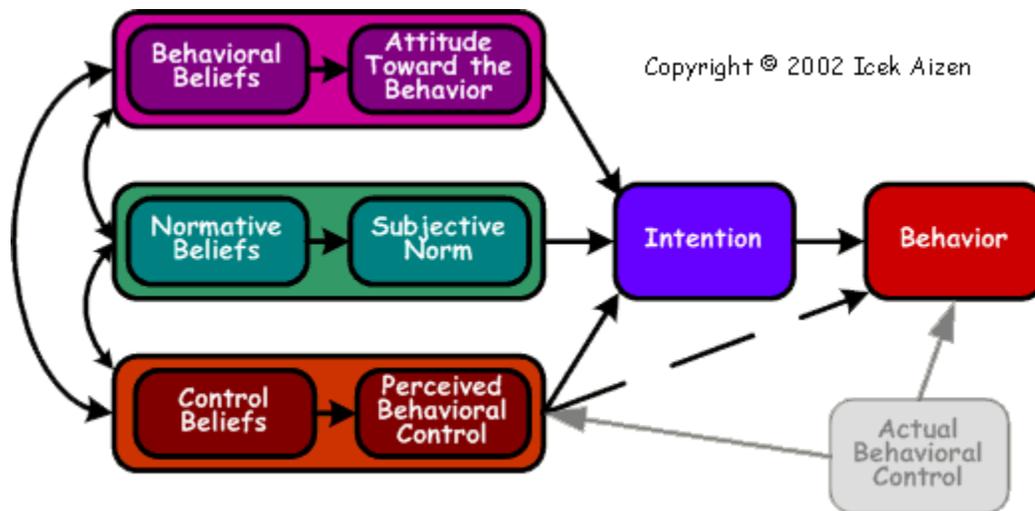
Figure 2.7: Theory of Planned Behaviour
Source: Ajzen (2002)

Therefore, behavioural control is influenced by control beliefs and perceived power. Control beliefs relates to "the presence or absence of the resources and opportunities required for performance of the behaviour" while perceived power is "the ability of the control attribute to facilitate or inhibit the performance of the behaviour" (Hale 2002:277). The theory posits that

perceived behavioural control in conjunction with behavioural intention directly determine performance of behaviour. Individuals form intentions by virtue of the control they have over their behaviour.

2.8 Technology Acceptance Model (TAM)

This model was developed by Davis (1989) who adapted some constructs (cognitive and affective variables) from the Theory of Reasoned Action (TRA) to explain user acceptance of computer information systems. Studies done using TAM have established that the theory explains a considerable proportion of the variance (40%) in intentions to use and accompanying behaviour (Venkatesh and Davis 2000:186). The aim of TAM is to provide a general explanation of the determinants of computer acceptance which can explain "user behaviour across a broad range of end-user computer technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis et al. 1989:985). TAM's intention is to enable tracing of the effect of external factors on beliefs, attitudes and intentions. The theory identified two variables as being important for computer acceptance behaviour, that is, perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness refers to "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (Davis et al. 1989:985). Perceived ease of use refers to the extent to which an individual believes that the use of the system will not require effort from them. TAM postulates that PU and PEOU mediate the effects of external variables (for example, system characteristics and training) on usage intention (Venkatesh and Davis 2000:187).

TAM proposes that the two external variables, PU and PEOU determine user acceptance of technology. Usefulness and attitude influence an individual's intention to use the system and actual usage is predicted by intention (Mathieson 1991:174). Therefore, TAM is relatively comparable to TRA. The model is presented in Figure 2.8 below.
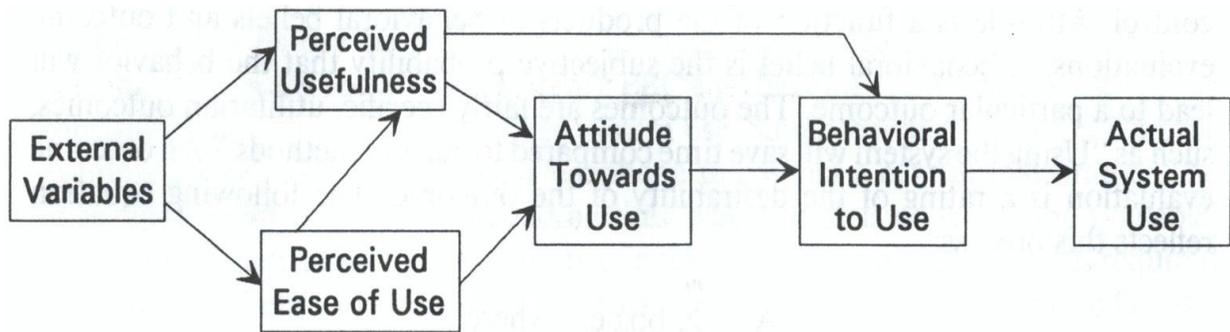
Figure 2.8: Technology Acceptance Model
Source: Mathieson (1991:175)

If a system is easy to use, then it becomes more useful. Therefore, TAM proposes that PEOU influences PU (Venkatesh and Davis 2000:187). Perceived ease of use has a significant effect on attitude through self-efficacy and instrumentality. Efficacy determines effect, effort persistence and motivation because of inherent drives for competence and self-determination. Attitude is defined as "the user's evaluation of the desirability of his or her using the system" (Mathieson 1991:175). Both PU and PEOU influence attitudes towards use.

2.9 Technology Acceptance Theory 2 (TAM2)

This model is an adaptation of TAM but includes TRA's subjective norm construct which was excluded in TAM. It includes additional key determinants of TAM's perceived usefulness and usage intention constructs and helps us understand how the effects of these determinants change with increase in user experience with the information system over time. The additional constructs in TAM2 which are classified into two categories include, *social influence processes* (subjective norm, voluntariness and image) and *cognitive instrumental processes* (job relevance, output quality, result demonstrability and perceived ease of use) as determinants of perceived usefulness and usage intention (Venkatesh & Davis 2000:187). See Figure 2.9 below.

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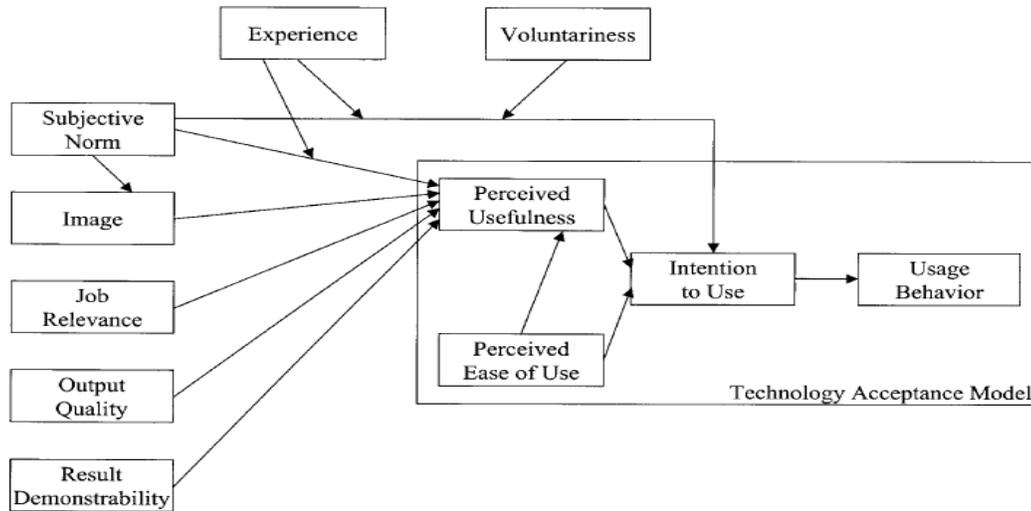
Figure 2.9: TAM2
Source: Venkatesh and Davis (2000:188)

The *subjective norm* is adapted from the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour TPB refers to the individual's perception of the reference group's expectations of him/her to perform a behaviour. So even though an individual may not be willing to perform a behaviour, he will be motivated to do it by the fact that they have to comply with the reference group's expectations. Subjective norm influences intention directly (moderated by experience and voluntariness) and indirectly through perceived usefulness. TAM2 proposes that "in a computer usage context, the direct compliance-based effect of subjective norm on intention over and above perceived usefulness and perceived ease of use will occur in mandatory, but not voluntary, system usage settings" Venkatesh and Davis 2000:188). *Voluntariness refers* to "the extent to which potential adopters perceive the adoption decision to be non-mandatory" (Venkatesh and Davis 2000:188). Hartwick and Barki (1994) found that some users are unwilling to use the system even where the perceived system use is organizationally mandated, which results in variations in usage intention.

As mentioned earlier, the subjective norm influences intention indirectly through perceived usefulness by internalisation and identification. *Internalisation* is defined as the process by which, when one observes that when a referent other expects them to use the system, the individual takes in the referent's belief and makes it his/her own (Venkatesh and Davis 2000:189). TAM2 posits that internalisation takes place whether the system use environment is voluntary or mandatory.

Social information persuasion increases system use even when it is organizationally mandated. *Image* refers to "the degree to which use of an innovation is perceived to enhance one's image or status in one's social system" (Moore and Benbasat 1991:195). Individuals often adopt use of innovations in response to social influences in order to build or maintain an image or social status within a reference group. Therefore, TAM2 proposes that the subjective norm will influence image positively because, if referent others in the workplace believe that he or she should use the system, then performing it will raise his or her status within the group (Venkatesh and Davis 2000:189). This behaviour is regarded as *identification*. TAM2 postulates that "identification, like internalisation but unlike compliance, will occur whether the context of system use is voluntary or mandatory" (Venkatesh and Davis 2000:189). Overall, TAM2 also postulates that the subjective norm's direct effect on intentions for mandatory usage will be strong prior to implementation and in early usage but decreases with time as experience with the system increases, giving a basis for continued use intentions. Similarly, the effect of subjective norm on perceived usefulness (internalisation) will weaken with time since more direct experience will provide concrete sensory information, removing dependence on social cues as grounds for perceptions of usefulness. On the other hand, the influence of image on perceived usefulness (identification) will not weaken with time since status gains from system use will continue as long as group norms continue to favour usage of the target system. (Venkatesh and Davis 2000:190).

Concerning cognitive instrumental processes, TAM2 posits that individuals "use a model mental representation for assessing the match between important work goals and the consequences of performing the act of using a system as a basis for forming judgments about the use-performance contingency (i.e., perceived usefulness)" (Venkatesh and Davis 2000:191). Potential users make judgements of job relevance. *Job relevance* refers to a person's perception concerning the extent to which the target system is relevant to his or her job. Venkatesh and Davis (2000) considered job relevance to have direct influence on perceived usefulness. With experience over time, continued use of the system will still be determined by people's perceptions of the match between their goals and job relevance. In addition, individuals consider how well the system performs tasks which match their job (*output quality* perceptions). Therefore, Venkatesh and Davis (2000) hypothesised that output quality will influence perceived usefulness even over time. *Results demonstrability* refers to the "tangibility of the results of using the innovation including their observability and their communicability" (Moore and Benbasat 1991:203) and this influences perceived usefulness.

Perceived ease of use from TAM directly determines perceived usefulness. As long as a system does not require effort, its continued use increases job performance.

2.10 Motivational Model (MM)

The motivation model originated from social psychology where several theories have been developed and modified. The motivation theory from which some of the constructs for technology acceptance models were derived is the Self-Determination Theory (SDT) developed by Deci and Ryan (1985, 2000). SDT suggests that human behaviour is influenced by different types of motivation differing in levels of self-determination (Mitchell et al. 2011:730), that is, intrinsic motivation, extrinsic motivation and amotivation. *Intrinsic motivation* (IM) is:

> The doing of an activity for its inherent satisfactions rather than for some separable consequence. When intrinsically motivated a person is moved to act for the fun or challenge entailed rather than because of external prods, pressures, or rewards (Ryan and Deci 2000a:56).

IM in SDT is concerned with satisfaction of psychological needs (inherent in humans) for competence, autonomy, and relatedness, in order for an individual to optimally develop and function (Deci & Ryan 2012:417). The *competence need* means that individuals are effective when they interrelate with the environment and when performing an activity. *Autonomy* refers to the individuals desire to act out of choice and volition. *Relatedness* refers to the need to feel close to and supported by significant others, for example, the Dean, chairperson or colleagues. Humans take interest in innovation, to learn and apply skills which results in better performance, perseverance and satisfaction (Ryan and Deci 2000a:56). The model emphasises the importance of social and environmental aspects that support intrinsic motivation rather than thwart it. External controls such as threats, deadlines and reward can thwart an individual's intrinsic motivation.

Extrinsic motivation (EM) on the contrary refers to "engaging in an activity for instrumental reasons, such as obtaining a reward or avoiding a punishment" (Mitchell et.al. 2011:730). It is a behaviour performed as a means to an end. Factors external (external regulation) to the individual cause her/him to perform an activity, therefore the action is not voluntary. Alternatively, extrinsic

motivation can result from the internalization of an external regulation and the value associated with it. Internalisation refers to:

> People taking in values, attitudes, or regulatory structures, such that the external regulation of a behaviour is transformed into an internal regulation and thus no longer requires the presence of an external contingency (thus, I work even when the boss is not watching) (Gagne and Deci 2005:334).

Amotivation refers to "the state of lacking an intention to act" (Ryan and Deci 2000a:61). Amotivation results from a person's lack of value for an activity, lack of sense of competence to do it and unbelief that it will yield desired outcomes (Ryan and Deci 2000a). The individual is just not motivated to act, lacks a sense of purpose and do not expect a reward.

At the core of SDT is the idea of distinguishing motivation as being autonomous (self-regulated) or controlled (Deci and Ryan 2012:416). Intrinsic motivation is autonomous since an individual acts out of interest and enjoyment. However, according to SDT, the level of autonomy of extrinsic motivation differs greatly. An individual can engage in an activity because it helps to increase her/his visibility (self-regulated behaviour) or because of a mandate from the institution (controlled behaviour). SDT proposes a self-determination continuum, as shown in Figure 2.10, in which the concepts of internalisation and integration explain how motivation ranges from amotivation, to passive compliance and to active personal commitment. Ryan and Deci (2000a:60) define internalisation and integration thus:

> Internalisation is the process of taking in a value or regulation, and integration is the process by which individuals more fully transform the regulation into their own so that it will emanate from their sense of self.

SDT, through its sub-theory - *Organismic Integration Theory* (OIT), identifies four types of extrinsic motivation, namely, external regulation, introjections, identification and integration (see Figure 2.10).

External regulation is the least autonomous – but most controlled - form of external motivation. It stands for behavioural action intended at getting a reward or avoiding punishment (Mitchell et al. 2011:730). *Introjection* refers to the adoption of a value or structure to maintain it but not accepting it as one's own, characterized by ego-involvement (maintenance of self-esteem), sense of pressure

or avoidance of guilt. Therefore, *introjection* is a controlled form of external motivation. *Identification regulation* is a more autonomous form of extrinsic motivation. It refers to personal identification with a value or regulation and regarding it as important to oneself. *Integrated regulation* is the most autonomous from of extrinsic motivation. It refers to total assimilation of identified regulation. According to SDT an individual does not necessarily have to go through each stage of internalization. "One can initially adopt a new behavioural regulation at any point along this continuum depending upon prior experiences and situational factors" (Ryan and Deci 2000a:62-63).
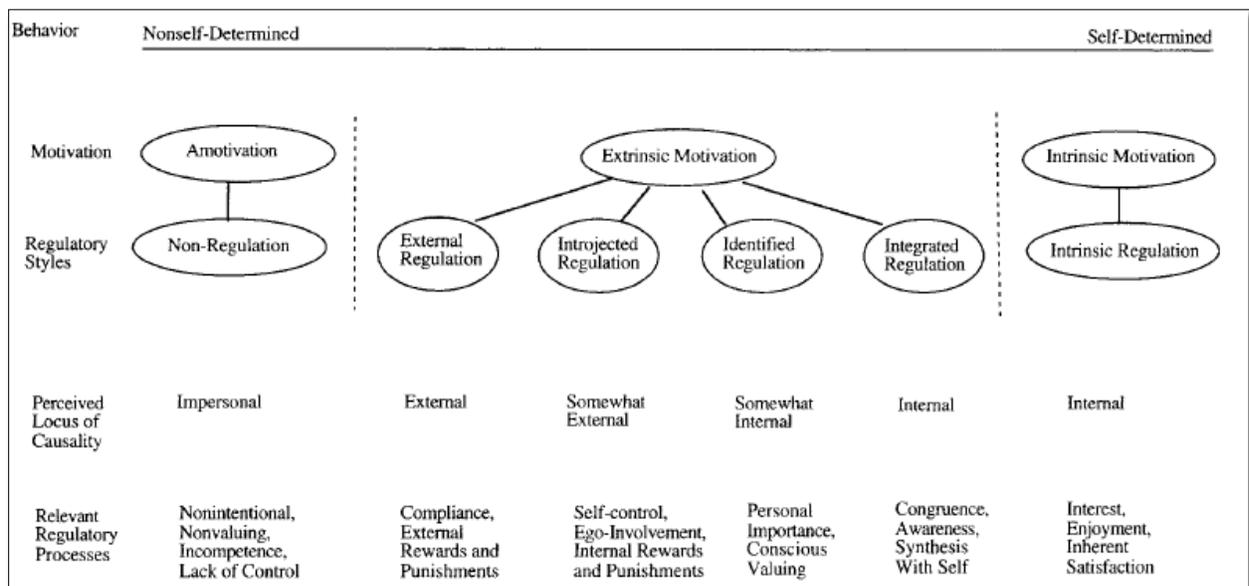
Figure 2.10: Self-determination continuum and types of motivation with their regulatory styles, loci of causality and corresponding processes
Source: Ryan and Deci (2000b:72)

Vallerand (1997) extended the SDT by developing his Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM). HMIEM's focus is on three levels of generality of intrinsic and extrinsic motivation, how they are interrelated, the defining factors and outcomes of the motivational representations (Vallerand 2000:312). The model proposes that motivation should be considered from a multidimensional viewpoint. Intrinsic and extrinsic motivation constructs are considered in a continuum where the various types of intrinsic (IM to know, IM to accomplish and IM to experience stimulation) and extrinsic motivation (integration, identification, introjection,

and externally regulated) range from high to low levels of self-determination, and amotivation (absence of motivation). *IM to know* concerns taking behavioural action due to enjoyment and satisfaction derived from learning, discovering and understanding new things. *IM to accomplish* concerns engagement in an activity due to enjoyment and satisfaction emanating from trying to excel beyond one's capabilities or achieving something. *IM to experience* occurs when one is engaged in an activity because of the excitement it causes (Vallerand and Ratelle 2002:42). The model also suggests that there are three levels of hierarchical generality in which IM, EM and amotivation occur within the individual, namely the global level (personality), contextual level (life domain) and situational level (state) (Vallerand 2000:313).

The global level of motivation refers to a tendency to be involved in activities with an intrinsic or extrinsic orientation. Contextual motivation refers to motivation based on the context in which it occurs, for example, education, leisure and interpersonal relationships. Lastly, situational motivation refers to the condition of motivation (state motivation). Thirdly, the model proposes that social factors determine motivation at the different levels of generality and these factors are mediated by opinions of competence, autonomy, and relatedness at each level. Finally, the model proposes that motivation generates psychological outcomes (cognitive, affective, and behavioural). IM produces positive outcomes, whilst, externally regulated EM and amotivation produce negative outcomes. These outcomes (consequences) also occur at the three levels of generality (global, contextual and situational levels) (Vallerand 2000:313-314). Figure 2.11 outlines the Hierarchical Model of Intrinsic and Extrinsic Motivation.
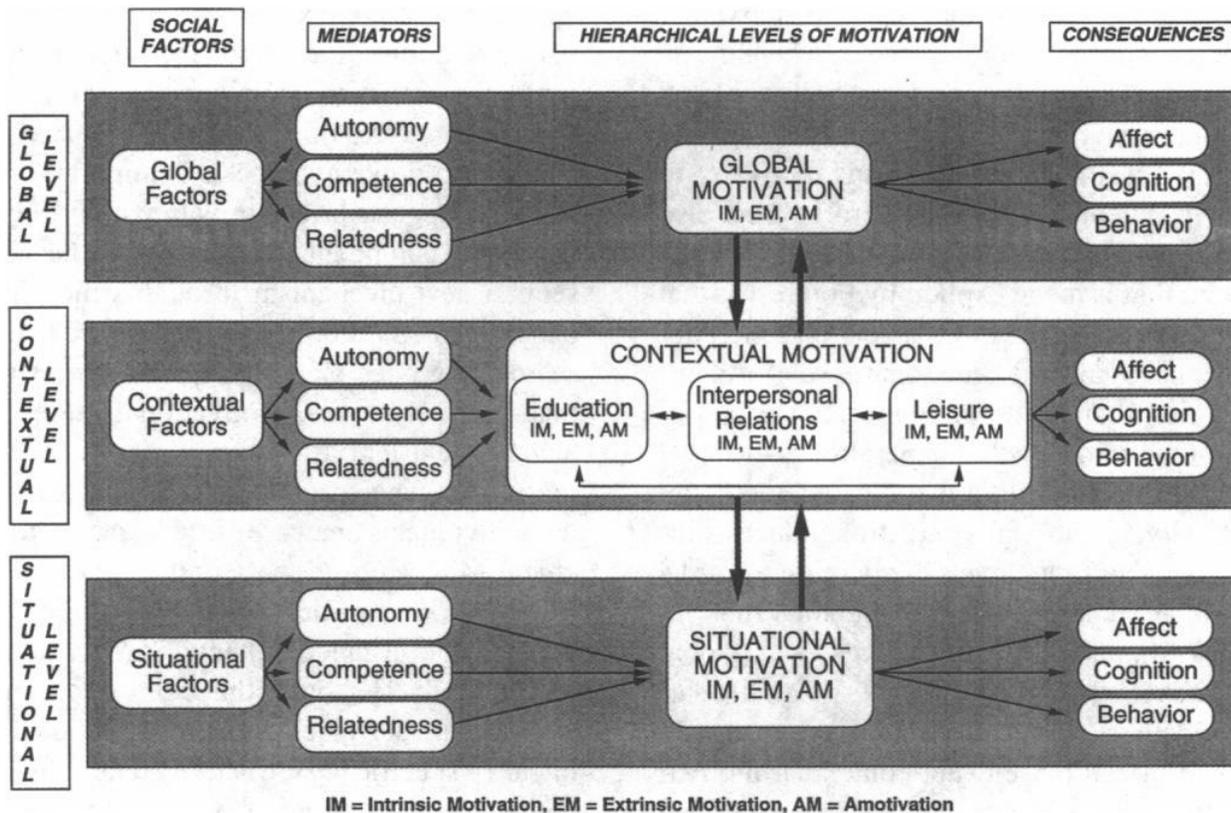
Figure 2.11: Hierarchical Model of Intrinsic and Extrinsic Motivation
Source: Vallerand (2000:313)

It is from the SDT theory that Davis, Bagozzi and Warshaw (1992) extracted constructs of intrinsic and extrinsic motivation and examined their effects on computer usage intention behaviour in comparison to perceived usefulness. Perceived usefulness is defined as "a person's expectation that using the computer will result in improved performance" (Davis, Bagozzi and Warshaw 1992:1112). Enjoyment is defined as "the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (Davis, Bagozzi and Warshaw 1992:1113). In their study, Davis, Bagozzi and Warshaw (1992) considered perceived usefulness to be extrinsic motivation and enjoyment as intrinsic motivation. The results of the study indicated that IM (enjoyment) and EM (perceived usefulness) were key determinants of behavioural intention to use information technology.

Igbaria, Parasuraman and Baroudi (1996) also extracted constructs of SDT to develop the Motivational Model of Computer Usage. The constructs were extracted from the distinction made in SDT between intrinsic and extrinsic motivators of behaviour which propose that people are

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motivated to use microcomputers for enjoyment and fun because of their perceived advantage (usefulness) or because of external demands (social pressure) (Igbaria, Parasuraman and Baroudi 1996:129). *Social pressure* refers to the individual's opinions of normatively appropriate behavior regarding the use of microcomputers. Individuals may use microcomputers because of pressure coming from people who are important to them (significant others), such as, colleagues, chairperson, management and so forth, and not for enjoyment or fun. The model as shown in Figure 2.12 incorporates perceived complexity as an intervening variable which links three antecedent variables - skills, organizational support, and organizational usage - with perceived usefulness, perceived enjoyment, and social pressure (Igbaria, Parasuraman and Baroudi:131).
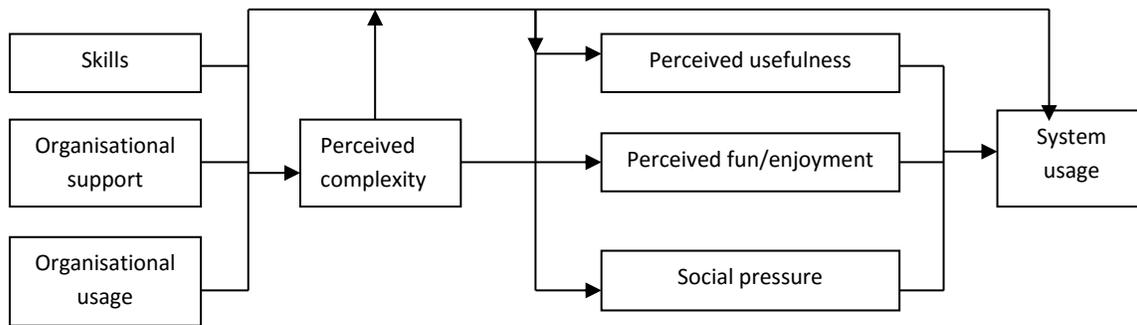
Figure 2.12: The Motivational Model of Microcomputer Usage
Source: Igbaria, Parasuraman and Baroudi (1996:130)

The model also proposes that ease of use, perceived usefulness and enjoyment are connected to ones' experience with computers and user training. The theorists posit that skills enhance usage of computers and that through their effect on perceived usefulness, perceived enjoyment, and social pressure, they also influence usage. Skills also reduce perceived complexity of information technology usage (Igbaria, Parasuraman and Baroudi 1996:141). Organisational support (management support) is perceived to be influential to computer usage. When an organization extensively uses computers, it motivates usage and facilitates perceived complexity, perceived usefulness, perceived enjoyment and social pressure to use the technology.

2.11 Model of PC Utilisation

The Model of PC Utilisation (MPCU) was developed by Thompson, Higgins and Howell (1979) and is drawn from Triandis's (1979) theoretical framework of human behaviour rooted in social psychology. Thompson, Higgins and Howell (1979) adapted the theory and applied it to technology usage. According to Thompson, Higgins and Howell (1994:168) organizations invest in technology believing that employees will use it but availability of the technology does not guarantee usage. So they sought to understand factors that influence usage of computers in order to ensure effective management of technologies in organisations. They, therefore developed the model of PC utilization based on constructs extracted from Triandis' theoretical framework. Therefore, it is critical that Triandi's theoretical framework be discussed to facilitate understanding of Thompson, Higgins and Howell's theory. Figure 2.12 presents Triandi's theoretical framework.

2.11.1 Triandis' theoretical framework

The thrust of Triandi's (1979) theoretical framework is on "the relationship of attitudes, values and other acquired behavioural dispositions to action or behaviour" (Triandis 1980:195). *Attitude* is defined as "an idea, charged with affect, that predisposes a class of actions to a particular class of social situations" (Triandis 1980:214). The theory postulates that habits, behavioural intentions, relevant arousal and facilitating conditions determine behaviour. *Habits* are "situation-behaviour sequences that are or have become automatic, so that they occur without self-instruction" (Triandis 1980:204). *Habits* (thought patterns, fantasy or emotions) mirror the person's past experiences (rewards or punishments) and the person's capability to perform the task. *Facilitating conditions* refer to "objective factors 'out there' in the environment, that several judges or observers can agree make an act easy to do" (Triandis 1980:205), for example, user training on information system use, technical assistance and, so forth. When the environment is not conducive an act may be prevented from occurring even though the individual has an intention to act. The individual's views that the act is easy are considered as 'internal factors'. *Behavioural intentions* are orders that individuals give themselves to act in certain ways, while *relevant arousal* refers to physiological awakenings of organisms relevant to the act.

HISTORY   ECOLOGY   SITUATION-BEHAVIOR-CONSEQUENCES

CULTURE

Objective-Subjective

PERSONALITY

Individual Perceptions
of Subjective Culture
Variables

Habit hierarchies (H)

SOCIAL SITUATION
Who
How many
When
Where
O's behavior

Social factors
S

Affect
A

Consequences
$C=\sum P_c\, V_c$

Intentions
I

FACILITATING CONDITIONS   Behavior

Relevant Arousal

Objective Consequences

GENETIC
BIOLOGICAL
FACTORS

Interpretation

Reinforcement

Figure 2.13: Relations among the major variables of the theoretical framework
Source: Triandis (1980:199)

Habits hierarchies influence behaviour directly, and indirectly through its effect on affect which influences behavioural intention, which in turn determines behaviour. *Social factors*, affect and perceived consequences influence behavioural intention which in turn determines behaviour (Triandis 1980:218). *Social factors* refer to the person's internalization of the subjective culture (norms, roles and values) of the reference group and "specific interpersonal agreements that the individual has made with others, in specific social situations" (Triandis 1980:210), influence behavioural intention. Therefore, the individual perceives appropriateness (morality) of behaviour based on the norms, roles and values of the culture. *Affect* refers to the individuals' feelings (joy, disgust, sadness, displeasure) toward the behaviour.

The framework presents *affect* and *perceived consequences* as independent factors that influence behaviour indirectly through behavioural intentions (Thompson et al. 1994:170). On *perceived consequences,* Triandis puts forward that every act is viewed as having potential consequences with value, and a probability that the consequence will happen (Thompson, Higgins and Howell 1991:128). The framework views behaviour as having objective consequences (occur in the

environment) that are interpreted (internally) by the individual. The *interpretation* causes a sense of reinforcement in the individual. *Reinforcement* alters the perceived probability that the behaviour will have certain outcomes (for example, rewards, increased visibility). It also alters the value of the outcomes.

Thompson, Higgins and Howell (1991) used the model to predict the relationship between attitudes and computer usage in organisations. Their study examined the direct impact of social factors, affect, perceived consequences, and facilitating conditions on behaviour. The study was concerned with the behaviour itself not the intention. The theory postulates that behaviour is largely determined by social factors, affect, perceived consequences, facilitating conditions and habits. It suggests that in an organisation where the use of a PC is not mandatory, use of the technology by the individual is influenced by his or her feelings towards PC use, organizational norms and values towards PC use, habits related to usage of technology, the person's perceived consequences of using a PC, and facilitating conditions in the environment that are favourable for PC use (Thompson, Higgins and Howell 1991:126). In their analysis two modifications were made to Triandi's theory, that is, they:

    a. Identified three cognitive components of perceived consequences- complexity, job-fit and long term consequences.

    b. Excluded the habits construct which they considered to be tautologically related to current use.

Therefore, model of PC utilization includes the following constructs; job-fit, complexity, long-term consequences, affect towards use, social factors and facilitating conditions. Figure 2.14 shows the model.
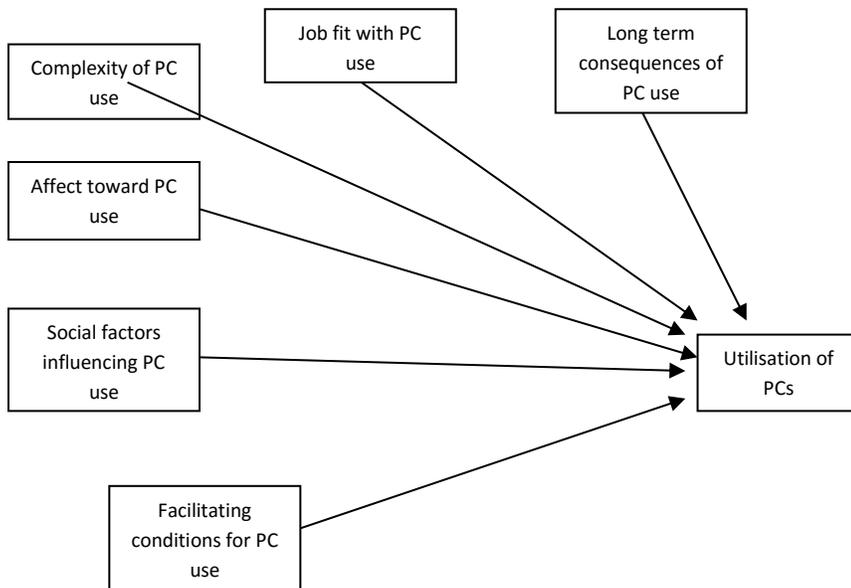
Figure 2.14: Factors influencing the utilisation of personal computers
Source: Thompson, Higgins and Howell (1991:131)

Complexity refers to "the degree to which an innovation is perceived as relatively difficult to understand and use" (Thompson, Higgins and Howell 1991:128). This construct is an opposite of TAM's 'perceived ease of use' (the extent to which an individual believes that the use of the system will not require effort from them) construct. The perceived *job fit* construct refers to the degree to which an individual believes that using a technology can enhance the fulfilment of his or her job (for example, maintaining a record of research output). It is similar to TAM's 'perceived usefulness' construct (the extent of an individual's belief that use of the information system will enhance his or her job performance). The *long-term consequences of use* are "outcomes that have a pay-off in the future, such as increasing the flexibility to change jobs or increasing the opportunities for more meaningful work" (Thompson, Higgins and Howell 1991:129).

The results of Thompson, Higgins and Howell's (1991) study showed that social factors, complexity, job fit, and long- term consequences had major effects on PC use but did not get any evidence that facilitating conditions and affect influence PC use.

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2.12 Unified Theory of Acceptance and Use of Technology (UTAUT)

The present study employed the UTAUT model to establish user acceptance behaviours towards open access institutional repositories technologies adopted by the public universities in Zimbabwe, in an effort to increase access to and visibility of the institutions' intellectual capital. Venkatesh et al. (2003) developed the UTAUT model by extracting the most important constructs with similarities from the eight technology acceptance models and theories discussed above. The model provides a refined view of how determinants of intention and behaviour develop over time. The goal of the model is to understand usage as a dependent variable.
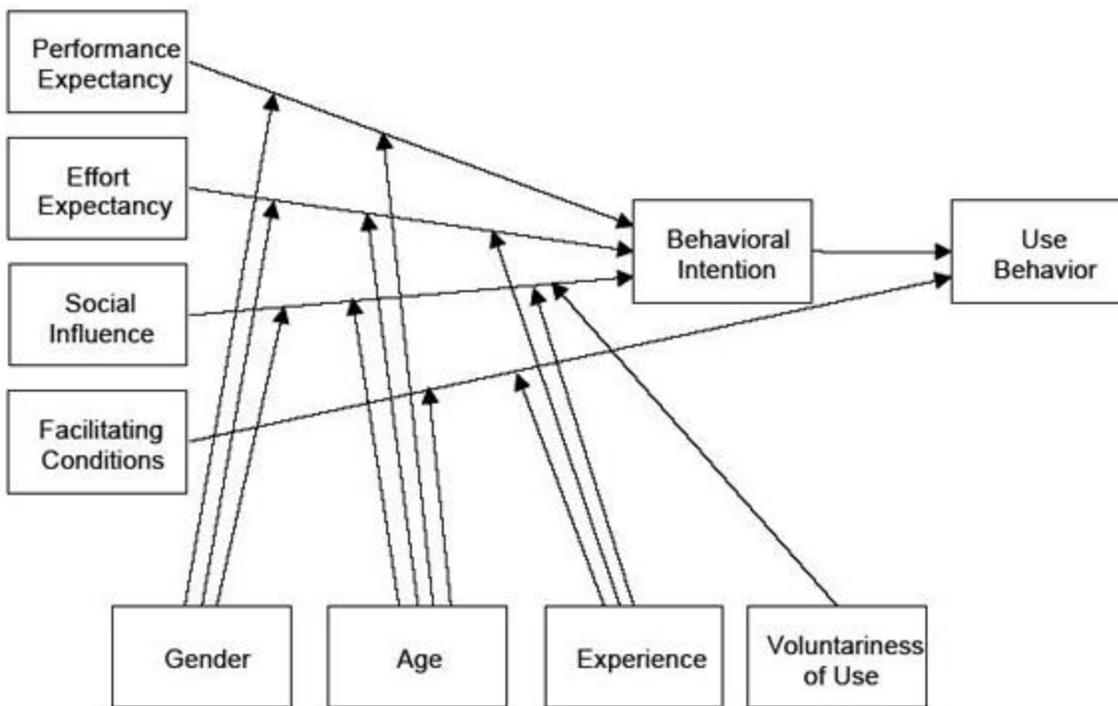
Figure 2.15: Unified Theory of Acceptance and Use of Technology
Source: Vankatesh et al. (2003)

UTAUT compresses the eight models discussed above, into four key predictors or determinants of usage intention and behaviour. Three constructs directly influencing usage intention, which in turn, determines usage include, performance expectancy, effort expectancy and social influence. The fourth construct, facilitating conditions directly influences usage behaviour. These predictors of technology usage are controlled or mediated by variables of age, gender, experience and voluntariness (see Figure 2.15).

Performance expectancy refers to "the degree that the user believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al. 2003:447). This construct was derived from TAM/TAM2 and C-TAM-TPB's perceived usefulness, MM's extrinsic motivation, MPCU's job fit, SCT's outcome expectations and IDT's relative advantage. This construct is regarded to be the strongest predictor of behaviour intention in both voluntary and mandatory situations. Gender and age variables will moderate the relationship between performance expectancy and behaviour intention and the influence is stronger for men, especially young men. Effort expectancy refers to the degree of ease of use of the system (Venkatesh et al. 2003:540). This construct was extracted from MPCU's complexity, TAM/TAM2's perceived ease of use, and IDT's ease of use. The model postulates that effort expectancy despite being significant in both mandatory and voluntary situations, it is only significant in the early stages (post training) slackens over time. It hypothesises that the influence of effort expectancy on behavioural intention will be moderated by gender, age and experience but the effect is stronger for women, especially young women in the early stages of experience.

Social influence refers to the degree to which an individual's perception that the referent others (academic community) believe s/he should use the new system (Venkatesh et al. 2003:451). The construct was developed from IDT's image, subjective norm in TRA, TAM2, TPB and C-TAM-TPB and social factors in MPCU. The influence of social influence on behavioural intention will be moderated by gender, age, experience and voluntariness. The model theorises that the effect will be stronger for women especially in mandatory situations in the early stages of experience.

Facilitating conditions refer to the "degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" Venkatesh et al. 2003:453). The construct was generated from perceived behavioural control in TPB and C-TAM-TPB, compatibility in IDT and facilitating conditions in MPCU. The model hypothesises that a) facilitating conditions will not have significant influence on behavioural intention, and b) the influence of facilitating conditions on usage will be moderated by age and experience to the extent that the effect will be stronger for older workers, especially with increasing experience (Venkatesh et al. 2003:254-255). The developers of the model posit that UTAUT studied complex organisational technologies and employees in organisations going through technological changes. Therefore, the model was found to be suitable for this study since its aim is to establish acceptance

and use of open access institutional repositories technology in Zimbabwe's public universities. UTAUT also studied both voluntary and mandatory usage settings. This study assumes that some universities have policies that make usage of IRs mandatory while others do not.

Sundarajev (2010:12) in his study sought to validate the UTAUT model on user acceptance towards an educational technology. The study demonstrates that the model "is an adequately valid and reliable instrument to measure the usage behaviour on information technology". UTAUT was used in several studies on technology usage in libraries (Chang 2013; Dulle and Minishi-Majanja 2011; Saravani and Haddow 2011; Tibenderana et al. 2008). Tibenderana et al. (2008) studied the use of electronic library services and the results revealed that social demands, relevancy of services, available facilitating conditions and benefits to be derived from the services, influence Ugandan communities to use electronic library services. A study was carried out by Chang (2013) integrating the UTAUT with Task Technology fit to explain users' intention of using library mobile applications in university libraries. The results revealed that the four key predictors of usage behaviour intention indeed influence behaviour intention to use library mobile applications. Orji (2010) studied the impact of gender and nationality on acceptance of a digital library using a nationality based UTAUT. The results of the study showed that social influence significantly impacted upon international students (both females and males) while effort expectancy impacted upon national students (both females and males) significantly.

Saravani and Haddow (2011) also used UTAUT in their study of staff preparedness in delivering mobile library services at institutes of technology and technical and further education libraries in Australia and New Zealand. The findings showed that the model is useful for analysing issues related to the identification of skills, competencies and requisite training in order to understand predictors of technology usage. Dulle and Minishi-Majanja's (2011) study on the acceptance and usage of open access in Tanzania's public universities established that effort expectancy, attitude, awareness and performance expectancy were key determinants of intention to use open access. They also found that social influence, awareness, age, behavioural intention and facilitating conditions significantly influenced researcher's actual usage of open access.

Table 2.1: Variables informing research questions

Research Question	*Variable*
1. What categories of documents are included in the IRs?	Performance Expectancy Social influence
2. What is the role of the academic librarian in promoting the institutional repository?	Effort Expectancy Facilitating conditions
3. How has the institution contributed to the promotion of OA?	Facilitating conditions
4. What are the attitudes and concerns of academics towards IRs?	Performance Expectancy Effort Expectancy Social influence Facilitating conditions
5. What challenges do the academics and librarians face in contributing to and managing the IRs?	Facilitating conditions Effort Expectancy
6. What strategies can be employed to overcome the challenges?	Facilitating conditions

20.13 Summary of the chapter

This chapter provided a detailed description of the UTAUT model and how it explains and predicts the behaviours of individuals toward adoption and usage of technology. The eight theories and models from which the UTAUT model originated have been discussed at length. These include IDT, SCT, TRA, TPB, TAM, TAM2, C-TAM & TPB, MM and MPCU. It is from these models that Venkatesh et al. (2003) extracted similar constructs and compressed them to develop the UTAUT model which provides a refined view of how determinants of intention and behaviour develop over time. In this model usage is the dependent variable that has to be understood by exploring its determinants (independent variables) which include social influence, performance expectancy, facilitating conditions and effort expectancy. The next chapter will review literature related to the study and provider a deeper understanding of the research problem.

CHAPTER III: LITERATURE REVIEW

3.1 Introduction

Literature review involves selection of available documents on the topic, containing:

> information, ideas, data and evidence written from a particular standpoint to
> fulfil certain aims or express certain views on the nature of the topic and how
> it is to be investigated, and the effective evaluation of these documents in
> relation to the research being proposed (Hart 1998:13).

Literature review establishes the broad context of the study, delineates its scope and justifies those decisions. It also places existing literature in a broader scholarly and historical perspective (Boote and Beile 2005:4). The transformation of the scholarly communication system over the years, through technological advancement, has resulted in the development of various publishing models and strategies by the stakeholders (publishers, libraries and scholars) in efforts to disseminate research results, increase their availability and visibility, enable access to research results, and abate the 'serials price crisis'. Electronic publishing, intensified by internet technology gave birth to open access publishing, which forms the basis of this review. The discussion will focus on issues surrounding acceptance and use of institutional repositories (as an open access publishing model) technology in academic institutions. The discussion starts by providing the scholarly communication landscape leading to the open access initiatives and finally focusing on institutional repositories.

3.2 Defining scholarly publishing

Scholars who teach and or conduct research in institutions of higher learning (universities and colleges) and other research institutions engage in scholarly publishing. A scholar is regarded as a learned individual who is either an academic or one involved in investigative or knowledge-based activities mainly as a learner, researcher or teacher (Ocholla 2011:2). On the other hand, research is defined as work done by scholars for promotion, teaching, professional development, or social good (Boettcher 2006:24). Turner (2002:3) cited in Stilwell (2006:1) describes research as:

any systematic effort to generate new information, create new knowledge, or produce new interpretations of existing knowledge or information, suggesting attention to method and exactitude in obtaining and analysing results.

Knowledge arising from research done by academics and researchers is critical to the development of a country, therefore, it has to be published to achieve the desired effect. Publishing is the process of making knowledge and information public by distributing and circulating it beyond geographical boundaries of its origin or source through publishing content in print or electronic format (Ocholla, 2011:1). Scholarly publishing, therefore "refers to published research output of the higher education sub-sector as well as that of government and science councils" (De Beer, 2005 cited in Ondari-Okemwa, 2007). It includes distribution of peer-reviewed literature (books and journal articles), conferences papers, technical reports, data sets and other media within scholarly communities (Kennan and Cecez-Kecmanovnic 2007:2; Phillips 2010:1). The term 'scholarly publishing' is central to scholarly communication which involves "collection, organisation, evaluation, interpretation, and preservation of primary and other sources of information, and the publication and dissemination of scholarly research" (Cullyer and Walters 2008:1 cited in Trotter et al. 2014:11). According to the Association of Research Libraries (2015), it is:

> 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.

Scholarly research reports are written to be read and to push for new writing. "The more influence that scholarship can produce, the better" (Fitzpatrick 2012:350). Despite generating knowledge, scholars and their institutions cede ownership of the scholarship to publishers and they can only access it through purchase and subscription. Universities and research institutions need to retain control of the scholarship they produce since they fund much of the research, together with research funding bodies.

> One approach is to identify the various ways a university funds publishing, explore the convergence of publishing activities and functions within the university, and take steps to increase access to the wealth of published material generated by the academy (Phillips 2010:2).

Most universities across the globe, including Zimbabwe, have established open access institutional repositories (to be discussed later in the chapter) in an effort to capture research results produced by their academics and enable access to the information while at the same time increasing their visibility and, in turn getting returns on their investment. It remains to be established if the institutions have achieved that goal.

Over the years, the nature of scholarship has maintained consistency to its core principles despite undergoing profound changes (Czerniewicz 2013:1) due to technological advancements. Clarke (2013) cited in Steel (2014:3) postulates that by creating the Web in 1991, Tim Berners-Lee's aim was to better facilitate scholarly communication and dissemination of scientific research; the Web was intended to disrupt scientific publishing. Numerous predictions of scholarly communication change have been made with many commentators being puzzled as to why the advent of the internet has not disrupted the scholarly publishing environment (Steel 2014:3). Phillips (2010:1) postulates that the boundaries of the traditional scholarly publishing practice have been extended by virtue of the scholarly publishing environment having become a complex combination of technological capability, economic certainties, and emergent social networking cultures.

Technology enables innovative scholarship and presents new alternatives to access research findings whilst the economy forces universities to examine business models and assess return on investment. Ware and Mabe (2012:13) outline the changes occurring in the scholarly communication landscape as:

i. Changes to the publishing market (new business models - open access; new sales models - consortia licensing; globalisation and growth of emerging regions)

ii. Changes in how research is conducted (use of networks; growth of data intensive and data-driven science; globalisation of research); and

iii. Changes to public policy (research funder self-archiving mandates; changes to copyright). These issues shall be discussed later in the chapter, but it is important to highlight that the first and third changes outlined above form the focus of this study. There is need to probe the issue of acceptance and use of the new business model of open access publishing by scholars in Zimbabwe, which is being driven by technological advancements. It is, therefore, necessary for us to gain insight into the scholarly communication system before delving into the emerging issues.

3.2.1 The scholarly communication cycle

Scholarly publishing follows a life cycle termed 'the publishing cycle' (see Figure 3.1). This involves the movement of information between the different players in the journal publishing process (Mabe 2006:58). There are three major players in the scholarly communication system, namely; scholars (including funders and host institutions generate knowledge), publishers (responsible for quality control, production and distribution of knowledge), and librarians (manage access, navigation and long term preservation of knowledge) (Ware and Mabe 2012:11). Carrigan (1996) cited in Mabe (2006:60) complements this by saying:

> Journals' publishing is not just about producing and marketing a product – it's also about serving a community and about helping develop a focus for a community. The community consists of readers, authors and academic editors – who are often the same people – and also involves others who contribute to the information chain, including librarians, subscription agents and other intermediaries.
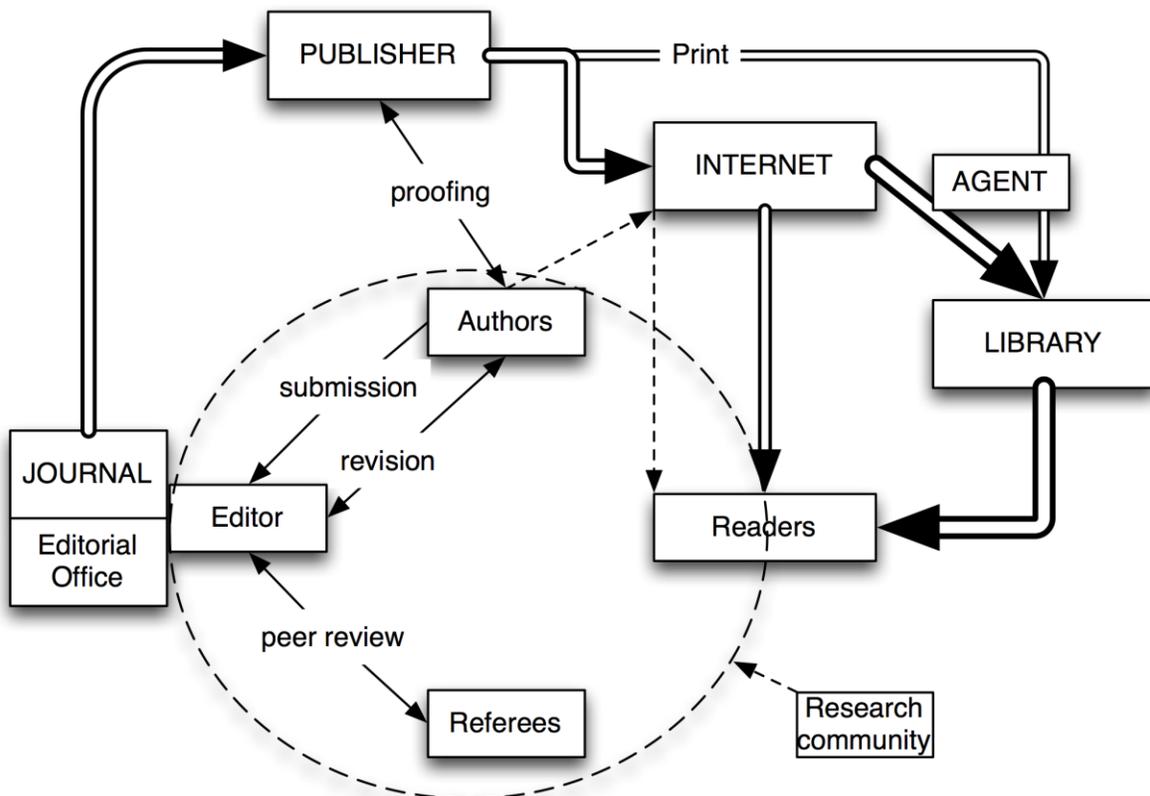
Figure 3.1: Scholarly publishing cycle
Source: Ware and Mabe (2012:16)

The initial step in scholarly publishing follows a research cycle (see Figure 3.2) which has the following stages; idea discovery, generate hypothesis (awareness, literature review, informal); funding/approval (literature review); conduct research (awareness); and disseminate results (formal publication, informal dissemination).
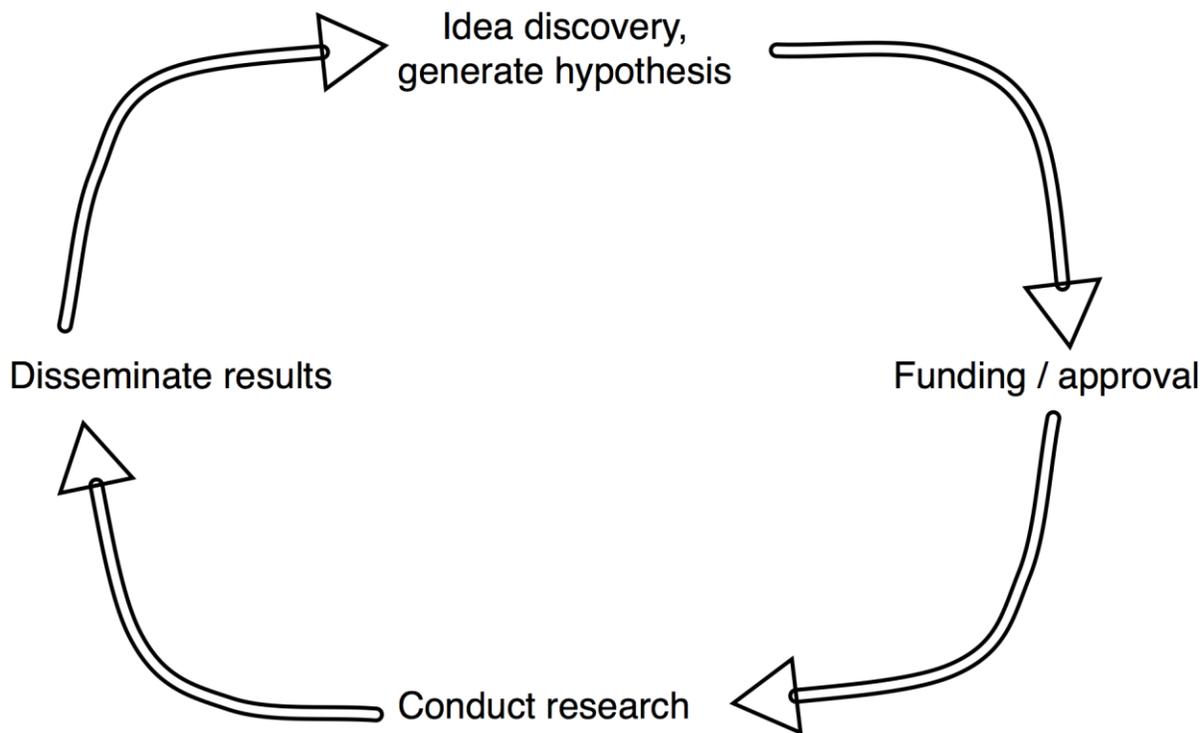
Figure 3.2: Research cycle
Source: Mabe and Ware (2012:11)

The scholar/author, who is a member of a particular research community, begins with the process of accessing information from various literature sources for inspiration and formulation of ideas over a subject, which results in the generation of hypotheses, research methodology, data collection and data analysis. As the author develops an idea, she/he can present and share the idea at conferences and workshops and use the feedback to further develop it. In the digital age at idea development (see Figure 3.3), the activities which were once private in the traditional scholarly system become shared and shareable. Social bookmarking software is now being used in developing a relevant bibliography, and connections with colleagues with shared interests. "The power of weak ties, which social media is known for enabling, can be brought to bear even at the outset of a research project" (Czerniewicz 2013:5). At the phase of data collection, curation and

data analysis in the cycle, the digital allows images and audio records to be shared in real time online.

Therefore, the online environment facilitates data sharing, which supports the open access drive to enable reproducibility. The online space also contributes to the transparency plan which allows for improved quality of data. Data is now linkable through hyper-linking and interoperability and data sets and types are extended. Data mining is now possible, thereby making it easy to give answers to questions that used to be too complex or time consuming. At this stage the scholar plays a number of roles, sometimes simultaneously, as reader of research literature, as an author, referee, and a journal editor (if given the opportunity). This view is shared by Mabe (2006:58) who says, "in any one year, a journal editor can also act as a reader, an author and even a referee."
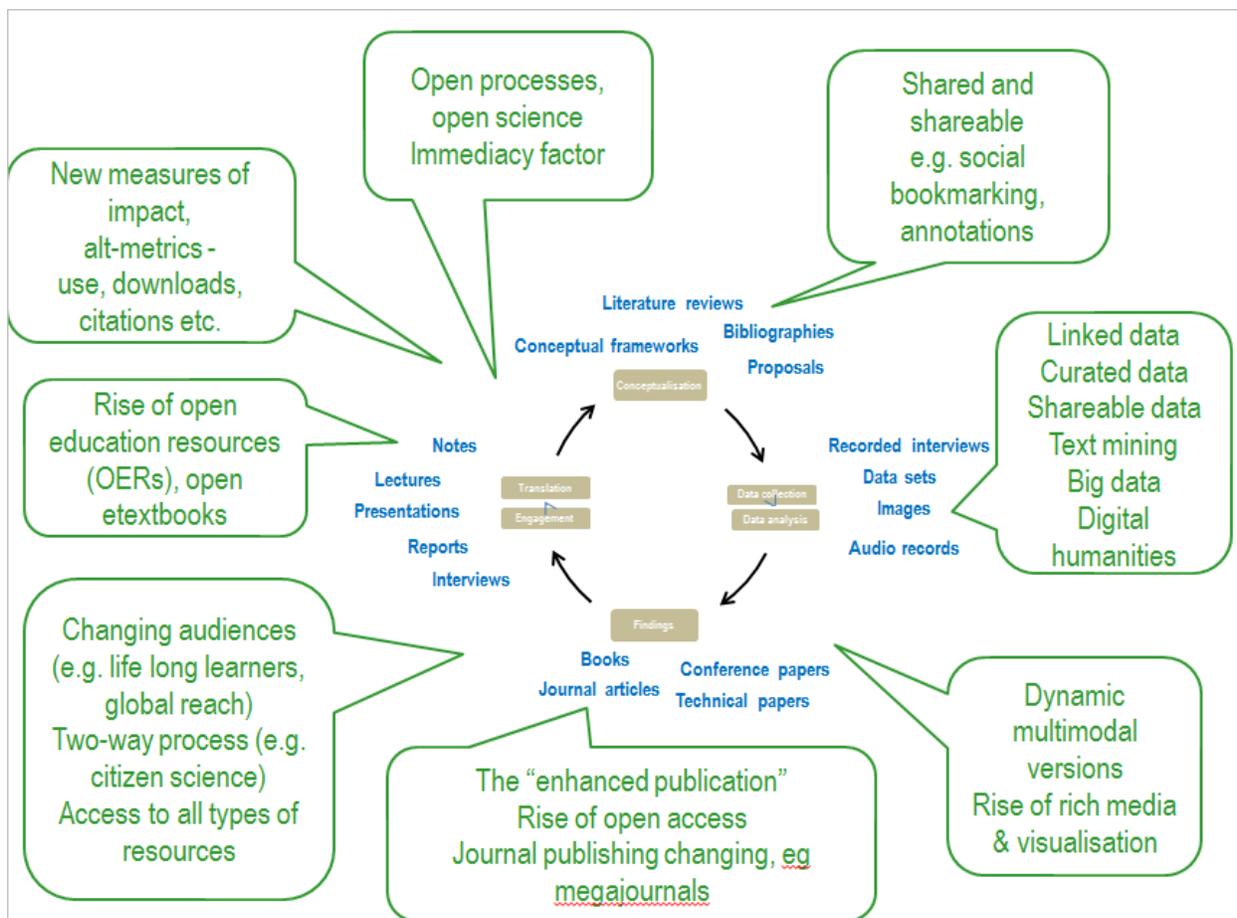
Figure 3.1: The digital scholarship terrain
Source: Czerniewicz (2013:7)

After conceptualisation, the writing or authoring stage follows in preparation for publication. Due to the digital environment, the outputs stage of the research cycle, has experienced the development of new types of improved publications, that is, journal articles with data visualisations and rich visual representations. Multimedia, animations, sound and video clips are utilized through exploitation of the multimodality feature of the web. The publications can have hyperlinks to references or data sets and can incorporate social media platforms and commentaries to share information.

After authoring a paper, the authors assess the level of their work and identify a journal that matches the quality they have produced. The selection of a journal to publish an article by an author is based on a number of considerations including; relevance, reputation and ranking in the discipline. The final decision to settle for a journal title is dependent upon the publishing experience of the author and of his/her colleagues or superiors. What motivates authors to want to be associated with a particular journal is the desire to "reach the eyes of their colleagues, to influence their minds and work, and thus to make an impact on knowledge (not just a contribution to it)" (Harnad 1995 cited in Mabe 2006:59). In the digital environment policy makers, such as research funders who have embraced open access policies that promote data sharing require that data management plans ensure that data sets are made freely available online. They are increasingly requiring that research funded by them be made freely available online. Some also specify that the research outputs should be shared in ways that facilitate mining, re-use and adaptation of the contents. So scholars now often find themselves also considering identifying open access forums for their publications to fulfil the mandates of their funders.

The moment the author identifies a publisher for his/her work, the publisher takes over and/or buys the copyrighted item and begins the production process. Authors surrender copyright for their research in return for dissemination. "All their [scholars] sweat and hard work in the creation of their articles or books becomes a commodity called copyright, which has an economic value and can be traded" (Boettcher 2006:24). However, the authors do not receive direct compensation for their efforts producing articles. They are compensated indirectly through additional entry on the curriculum vitae which is used to convince administrators to promote, tenure, increase salaries, and allocate more resources (Parks 2002:326).

The publisher can be a commercial company, university press or a professional association. Commercial publishers are mainly concerned with making profits whilst the non-profit university presses and professional associations' desire viability. When the author hands over the manuscript, *the editor* takes charge of the coordination of the peer review process, resubmissions and distribution of the publication through print or electronic media (books, journals, websites). The journal editor is "usually an independent, leading expert in his field (most commonly but not universally a university academic) appointed and financially supported by the publisher" (Mabe 2006:59). The editor looks at the title of the paper and sends it to two colleague reviewers/referees who are champions in the subject. If both reviewers advise publication, the editor sends it to the printers but if they advise against publication the editor rejects the paper (Smith 2006:178). The final decision to publish or not to publish rests with the editor. The peer-reviewers recommend publication on condition the author revises the article or book. The editor then sends the reviewers' comments to the author for revision and resubmission. After resubmission, the work is accepted for publication. The review process can take several weeks or months, with a similar delay in publication of the article after acceptance. However, electronic publishing has greatly reduced delays in publication of accepted articles (Mabe 2006:60) but, the online journals have also presented challenges for the peer review process since they are published much faster than was previously possible. The impact of the journals is now measured through online discussions or commentaries on blogs and downloads, which translates to the fact that the peer review process occurs at pre-publication and post-publication, thereby presenting an emerging peer review process.

The publisher's role is to identify niche markets for the promotion of new journals, or the expansion (or closure) of existing journals.

> This entrepreneurial aspect seeks both to meet a demand for new journals from within the academic community – and it is noteworthy that journal publishers have been instrumental in the birth of a number of disciplines through their early belief in them and support of new journals for them – but also to generate a satisfactory return on investment (Ware and Mabe 2012:15).

It is the responsibility of the journal publisher to manage and sustain the relationship between the journal and its target market. The publisher achieves this through selection and support for the

right editor, funding the journal, and managing the production, marketing and distribution in print or electronic format. Mabe and Ware (2012:14) list four expected capabilities of a publisher as; manufacturer or electronic service provider, marketer, distributor, and economic host:

i. *Manufacturer/electronic service provider* – The publisher should be able to copy edit, typeset and tag, and print and bind the journals.

ii. *Marketer* – attract the paper submissions (authors), increase readership and new subscribers.

iii. *Distributor* – maintain a subscription fulfilment system guaranteeing that journals are delivered timeously; maintain relationships with subscription agents, periodicals librarians and academia.

iv. *Electronic host* – electronic journals require many additional skill sets more commonly encountered with database vendors, website developers and computer systems more generally.

The finished product is then distributed to consumers (university libraries, research institutions and scholars) to form library collections as databases, repositories or personal collections. Large academic libraries collect the resources from distributors or agents and become points of access for scholars doing research. Universities and/or research institutions are significant scholarly publishing stakeholders whose mission is to collect and provide access to scholarly publications which will be used by academics to inform and validate their research (Phillips 2010:4). The sale of journals has transformed from a tradition of individual libraries subscribing to individual journal titles, which could be stored or archived in the library with the intention to preserve for posterity and continued use in the generation of new knowledge and information by the institution's scholars, to that of bundles of titles (50 or more) by individual libraries or library consortia. Czerniewicz (2013:6) refers to them as 'mega-journals' with broader disciplinary coverage enabling disciplinary linkages whose "platforms are forms of large thematic repositories". Cox & Cox (2008) cited in Ware and Mabe (2012:18) established that most publishers use the "prior print" model to price journal bundles. The library would be offered electronic access to all the titles in the bundle at a similar price to the existing print subscriptions of the library plus an additional fee (top-up model) for electronic-only access to the titles not subscribed to. The top-up model is referred to as the Big Deal. Other licensing models include; usage-based pricing, tiered pricing based on a classification of institutions by size, pricing based on the number of

simultaneous users. Ultimately the survival and existence of scholarly publishers hinges on the subscription, site license or pay-per-view (S/SL/PPV) model.

From this expose, it is clear that academic libraries play a key role in the `market of distribution' for learned inquiry (Parks 2002:323). The traditional print journal model gave libraries ownership to subscribed journals whereas the electronic model takes away the ownership since they cannot retain journal copies at the expiration of the subscription period. Academic libraries are increasingly concerned with licensing and copyright issues pertaining to access to the print and electronic resources for which they would have paid a subscription. Hence, the shift to focus on working with the open access advocates.

It is interesting to note that academic libraries are playing a significant role in exploring new options for scholarly publishing. According to Mabe (2006:61,) citing Sumsion and Fossey (1992), Creaser, Maynard and White (2005) and Mabe (2003), support for academic libraries from their institutions has been decreasing with university spending on the libraries since 1980, having dropped from 4% to under 3% of average institutional spending, while concurrently, the size of the literature has more than doubled at an annual growth rate of 3% for articles and 3.5% for journal titles. The traditional one subscription to one printed journal sales model of journals has been transformed by the advent of online journals to consortia deals involving electronic licensing agreements on site-wide access or country-wide access to the publisher's online collection. The consortia deals have the advantage of ensuring consistent, reliable holdings and fixed price increases at particular levels for a period of time. The benefit for publishers is stabilization of sales from a particular institution. End users stand to benefit more from these deals as more materials are availed to them and access is continuously improving with digitization of back lists (Mabe 2006:61).

In as much as consortia purchase assists libraries to increase access to a wider scope of journals, it does not entirely solve their challenge of sustaining funding to pay spiraling costs of information resources. The university faculty and their graduate students engage in research that results in the creation of new knowledge. In addition to the new modes of information dissemination mentioned earlier, the digital space enables posting of papers to electronic repositories before and after peer review. The repositories are largely manned by the university library, hence the heavy involvement of librarians in the new publishing mode. Librarians are now engaged in educating academics on

the economics of publishing and help them appreciate changes occurring in the scholarly communication culture (Phillips 2010:3-4).

In digital scholarship (see Figure 3.3), at the teaching phase new forms of open education resources (OER) and open electronic textbooks are made available online either as whole courses or individual images. The educational resources can be easily updated, adapted or remixed. Access to academic resources has also been broadened in that the resources produced by lecturers, such as lectures and talks published online can be accessed by anyone with internet access, thereby widening the audience and readership for academics.

3.2.2 History of scholarly publishing

Scholars have traditionally used journals as the principal channel of communicating their research findings to a wide audience. The first journal for scholarly publishing, *Philosophical Transactions*, licensed by the Royal Society, was created in the mid-17th century by Henry Oldenburg in 1665, as the first joint secretary of the newly founded Royal Society of London. The journal was created to solve challenges that were being faced by early scientists who desired to register authorship precedence, that is, the first authors of a phenomenon or result wanted their priority as discoverer to be publicly acknowledged and secured before they were prepared to share their results with their colleagues (Mabe 2006:56). Oldenburg realized that a journal publication run by a sovereign third party could resolve this predicament for the founding scientists by "faithfully recording the name of a discoverer and the date he submitted his paper, as well as his description of his discovery" (Mabe 2006:56). According to the Royal Society of London (1665) cited in Mabe (2006), not all materials received were published in the *Philosophical Transactions.* The Council of the Royal Society reviewed the articles sent to Oldenburg before approving a few of them for publication. This marked the beginning of 'peer review' (to be discussed later in the section).

For generations, scholars have used scholarly publishing to further interests toward interconnecting the creation and development of new knowledge, promotion and publicity announcements of ownership of research output, justification for funding and as proof of existence of scholar or department/research unit (Ocholla 2011:1). In support of this notion, Ondari-Okemwa (2007) asserts that traditionally, scholarly publishing has been meant for communicating research results, but has since also included the dissemination of knowledge to enable scholars to keep

abreast of the latest developments in their disciplines. Trotter et al. (2014:63) identifs three traditional characteristic features of scholarly communication as:

i.   It is primarily disseminated through journal articles, books and book chapters,

ii. Publication is by third party commercial publishers who charge subscription fees (for institutions) or purchase costs (for individuals) to access their publications, and

iii. Often assessed according to a work's impact factor, the metric purporting to measure a work's prestige and "importance" based on the average citation rate the publishing journal's articles collectively achieved during a two-year period.

Scholarly publishing serves three purposes, that is, publicity, access and trustworthiness (Drott 2006; Kennan and Cecez-Kecmanovic 2007).

Publicity involves creating awareness of the work in the audience through indexing and abstracting, advertising, subscriptions and citation (Kennan and Cecez-Kecmanovic 2007). The intended readership of the publication have to be made aware of its existence and availability through the discipline or subject indices and abstracts, such as, the Social Science Citation Index and Psychology Abstracts. Citation of a book or article by colleagues in their works also helps to publicise it to potential readers.

Accessibility is how the intended audience or readers can access the work, either electronically or print copies, open access, subscription or pay per view. The readership are keen to know how they can access the publication, therefore, the necessary bibliographic data that can be used to identify the book or article have to be availed. The publication's metadata, such as, the author, author institutional affiliation (in case it is available in a repository) book or journal title, have to be availed to facilitate access and retrieval by scholars. It is this accessibility that is of concern in this study, particularly in this day and age where most scholarly publications (books and journal articles) are available in electronic format rendering them inaccessible if either the library does not subscribe to the journal or the subscription has expired. Electronic subscriptions cannot be archived compared to print subscriptions and purchases. Access is at the centre of scholarly communication; scholars depend on it for research, teaching and keeping track of their areas of specialty (Kennan and Cecez-Kecmanovic 2007).

Trustworthiness refers to the level of trust that can be put in a work. It is aligned with quality and emanates from the knowledge that an article has been peer-reviewed. The peer review process assures the readership that the publication has been scrutinized by experts, therefore, it is authoritative (Drott 2006; Kennan and Cecez-Kecmanovic 2007). The reputation of the journal or publisher also contributes to the trustworthiness of the publication. Some publishers, commercial or professional associations are associated with publications of high quality while others hold a questionable standing. Institutional repositories seek to further this agenda which has been largely dominated by commercial publishers at high cost to the consumers, but a question remains to be answered. Are they a trustworthy medium for scholarly communication? Kennan and Cecez-Kecmanovic (2007:3) opine that OA is seen "to undermine the peer-review process and ultimately quality" and this impacts on the adoption of OA IRs.

The functions of the scholarly communication process include; registration, certification, awareness/dissemination and archiving (Roosendaal and Geurts 1997; Ware and Mabe 2012:14).

i. Registration is concerned with identification of the person responsible for the intellectual property. Stamping of ownership (by way of copyright and author identification) and precedence are key to the process;

ii. Certification involves establishing the quality of the research through peer review and rewarding authors;

iii. Awareness/dissemination - availing the research findings to the target audience through the unique journal title; and

iv. Archiving - preservation for posterity and making the results available for future reference and citation. Publishers and libraries have created electronic warehouses or archives from which they allow distribution of the material.

On the publication of the first journal in the 17th century:

> By organizing the editorial office by appointing Mr Henry Oldenburg as the
> journal's editor and by having the submitted articles reviewed by members
> of the Council of the Society, it was the Royal Society that took charge of
> the registration and certification functions, whereas the journal developed
> itself quickly as the archive per se (Roosendaal and Geurts 1997).

Therefore, scholarly communication underscores the issues of trustworthiness (which is achieved through certification), publicity (through awareness and dissemination) and accessibility (through archives of publishers and libraries). Ondari-Okemwa (2007) opines that scholarly publishing in the twenty–first century is expected to serve the purpose of disseminating knowledge in addition to the traditional purposes of communicating results of research and enabling scholars to keep abreast of latest developments in their disciplines or sub–disciplines. Therefore, the overall purpose of scholarly publishing is to promote and support scholarship, research, and academic or learning activities (Ocholla 2011:2).

The publishing landscape has transformed from being exclusively a print environment to include electronic publishing. Though the concept of electronic publishing is not new, electronic scholarly publishing is, and scholars are still grappling to embrace it for disseminating and increasing visibility of their research output (Ocholla 2011:1). The term 'e-scholarship' is commonly used with regard to digital repository services, and also to describe services associated with digital activities in higher education (Coleman 2008:166). E-scholarship is "an academic or research activity or work undertaken or fulfilled by a scholar using an electronic medium to enhance teaching, learning and research" (Ocholla 2011:2). The media include, video articles, posting of pre-print or post-print papers to e-repositories, posting commentaries on blogs (social networks) and websites. Social networks generate strings of ideas which the scholars can integrate into their papers, as well as use the ideas as supplementary material enhancing initial publications (Phillips 2010:3). The new modes speed up communication unlike the twentieth century system which was characterized by delays in distribution of publications. The time from submission to publication frustrated authors a lot and they could not keep pace with new developments in their disciplines (Cullen and Chawner 2011:460).

The changing communication technologies and ways of information dissemination, such as, OA publishing systems (which include institutional repositories) have apparently, transformed scholarly publishing to e-scholarship. Phillips (2010:1) advances that:

> Today's academic publishing environment is a complex amalgam of technological capability, economic realities, and emerging social networking practices pushing the boundaries of the traditional scholarly publishing culture. Technology enables innovative scholarship and offers

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new options to access research results. The economy compels universities to scrutinize business models and evaluate return on investment.

The traditional communication system did not encourage sharing of research processes within or outside the research community. It had a demarcated target audience for its content and communities outside the university could not access the content easily since they did not have access to the university libraries (Czerniewicz 2013:3). The affordances of the digital landscape have, however, transformed all this by enabling new practices which now allow the once excluded communities to gain access to the content once meant for the privileged few.

3.2.3 What motivates scholars to publish?

Several explanations have been advanced for the need by academics to publish (Starr-Glass 2014:69-70; Ocholla 2011:2; Mabe 2006:59; Stilwell 2006:7). Starr-Glass highlights that personal (internal forces) and institutional factors (external forces) prompt scholars to want to publish. The interplay between the internal and external forces ultimately shapes and expresses the scholars' publication efforts. Åkerlind (2008:18-28) cited in Starr-Glass (2014:70) suggested four ways in which individuals, research, and publication are connected:

  i.   faculty regards research as an academic requirement, as an academic duty, and publishing should focus on the concrete results of research:

  ii.   faculty appreciates that research helps to establish the scholar in his or her field of expertise, it is a matter of personal achievement, and publishing increases academic standing;

  iii. faculty considers that research is a way of developing personally and intellectually, it is a route to self-understanding, and publishing generates feedback for the self-improvement process; and

  iv.   faculty believe that research can precipitate organizational and societal change, it provides an impetus for benefitting the community at large, and publishing disseminates new conceptualizations and encourages change.

In addition to the above, Murray (2005) and Ocholla (2004) cited in Stilwell (2006:7) refer to the South African research publication incentive system whereby the South African government funds universities for articles published by their researchers in accredited journals or peer-reviewed conference proceedings, or publication of books. The subsidy is awarded if the publication appears on one of its accreditation lists for journal articles. Conference proceedings, books and book

chapters have to be approved for subsidy by the relevant adjudication committee (Tongai 2013). The subsidy figure between 2010 and 2013 was around R120 000 (figure fluctuates) per full publication with multiple authorship, resulting in the subsidy being shared. Institutions have the prerogative to decide how the incentive funds are spent and this varies by institution. Some institutions commit the money to general research funding, while others give a certain percentage to the faculty. The faculty further divides the funds between the faculty and the researcher. "Depending on the institution, the researcher may pocket some or all of this money, or it is placed in an account for use for further research" (Tongai 2013). This is enough incentive for scholars, in the country, to want to publish because they are rewarded for their efforts. Murray (2005) cited in Stilwell (2006:7) summarises the motivating factors for publishing, particularly in academic journals, as follows:

i.   Career progression - moving up to the next level on the ladder;
ii.   Gaining recognition for work one has done;
iii.   Stopping someone else taking credit for one's work or using one's materials;
iv.   Helping one's students to gain recognition for their work;
v.   Contributing to knowledge;
vi.   Learning how to write to a higher standard; and
vii.   Developing a profile or research niche.

Therefore, publication in journals by scholars affirms their priority, establishes proprietorship of an idea, provides recognition for better authors and assists them to build a reputation (Mabe 2006:59). Proprietorship is established by the date-stamping mechanism in which a journal registers the paper as having been received and accepted at a particular date. Calvert and Gorman (2002) cited in Ocholla (2011:2) concur with Mabe (2006) by saying that publication of an article establishes precedents in the creation of new knowledge, and in addition, puts new information in the discipline where it can be examined, critiqued and either accepted or rejected. It may then contribute to additional dialogue, thereby putting the author's name in the limelight in academic circles. Mabe (2006:59) proffers that a multitude of links contribute to the achievement of a journal's reputation. These include: the relationship between the journal's name and the authors generally appearing there; the quality and uniqueness of the published articles, and the peer review process. As an author publishes in more and better journals she/he in turn is considered as the best

author. That is, the author becomes associated with known high-quality journals resulting in his/her own name becoming high-quality brand in his/her own right. Scholars also write to disseminate new research findings or ideas coupled with the desire to be publicly credited for their works and having a permanent record of the works. Therefore, it suffices to conclude that both intrinsic and extrinsic drivers cause scholars to publish their research results.

Publishing also contributes to the establishment of scholarly networks. Networking is "a method for giving the individual a competitive advantage among professionals who are otherwise equal in education, competence and experience" (Zeldin 2005:1 cited in Stilwell 2006:7).

> The author also makes personal gains by adding to a list of publications that can be used for tenure and promotion, for gaining professional acceptance that may lead to speaking engagement, consultancy work, perhaps even awards (Calvert and Gorman 2002 cited in Ocholla 2011:2).

Ocholla (2011:2) advances more reasons for publishing to include:
   i.   to justify funding for an individual, department or institution;
   ii.   'publish or perish';
   iii.   other forms of reward, gratification, or boosting one's ego through recognition/visibility;
   iv.   knowledge sharing;
   v.   announcement of propriety or ownership; and
   vi.   education and training.

In concurrence with Ocholla (2011), Mabe (2006:59) says a researcher's publication record can be one criterion by which to assess whether they should receive future funding, eligibility for tenure, promotion and evaluation of the researcher's university department (whose reviews can affect the future existence and funding of the departments). Evaluation of publications is often based on citations to the articles, the number of articles published and the journals' reputation. This pressure on scholars with regards to funding and career progression is what is known as 'publish or perish' and this syndrome amplifies the many pre-existing reasons for authors' desire to publish. According to Parks (2002:326) quality readership is also a driving force for the scholar to publish. "The `quality' readers are ones who can, in a direct or indirect way, provide benefits"

(Parks 2002:326). Other benefits of publishing which translate to promotion and tenure include; citations, inclusion on reading lists at institutions, invitations to speak and so forth.

The above stated reasons are indicators that scholars engage in publishing when they are intrinsically and/or extrinsically motivated to do so. Trotter et al. (2014:96) advise that when analysing scholarly research values, it is useful to evaluate the extent to which they lean on intrinsic and extrinsic motivations. Intrinsic motivation relates to the desire by the scholar to avail their research findings to colleagues and stakeholders - they originate from within the individual. The scholar's response to the internal drive is viewed as an act of congruence since the behaviour aligns with the personal values and desires of the individual. Extrinsic motivation relates to recognition for the scholar and the institution, publicity, trustworthiness and academic reward (Cullen and Chawner 2011:462) - the motivations originate from the university management.

According to Trotter et al. (2014:97) the motivations are values of the university administration in the form of policies (institutional mandates) and contracts (job descriptions). The scholars' responses to the managerial incentives are viewed as acts of compliance devoid of personal buy-in. Trotter et al. (2014) propound that in-between the intrinsic and extrinsic motivation continuum is a space where the two meet where external collegial and social demands build internal personal desires. This is because the individual identifies with members of the social group who are central to the value. The scholar's response to motivations from such connections is viewed as an act of conformity. This correlates with the construct of social factors and performance expectancy as determinants of users' behavioural intentions to use new technologies; a factor which is important to this study.

3.2.4 Peer review in scholarly publishing

As mentioned earlier, one of the purposes of scholarly publishing is trustworthiness of a work emanating from the knowledge that the work has been peer-reviewed. This factor is particularly important for this study in determining trustworthiness of OA institutional repositories as publishing platforms in academia. The history of peer review spans decades to the early days of scholarly communication and forms the basis for academic publication and is a necessary step in the scrutiny of any scholarly work. Peer review is defined as "the attentive, unbiased assessment of any scholarly work that is submitted for formal scrutiny" (Ruiz, Candler and Teasdale 2007:503) with the reviewer making comments to the journal editor and/or author's attention (Ocholla

2003:3). It is used as a measuring instrument for quality, reliability and credibility of the scholarly output. Peer review is built on the premise that research output (articles, monographs, research reports, patents, and so on) would earn more credibility, be more accepted, contribute more towards a society or discipline, command more respect and be more reliable if experts in the discipline (peers) vet its quality by scrutinising, screening and evaluating its content and format (Ocholla 2011:3).

Peer review is done by renowned scholars or qualified adjudicators (unbiased peers) in a discipline or subject domain who thoughtfully scrutinise a manuscript enabling authors to transform scholarly work into scholarship. Through the peer review grants are allocated, papers are published, academics are promoted, and Nobel prizes are won (Smith 2006:178). According to Smith (2006:178), it is concerned with scrutiny of "a grant application or a paper by a third party — who is neither the author nor the person making a judgement on whether a grant should be given or a paper published." The reviewer checks the manuscript for originality, significance and contribution to knowledge, and theoretical soundness before it is recommended for publication. Increased concern for peer review amongst academics is evident in this age of the open access initiative and institutional repositories.

Ruiz, Candler and Teasdale (2007:503) expound that peer review fulfils the quality-control requirement of scholarship and ensures that published materials meet set standards. Smith (2006:179) gives the following reasons for peer review:

i. It is a method to select the best grant applications for funding and the best papers to publish in a journal.
ii. To improve the quality of papers published or research proposals that are funded.
iii. It is useful for detecting errors or fraud.

Therefore, scholarly publishing underscores the crucial role of "peer review in the maintenance of the global system of knowledge production, accumulation and use" (Pouris 2006 cited in Ocholla 2011:3).

However, we cannot turn a blind eye to the downside of the peer review process. The process is poor at detecting gross defects and almost useless for detecting fraud, it is slow, expensive, wastes

academic time, highly subjective, it's like a lottery, prone to bias, and easily abused (Smith 2006:179). Smith (2006) expounds the allegations as follows:

i. Errors and fraud - Some papers are sent to reviewers with gross errors but in some instances reviewers spot very few errors or fail to see them at all. Smith (2006) is of the view that fraud is picked up by chance, therefore, peer review in general cannot be relied on for detecting fraud because it works on trust.

ii. Slow and expensive – A number of journals take a year or more to publish a paper. In one OA model authors pay for peer review and the cost of posting their article on a website — which is currently between $500 to $2500 per article.

iii. Inconsistent – the process is subjective and inconsistent. Inconsistency can make peer review seem like a lottery.

iv. Bias – Peters and Ceci (1982) cited in Smith (2006:180), in their study established that acceptance of journal articles by journals showed evidence of bias against authors from less prestigious institutions.

v. Abuse of peer review – One can steal ideas and present them as their own, slow down or block the publication of a competitor's ideas by producing an unjustly harsh review.

From this discussion it is clear that peer review is central to scholarly publishing. It puts a stamp to the quality, reliability and credibility of the research publication which scholars would want to be associated with. Scholars are wary of what the significant others (peers) say about their work. Therefore, the social influence construct in the UTAUT model plays a significant role in the behaviours of scholars as they make decisions as to which platform to publish their work on.

3.3 Scholarly publishing landscape in Africa

This study's focus is on Zimbabwe which is an African country, therefore, it is necessary to get an overview of scholarly publishing on the continent. Africa does not have a long history of scholarly publishing and journals despite being accredited with the founding of the first university in the world. The first and oldest degree-awarding university was founded in CE 859 (University of Al-Karaouine) at Fez in Morocco, followed by Al-Azhar University in Egypt - founded in 970

(Adams, King and Hook 2010). The Association of African Universities (AAU) has a membership of 225 institutions in 44 countries. In sub–Saharan Africa (SSA), scholarly publishing dates to the second half of the twentieth century. However, scholarly publishing in Africa still lags behind in the global sphere, which paints a gloomy picture on the development of Africa's economies in the absence of research output. Researchers in developing countries face challenges:

> getting their research results published in "international" journals, because their work is either considered to be only of local or regional interest or does not meet the quality standards required by the major commercial indexes (Chan, Kirsop and Arunachalam 2011:1).

Research output from the African continent is not sufficiently visible on the international arena. Visibility in this case refers to digital accessibility. "It means that a scholarly object is profiled in such a way that makes it easily findable by search engines or databases through a relevant search string" Trotter et al. (2014:1). In this study,

> Visibility means that research on subjects and themes of local interest should be made public in ways that will enable the relevant actors (researchers, students and …[research fellows] to easily identify local research that can be a valuable contribution to society, whether for future knowledge production or for development practice (Abrahams, Burke and Mouton 2010:23).

Visibility of research output is conceptualised in a bibliometric pattern as international visibility, considering the number of publications in the Thomson Reuters Web of Science (WoS) (formerly Thomson-ISI) and Medline databases. Currently, the WoS indexes articles in over 10, 000 journals globally. The WoS is viewed by most scholars as the measuring rod for international visibility even though it marginalises journals from developing countries:

> This structural inequality has resulted in a citation and reputation divide in the developing world, with a sub-community of authors who publish almost exclusively in ''international'' journals indexed in the Thomson Reuters (formerly ISI) Web of Knowledge, while others are oriented towards research and publication in ''local'' journals on topics of interest to ''local'' audience (Chan, Kirsop and Arunachalam 2011:2).
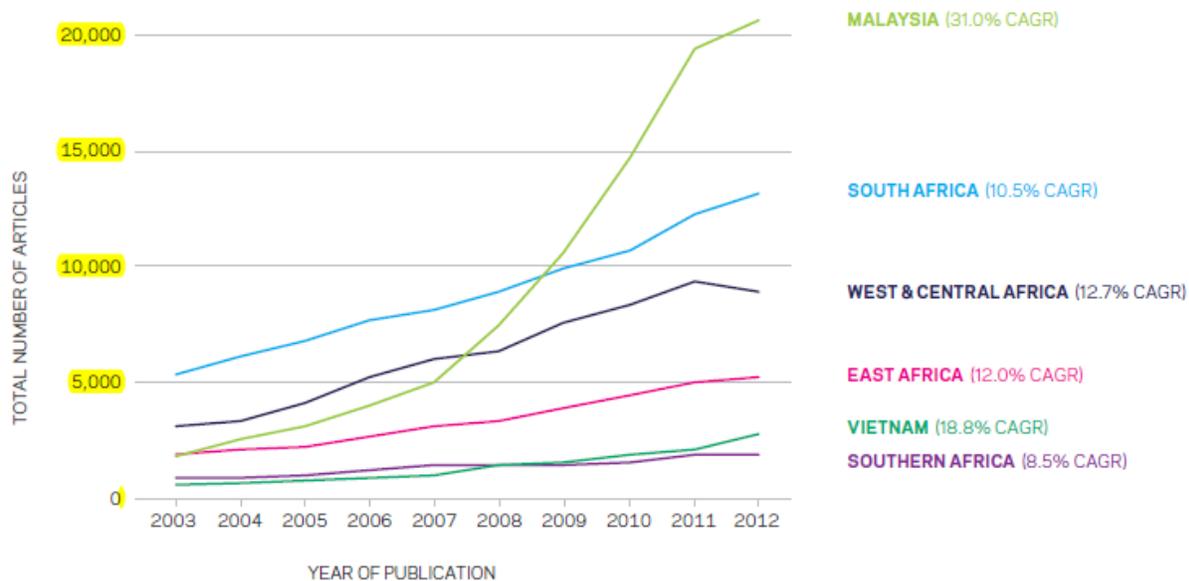
Figure 3.2: Overall number of articles for Sub-Saharan Africa and comparator countries
       2003-2012

Source: Scopus (1996-2013) cited in World Bank and Elsevier (2014:15).

However, in the last two decades, Africa has shown a positive increase in scientific research (with ties to the international community) being conducted by local African scientists.

> From 1996 to 2012, the number of research papers published in scientific journals with at least one African author more than quadrupled (from about 12,500 to over 52,000). During the same time the share of the world's articles with African authors almost doubled from 1.2% to around 2.3% (Schemm 2013:11).

The Global Research Report puts Africa's research output between 1999 and 2008 at over 27,000 papers per year (Adams, King and Hook 2010). The North region with six countries, accounted for the highest number of papers (more than 10,500 in 2008). The Central region, with 30 countries, produced roughly 7,100 papers per year, whilst the South region (SADC), with 14 countries, accounted for more than 10,000 papers. Three countries dominate the region in their research output; Egypt in the North with over 30,000 papers, Nigeria in the middle with over 10,000 and South Africa in the South outstandingly leading with over 47,000 papers. Trotter et al. (2014:37) attribute South Africa's success and supremacy in regional research production to it being regarded as a centre of academic excellence which attracts many students from countries across the region.

Doctor of Philosophy (PhD) qualifications tremendously contribute to research output. Because South Africa attracts many postgraduates, out of the 1,546 doctorates produced in the region in 2010, the country accounted for 89%, while 125 were produced by the other countries in the region (Kotecha, Walwyn and Pinto 2011:12 cited in Trotter et al. 2014:40).

The World Bank/Elsevier report on *Development of Sub-Saharan African (SSA) science, technology, engineering and mathematics research* (2014:10-11) states that three sub-regions within sub-Saharan Africa more than doubled their total yearly research output between 2003 and 2012. The sub-regions include; West and Central Africa, East Africa, and Southern Africa (excluding South Africa). South Africa was excluded from the Southern African countries due to fundamental differences between them in the state of research infrastructure, the levels of research output, and the quality of research performance. The report compares the research performance of these sub-regions to that of South Africa, Malaysia and Vietnam:

> Southern Africa[n] researchers produced 928 articles in 2003 and 1940 in 2012. West & Central Africa researchers produced 3,069 articles in 2003 and 8,978 in 2012. The compound annual growth rates (CAGRs) for research output exceeded 10% for both East and West & Central Africa (Southern Africa still grew at a respectable 8.5% annually) (World Bank/Elsevier report 2014:15).

As the sub-regions' research output grew, so did that of the comparator countries, at a much faster rate over the same period. According to the World Bank/Elsevier report (2014), in 2003, Malaysia's output was similar to that of East Africa, but its output grew by 31% per year. On the other hand, Vietnam's output in 2003 was two thirds more than Southern Africa; it grew its output by 18.8% per year.

Figure 3.3: World publication shares for Sub-Saharan Africa and comparator countries 2003-2012

Source: Scopus (1996-2013) cited in World Bank/Elsevier report (2014:16).

Collectively, Sub-Saharan Africa's share of global research increased from 0.44% to 0.72% (see Figure 3.3) which is less than 1% of the world's research output. According to the report Sub-Saharan Africa's research output is a far cry from its share of global population (12%) even though its growth rate for 2003-2012 outpaced that of the world's overall growth. Adams, King and Hooks (2010) conclude that Africa's research performance is much lower than expected if the potential contribution of researchers in the continent is to be realized for the benefit of its populations.

Rotich (2011:131) postulates that most publications (from Africa) captured by the citation indexes are likely to be the visible ones and may not include all the publications in the countries represented. This is supported by Trotter et al. (2014:8) who express that much of Africa's scholarly outputs are not published in the Web of Sciences (WoS) listed journals, but are scattered in a plethora of other outlets. As a result, they miss the opportunity of being measured in the prestige-based indices which reduce visibility of African research output. These statistics give the impression that Africa lacks innovativeness. Chan, Kirsop and Arunachalam (2011:1) lament that:

> This inequity has led to the misguided notion that little, if any, research of substance is generated in the global South, and that the needs of researchers in poor countries are therefore met solely by information donation from the North.

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A study by Abrahams, Burke and Mouton (2010) on *Research productivity, visibility, accessibility and scholarly communication in Southern African universities*, established that in Southern Africa the volume of scholarly research and publishing is very low, and what is published is slightly visible, in comparison with the high visibility of northern authors and journals. This state of affairs is attributed to behaviours of scholars who do not share their research output, exacerbated by the failure of the journals to regularly publish or remain in existence, culminating in loss of confidence and trust in them (Abrahams et al. 2008:8). Only South Africa has a reasonably tractable degree of visibility (Abrahams et al. 2010:24). Trotter et al. (2014:1) postulate that one of the ingredients missing in Africa's institutions of higher learning and scholars approach to dissemination of research is a communication strategy. Abrahams et al. (2008:9) carried out a qualitative study entitled *Open access to knowledge in Southern African universities* involving eight universities in the SADC region. They proposed a new framework based on open information strategies to production of knowledge, publishing and dissemination in response to challenges to scholarly communication. They also proposed that, integral to the framework, should be adoption of a "Vision for Open Knowledge in Southern African Universities and the establishment of a research publishing and dissemination platform" (Abrahams et al. 2008:9). Therefore, this study explores the acceptance and use of institutional repositories in Zimbabwean universities as a conduit for disseminating the country's research output with a view to increasing its visibility on the continent and globally.

The electronic Information for Libraries (eIFL.net) and International Network for the Availability of Scientific Publication (INASP) have made efforts towards building electronic networks amongst libraries in Africa to promote the flow of university research information across the region. eIFL.net established the first institutional repository at the University of Zimbabwe in 2005. INASP has also made milestones in building the "capacity to create, manage and communicate scholarly information and knowledge through national, regional and international networks" (Abrahams, Burke and Mouton 2010:25). It was through INASP that the African Journals Online (AJOL) database was initiated in May 1998, to help the African universities and research institutes increase their online visibility, access and use of Africa's research output and enable exchange of knowledge amongst African scholars. AJOL is the largest online collection of over 400 African-published, peer-reviewed scholarly journals from 30 African countries as of February 2015. It aims to promote awareness and use of African published journals so that output of African origin is

available to Africans and to the rest of the world culminating in the translation of African learning to African development. Scholars and researchers in the continent have experienced difficulties accessing African published research papers due to poor organisation, lack of indexing and electronic unavailability (Abrahams et al. 2008:8). As a result, the papers have been under-valued, under-utilised and under-cited in the global and African research arenas. The internet presents a platform for change "but many hundreds of worthy, peer-reviewed scholarly journals published from Africa cannot host their content online in isolation because of resource limitations and the digital divide" (AJOL 2015: Why is AJOL needed? paragraph 2).

AJOL has a total of 417 journals from Africa distributed as follows: West Africa has 212 (53.5%); East Africa has 69 (17.4%); North Africa has 18 (4.5%); Central Africa has three (0.8%); and Southern Africa has 93 (23.5%) (Rotich 2011:135). The root cause of this gloomy picture of low research output from the Sub-Saharan region, and the African continent at large, needs to be explored. According to Trotter et al. (2014:1), three primary reasons account for the elusiveness of African scholarly research:

   i.   While research production on the continent is growing in absolute terms, it is falling in comparative terms (especially as other Southern countries such as China ramp up research production), reducing its relative visibility.

  ii.   Traditional metrics of visibility (especially the ISI/WoS Impact Factor) which measure only formal scholar-to-scholar outputs (journal articles and books) fail to make legible a vast amount of African scholarly production, thus underestimating the amount of research activity on the continent.

 iii.   Many African universities do not take a strategic approach to scholarly communication, nor utilise appropriate information and communications technologies (ICTs) and Web 2.0 technologies to broaden the reach of their scholars' work or curate it for future generations, thus inadvertently minimizing the impact and visibility of African research (Trotter et al. 2014:1).

Numerous other challenges impeding the growth of scholarly publication in Sub-Saharan Africa, have been put forward by Ondari-Okemwa (2007). He contends that most of the impediments are

socio-economic, technological and political. Most universities and research institutes in the region are financially incapacitated; as a result, their research facilities are out-dated and inadequate. The books held by these libraries are outdated and cannot help the scholars make any meaningful progress in scholarly scientific research. The academic libraries continue to face budgetary cuts, which has a ripple effect on their purchasing power, resulting in most of them cancelling journal subscriptions:

> The sheer lack of scholarly journals and books as well as nominally equipped science laboratories and a lack of access to the internet makes it hard for the researchers to make scientific and scholarly progress by building on the contributions of others (Ondari-Okemwa 2007).

Most of the institutions of higher education in Sub-Saharan Africa find it difficult to maintain internet connectivity either due to incessant power cuts or incapacity to maintain connectivity; Zimbabwe is currently experiencing long hours of load shedding and is reeling under crippling financial challenges as of 2015. Ondari-Okemwa also cites lack of incentives as a challenge to scholarly growth in the region. Research funding is almost non-existent; increased student enrolment while faculty remuneration remains stagnant; poor facilitation of sabbatical leave which gives the scholars an opportunity to interact with scholars from other regions and conduct research; and non-participation in conferences and workshops. Due to financial constraints, most institutions cannot afford to sponsor their scholars to attend conferences and the scholars cannot afford to fund themselves. In the UTAUT model, facilitating conditions are central to prediction of behavioural intentions of acceptance and use of new technologies by the users. Therefore, the institutions of higher learning in Africa have a mammoth task of promoting increased visibility of research output by their scholars and researchers for the benefit of the economies of Africa.

Ondari-Okemwa (2007) contends that:

> The twenty–first century is also expected to present numerous opportunities to the scholarly publishing fraternity in the sub–Saharan Africa region. Information and communication technologies are poised to make digital access to scholarly resources more easily accessible. Digital publishing, preservation of information and fast access to scholarly resources are all being made possible by new developments in information and communication technologies.

Therefore, employing open access principles to communicate Africa's research will contribute to its visibility, reach and effectiveness:

> Making all African research outputs clearly profiled, curated and made freely available to the public would give African research a higher likelihood of not only shaping academic discourse because it would be more visible to scholars, but of getting into the hands of government, industry and civil society personnel who can leverage it for development (Trotter et al. 2014:1).

Therefore, open access publishing "is an opportunity to re-think not only the equal distribution of all research knowledge, but to reconsider the way in which knowledge is valued and measured" (Chan, Kirsop and Arunachalam 2010:3).

3.4 The 'serials crisis' cripples scholarly publishing

The 'serials crisis' has contributed tremendously to stakeholders in the scholarly communication system reconsidering cheaper ways of disseminating research output, which saw the emergence of the open access movement. The term 'serials crisis' refers to "runaway cost increases of many scholarly journals" (Panitch and Michalak 2005:1), which are beyond the journals budgetary limits of academic libraries worldwide. Parks (2002:318) refers to the serials crisis as "the budgetary pressure on libraries due to increased costs for maintaining a journal collection." The increased costs emanate from price increases of existing journals, new titles coming onto the market, and additional costs of electronic versions of traditionally printed journals. Moore-Jansen, Williams and Dadashzadeh (2001:49) opine that the source of the serials crisis is largely attributed to the ratio of university budgets committed to library resources and the portion and research grants, if any, accorded to library research support.

The crisis has existed for decades since the 1960s and is historically rooted in the institutionalisation of the `publish or perish' regime initially in American universities and later on others followed suit. Universities placed demands on faculty to research and publish as conditions for tenure and promotion. As a result, there was an increased demand for publication outlets, hence scholarly societies and commercial publishers were compelled to introduce new journal titles on the market. This contributed to the proliferation of journal publications in the English language

accompanied by an increase in prices which libraries cannot keep pace with in the face of their dwindling budget allocations (Plasmeijer 2002:341); as a result, many academic libraries have been hugely affected by the journal cancellation decisions they are forced to make.

The increasing number of journal output and the ever rising costs of journal subscriptions have left institutions (libraries) overwhelmed and unable to provide access to all or even most of them. In support of this assertion, Phillips (2010:1) reiterates that "subscriptions to expensive commercial publications are unsustainable, and resources devoted to costly journals reduce available funding to purchase monographs." Attempts by libraries to reallocate funds from monograph budgets have not been successful in offsetting the skyrocketing increases in prices of scholarly journal subscriptions (McGuigan 2004:17). Therefore, "academic libraries continue to depend on serials cancellation projects as a short-term, albeit necessary, response to containing serials costs" (Moore-Jansen, Williams and Dadashzadeh 2001:49). The library journal subscription lists continue to shrink as they try to maintain the indispensable journal service to the academic communities. Cancellations of journals has a negative impact on the scholars, students and community users of the university libraries depriving them of invaluable research resources.

Significant journal price increases have been experienced particularly in the science, technology and medicine (STM) disciplines and those in law, economics and business, and these have always been high compared to other disciplines. Earlier Mobley (1998) provided a detailed picture of the average journal price increases over 35 years.

> In 1963, the average price of chemistry and physics journals was $16.07; engineering, $6.69; mathematics, botany, geology, and general sciences, $9.58; and zoology, $9.51 while the average price across all disciplines of titles in the U.S. Periodical Index was $6.31. In 1968, the average price of chemistry and physics journals was $24.26; engineering, $10.02; mathematics, botany, geology, and general sciences, $15.42; and zoology, $13.49 while the average price of all titles was $8.65. Thirteen years later in 1981, the average price for chemistry and physics journals was $156.30; engineering, $54.55; mathematics, botany, geology, and general sciences, $75.62; and zoology, $48.32 while the average price for all disciplines was $39.13. By 1996, another 15 years later, prices for the same sci-tech disciplines above had ballooned to $867.00; $247.72; $342.07; and $299.84 respectively, while the average price for all disciplines had reached $165.61 (Mobley 1998: historical perspective).

Annual statistics compiled by the Association of Research Libraries (ARL) showed that between 1986 and 2003 the price per subscription of serials rose by 215% yet the Consumer Price Index (CPI) rose by only 68% in the same period (Panitch and Michalak 2005:1). Library budgets are continuously facing cuts, further crippling their ability to provide access. The discrepancies in journal pricing by discipline impact negatively on the cheaper journals, particularly in the humanities and social sciences as they can be sidelined since libraries will try to find ways of supporting the costly core STM journals upon which scientific research relies:

> Exacerbating the crisis are conditions imposed by many publishers that restrict access. Because most electronic resources are leased, rather than purchased outright, libraries experience consequences beyond rising subscription costs. License terms that limit the number of users for electronic resources, disallow off-campus use by university affiliates, or restrict the sharing of resources by interlibrary loan are common and mean that the University does not always get the full value of what it pays for (Panitch and Michalak 2005:4).

It is also worthwhile noting that in this electronic era, publishers are bundling several journal titles into inseparable "Big Deal" packages. Libraries are, therefore, forced to pay for journals which may be irrelevant to their user needs. This fosters the need to understand the underlying causes of such substantial price increases over the years given that professional and learned societies are largely in control of most of the historically prestigious journals in these disciplines. Mobley (1998) pondered how prices could rise so dramatically and how the societies could have contributed to the serials crisis over the years. McGuigan (2004:14) opines that these constant and striking journal price increases, which seem to threaten the quality and future of collections of academic libraries can be attributed to the uniqueness of academic libraries, the scholarly publishing model and the profit-driven behavior of commercial publishers.

Panitch and Michalak (2005:2) proffer that scholars and researchers rely upon the availability of crucial journals in order to support their own research. The academic library has traditionally played a key of providing access to the requisite journals, thereby fulfilling the expectations of scholars and researchers. The scholars equally expect that the library budget will cover the subscription costs. Availability, accessibility and visibility of scholarly literature facilitates research activity by scholars in institutions of higher learning and research institutes. These facilitating conditions are essential to the development of scholarship as knowledge and

information are disseminated and shared with a wider audience/readership globally. Therefore, academic libraries, if they are to remain relevant, just have to maintain journal collections despite the crippling prices, a weakness which commercial publishers take advantage of.

Mobley (1998) contended that the serials crisis is not a library problem but a university problem and faculty have a major role in resolving it. Librarians do not publish in the journals, read, edit, use them in their research, nor do they sit on editorial boards of the journals. Rather, they play a facilitating role linking users to journals which meet their needs. Therefore, scholars play a significant role since they are both creators and consumers of the content. They willingly relinquish copyright ownership or accept limited rights to the articles they would have composed, "sit on editorial boards and either by commission or omission approve price increases or approve policies and/or operating agreements which lead to increases" (Mobley 1998). Plasmeijer (2002:342) further propounds that the mandatory transfer of copyrights ownership from the author to the journal publisher forms the basis of the publisher's market power. This puts the publisher in a monopolistic position since scientific articles cannot be substituted due to their uniqueness.

On the other hand, McGuigan (2004:18) opines that much of the debate on the serials crisis revolves around differential pricing of journals adopted by publishers, both commercial and not-for-profit scholarly societies, thus creating a two-tiered pricing system. There is discrimination by geography in which publishers charge higher or lower prices in the different markets. For example, a European publisher charges a higher price to the American market and lower prices to developing countries. Another model is discrimination by status of the consumer, that is, libraries/institutions are charged more than individual (member) subscribers despite the fact that the cost of production of the title is not covered by the member price but rather, library subscriptions subsidise production of member copies (Mobley 1998). The journal market has two types of buyers (institutions and individuals) but one group of consumers (the scholars) (Plasmeijer 2002:344). The differential pricing is justified by the idea that the library journal copy will be consulted by multiple users compared to the individual member's copy. Library users also have the privilege of photocopying articles from the journals at low cost.

Questions have been raised as to whether the root cause of the rising costs of scientific journals is monopolistic behaviour by commercial publishers (the suppliers of the information) or on the

demand side (those who pay for the expensive journals). Plasmeijer (2002:338) contends that the demand side institutions have contributed tremendously to the continuation of the serials crisis. This is despite the fact that arguments by both publishers and librarians often place the blame of the price increases on the supply side, particularly commercial publishers. Librarians argue that the mandatory copyright transfer by authors to publishers and the company mergers (market concentration) give publishers market power. "Market power is the power to enhance prices over costs" (Plasmeijer 2002:342). For example, Elsevier's merger policy and Taylor & Francis' acquisition of Carfax and Routledge were viewed with suspicion by librarians. The argument by publishers is that the escalation in the number of titles resulted in the decrease in circulation of quite a number of journals. Therefore, publishers could only recover costs and a normal return if they raised institutional subscription rates since the publishing industry is a declining cost industry. Plasmeijer (2002:342-343) dismisses the arguments of the librarians and publishers by arguing from an economist's point of view and places the blame solely on institutions.

> What could have happened in the serials market is, that the highest bidders have not changed their willingness to pay as a response to the increase in the number of titles, while the other bidders have diminished it (Plasmeijer 2002:343).

The monopolist's market power is largely dependent upon elasticity of demand, that is, addiction to a product by consumers increases the supplier's market power. Therefore, monopolist power could explain increases, but Plasmeijer (2002) opines that this does not explain the history of price increases over the years.

Jansen, Williams and Dadashzadeh (2001:55) recommend that any alternative solution to this problem must address the supply side of the equation. Parks (2002:317) proposes that a permanent solution to the 'serials crisis' calls for a complete overhaul of scholarly publishing, taking forward scholarly publishing into an era of freely available electronic journals whose costs are innate to academic life. Kennan and Cecez-Kecmanovic (2007) concede that even though economic conditions appear to be limiting access to the scholarly body, technological advancements are enabling access. Escalating prices of journals and scholarly materials and the dwindling budgets of libraries are disabling access while technological advancements, through open access, are enabling access. So, the open access movement has presented a welcome opportunity for

developing countries to access the once inaccessible research information as well as to showcase their national research in the international arena.

3.5 Open access (OA) publishing

The advent of OA publishing brought significant changes to the scholarly communication landscape. Open access is concerned with online free access to scholarly literature and is a means by which the scholarly community can increase the availability of research outputs by removing access costs to the readership. OA, is defined by the Budapest Open Access Initiative (BOAI) as:

> 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 (BOAI 2004:225-226).

Rizor and Holley (2014:322) and Boissy & Schatz (2011:479) posit that open access is when scientific and scholarly research literature is made freely available to all potential users immediately upon publication through open digital repositories or open access journals. OA operates around:

> the idea of open licences as alternative to all rights reserved restrictions, while retaining the rights of the knowledge creator to attribution and to decide whether and how his/her knowledge may be used for sharing or for commercial or non-commercial purposes…[it has] the intent of inviting scholars to use and build on each other's work (Abrahams et al. 2008:15).

Libraries across the globe, particularly those in developing countries including Zimbabwe, have been struggling to provide access to the much needed scholarly literature to influence the creation of new knowledge by their scholars due to journal price restrictions. Where they have managed to subscribe to electronic journals, they have been hamstrung by the licensing restrictions and software locks. Open access by its nature removes price barriers erected by subscription fees, pay per view and licensing fees and; permissions barriers imposed by most copyright and licensing restrictions (Suber 2004). The first element of OA as extracted from the BOAI definition given above, that is, it is free of charge, solves the price crisis; while the second property, that "the

copyright holder has consented in advance to unrestricted reading, downloading, copying, sharing, storing, printing, searching, linking, and crawling" (Suber 2003: thesis 1, paragraph 1), solves the permissions crisis. Suber (2004) suggests that copyright holders can manifest their consent to OA by using Creative Commons Licensing and other open content licenses, thus, removing legal barriers.

The struggles of researchers in the developing world, highlighted earlier, of having difficulties getting published in international journals and accessing them can be solved by OA. OA provides an opportunity for South-South exchange of research since their socioeconomic conditions are more or less similar. Therefore, their research findings are more relevant than research from the developed countries; thus making the research become an integral part of the global knowledge commons (Chan, Kirsop and Arunachalam 2011:1-2).

Therefore, Southern Africa should take advantage of this opportunity and move from its current state of "limited knowledge production to a strong body of Southern African research in 20 years" (Abrahams et al. 2008:15). There has been realisation of increased growth in the volume of scholarly publication and increased value of knowledge to society where OA has been used. According to Chan, Kirsop and Arunachalam (2011:2) the number of OA journals across Africa as well as awareness about institutional repositories (IRs) is growing due to the efforts of EIFL and the Electronic Publishing Trust for Development. The concept of OA, according to Pandita and Ramesha (2013:56), has shown increased acceptance by many countries and has become the order of the day. Currently 20% of the global scientific publications are freely available (Björk, Welling, Laakso, Majlender, Hedlund, and Guðnason, 2010 cited in Woutersen-Windhouwer 2013:105). The Directory of Open Access Journals (DOAJ) as at 2012 had 120 countries listed (Pandita and Ramesha 2013) and as of 2015 the Directory of Open Access Repositories (OpenDOAR) had 2,615 listed repositories. Pandita and Ramesha (2013) estimate the average annual growth of countries introduced to OA publishing to be 14.4% and they forecast that if the trend were to continue, then within five years (from 2012) the world would have 100% OA. Lewis (2012:493) amplifies this view by conceding that OA, particularly in its gold form, is a disruptive technology and it can be anticipated to become the leading model for distribution of scholarly journal output in the next decade. Therefore, the OA movement has to be applauded for fostering equal distribution of research knowledge across boundaries globally, thus, bridging the digital

divide between the North and the South. It has, according to Pandita and Ramesha (2013), broken the closed access myth as people have embraced the concept.

Abrahams et al. (2008) in their report entitled *Opening access to knowledge in Southern African universities* proposed the adoption of an OA research dissemination platform for Southern African universities (see Figure 3.6 below):

> that serves to significantly increase the volume of published research, profiles the work of publishing researchers and scientists in both the Southern African and international research communities, promotes quality in scholarly publishing, makes research and scholarly publication available to the broad academic and student population, particularly the postgraduate student population at low cost and promotes the utilisation of research output by a broader community of researchers and members of society (Abrahams et al. 2008:15).

In Breakthrough Y in the diagram, the authors recommended conducting advocacy campaign strategies that focus on open access publishing and licensing, from 2009 to 2014, with universities and academic journals originating from Southern Africa. The selected strategies had to be practical by advancing usage of scholarly publishing through introduction of 'creative commons' licensing.
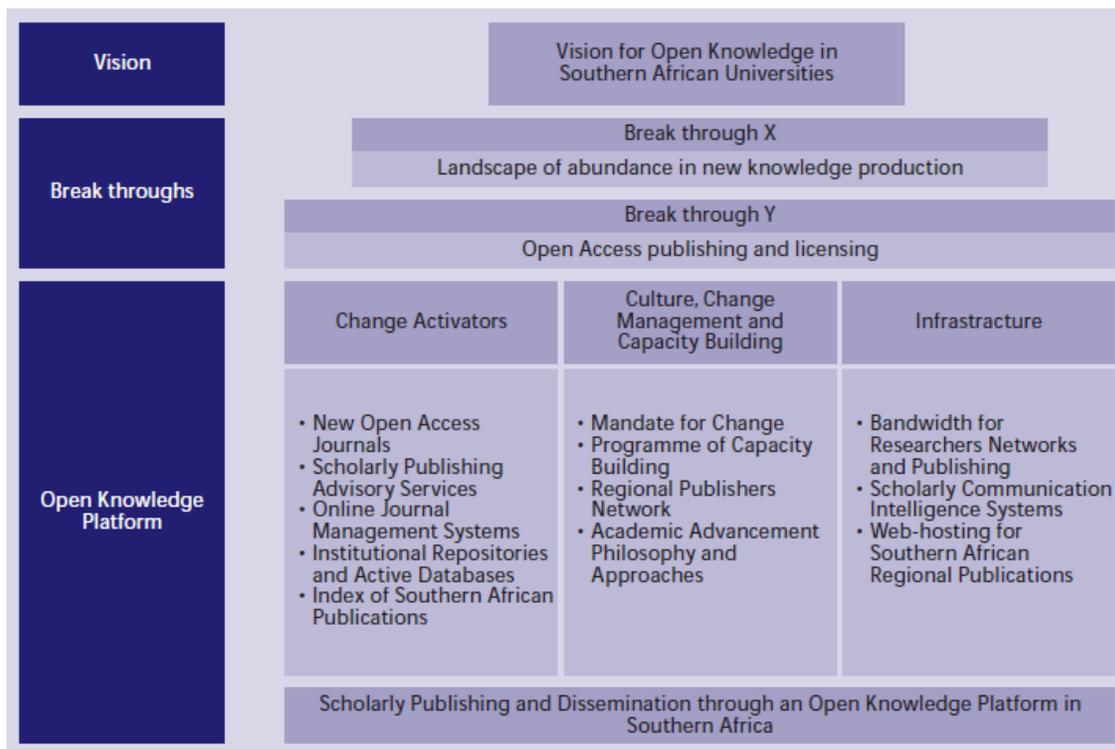
Figure 3.4: Platform for OA scholarly communication in Southern African universities
Source: Abrahams et al. (2008)

Further down the pyramid the authors proposed engagement of five activators of this change namely; new OA journals to enhance the visibility of African research, scholarly publishing advisory services, journal management systems, IRs and active databases and, new index of Southern African publications. Therefore, this study aims to establish the state of IRs in Zimbabwe's (a Southern African country) public universities in their endeavour to fulfill the recommendations of Abrahams et al.'s (2008) research report to the Southern African Regional Universities Association (SARUA).

3.5.1 Speculations about open access

The concept of OA is fraught with a lot of speculations amongst researchers, publishers and librarians (Rizor and Holley 2014:321; Fitzpatrick 2012:348) and is also loaded with many misconceptions which may be deliberate or unintended some of which were advanced by those who felt their well-being threatened by OA publishing (Boissy and Schatz 2011:480). One of the arguments proffered by scholars is that OA will result in bad scholarship; could be vanity or self-publishing, which damages the peer review process (Pandita and Ramesha 2013:50; Boissy and Schartz 2011:480), yet OA "publishing is perfectly compatible with peer review" (Fitzpatrick 2012:348). Critics of OA opine that the conventional system of closed access guards against

substandard publications (Pandita and Ramesha 2013:50). Articles published in open access journals go through the peer review process as much as the subscription based journals do. From the discussion on peer review earlier, it was highlighted that peer review in the conventional system is fraught with flaws where some fraudulent articles have on occasion passed unnoticed and have been published in reputable journals; others are published with errors. This is evidenced by the publication of a hoax paper in 2009 which was computer-generated and published by a reputed publisher (Gilbert 2009 cited in Pandita and Ramesha 2013:50). This argument is not meant to bring to fore the fact that peer review for both subscription-based and OA journals is susceptible to bad scholarship. The peer review system relies on trust, so scholars have to put the same trust in OA. This fear amongst scholars could be a contributing factor to the low rate of adoption of OA platforms for disseminating research by scholars and academics in institutions of higher learning. As a follow-up to the same issue, was the expressed fear by others, if publishing in OA journals (untested waters) would not hurt the reputation of scholars who submitted their works there (Boissy and Schatz 2011:480). Actually, increased citation of OA literature and the journal impact factor have been reported (Pandita and Ramesha 2013:56; Fitzpatrick 2012:353; Boissy and Schartz 2011:480), so scholars can rest assured that OA publication, by increasing discoverability, simultaneously increases impact.

Librarians and publishers speculate over the sustainability of the open access model. They ponder whether OA will replace, entirely, some journal subscriptions or if budgets of libraries will be relieved of the spiralling price increases of journal subscriptions (Rizor and Holley 2014:321). This speculation is manifest in the statement:

> If this new model could be established and grow, it would mean that access
> to valuable peer-reviewed articles could be offered without a direct financial
> impact on library materials budgets (Boissy and Schatz 2011:481).

On the other hand, publishers were less enthusiastic about OA publishing as it posed a potential threat to their business. According to Boissy and Schatz (2011:481) they feared looming competition for quality research articles which had the potential to undermine the over 200-year-old relationship that has existed between publishers and the research library. There was also fear that smaller scholarly publications that could not contend with OA would be driven out. Boissy and Schatz (2011) presume this could explain the demise of some journals that ceased publication.

Despite all these and other speculations and misconceptions about OA publishing which were meant to sway people's perception of OA and discredit it, OA has come out triumphant in pushing forward the agenda of cost free availability and dissemination of research for continued generation of knowledge. Over time, some commercial publishers, such as Elsevier Science, began to collaborate with the OA movement. Alicia Wise's (2015) article entitled *'Unleashing the power of academic sharing'* expresses Elsevier Science's article posting policy stating:

> We make it clear that authors may share their research at each stage of the publication process: before submission, from acceptance, upon publication, and after embargo. We differentiate policies for private sharing from those for public sharing. We've also made it easier for institutions to implement green open access policies via institutional repositories by eliminating the need for them to have a formal agreement (Wise 2015: Our new policy framework).

OA has numerous benefits for scholars and their funding institutions (will be discussed later in this section). It is crucial for stakeholders in the scholarly communication system to understand that:

> OA, is not self-publishing, nor a way to bypassing peer-review and publication, nor is it a kind of second-class, cut-print publishing route, but simply a means to make research results freely available on-line to the whole research community (Katebere and Kate, 2008 cited in Wasike 2013:17).

At this point, it is crucial for us to gain insight into the conception of open access.

3.5.2 History of the OA movement

The BOAI was the first to coin the term 'open access' even though the concept was not new. The provision of free online access to literature had existed since the 1970s when computer scientists invented the Unix and the internet. The scientists had long started providing "open access to their research papers by self-archiving them in anonymous FTP archives" (Harnad 2010:86). The invention of the Web in the 1990s saw the websites becoming the preferred means of self-archiving research papers. Self-archiving is the act of depositing a digital document on an institutional website that is publicly accessible. In 1991 high energy physicists started self-archiving their papers in arXiv (centralized physics web archive) at Los Alamos National laboratory in New Mexico and is now owned and run by Cornell University. ArXiv was the first centralised archive of physics pre-prints but was extended to include computational linguistics, mathematics and

neuroscience. Its aim was to capture electronic pre-prints and disseminate them to a wide audience (Cullen and Chawner 2011:460).

Therefore, the advent of the internet and the Web brought convergence to the old tradition of print journal article publishing with the electronic dimension (internet) to enable access to the 'public good'. The BOAI (2004:225) describes the old tradition as the "willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment for the sake of enquiry and knowledge." The free and unrestricted access by scholars and researchers to worldwide electronically disseminated and distributed peer-reviewed scholarly literature is the 'public good'. This is complemented by Panitch and Michalak (2005:3) who posit that it is difficult to envision advancement of research and career decisions being made in academia without scholarly literature. Scholarly literature has become a common currency of the university and, therefore, has attained the status of a 'public good'.

The idea of OA derived from the fact that most research undertaken across the globe is primarily supported by public money as the money provided to various government agencies by government is raised from the public mostly in the form of taxes; as such the public has every right to know about the research results without paying for it (Gul, Wani and Majeed, 2008 cited in Pandita and Ramesha 2013:48). Universities pay twice for research conducted by faculty in their institutions. One of the mandates of scholars employed by universities is to publish their creative works (supported by the university); they are paid a salary for executing their duties and they use the institution's facilities such as laboratories and other resources. Scholars willingly surrender copyright of their works to commercial publishers and the university finds itself having to pay, a second time, for access to the peer-reviewed article through the library's collection development. The irony of all this is that scholars have to pay to access their articles yet they voluntarily assist the publishers by serving as editorial board members and editors or peer reviewers for the journals. So, basically commercial publishers sell literature which they have neither produced nor paid for (Phillips 2010:7; Panitch and Michalak 2005:2-3). The prices at which they sell the literature are not commensurate with their expenditure:

> In some cases, the content is purchased multiple times in the form of print
> and electronic subscriptions, electronic reserves permissions, and even
> course pack permissions. Nor do these expenditures always guarantee the
> long-term archiving and accessibility of electronic journals should a

publisher choose no longer to offer some or all of its content (Panitch and Michalak 2005:4).

The other factors which inspired OA include; the 'serials crisis' (discussed earlier) where the ever dwindling university library budgets were not matched by the ever increasing journal subscription fees particularly in medicine and science. Many libraries across the globe were forced to cancel journal subscriptions and, the development of digital publishing opportunities and technologies saw journals beginning to appear in electronic formats alongside the print format, and eventually in electronic format only. So, libraries began to realize that they could lose access to previously purchased intellectual content once a subscription was cancelled (Cullen and Chawner 2011:461). Dissemination of knowledge is at the centre of scholarly communication and this has been curtailed by the restrictions imposed by the ever rising costs of journal subscriptions. Academic libraries the world over found themselves unable to subscribe to the much needed literature due to the budget cuts they were experiencing. Universities in the developing world were the most affected given their limited financial resources; as a result, the new scholarly literature became inaccessible to the scholars, and researchers. This is affirmed by Derek Hanekom, the then Minister of Science and Technology, South Africa, who spoke at the Berlin10 Open Access Conference gala held in South Africa by saying:

> Academic libraries, especially those in Africa, have limited access to critical research information. This stifles the growth of African research and its capacity to find solutions to the problems facing the continent. Access barriers sometimes even result in critical, relevant knowledge and research outputs generated in Africa being published in journals overseas. And these journals are not affordable to African academic libraries. This means that Africa is deprived of its own knowledge production, relegating the continent to the status of silent and invisible contributor to research output. Open access can help to remove these financial barriers to access to information and it is one of the most progressive ways of growing and showcasing African research (Stellenbosch University News blog 2012: Close to thirty institutions receive certificates at Berlin10 open access conference, paragraph 6).

This scholarly communication crisis prompted worldwide efforts to resolve it by taking measures that would ensure that scholarly literature is widely disseminated and made readily available to scholars and researchers. Hence, the birth of the OA movement.

3.5.2.1 The subversive proposal

The origin of the open access movement can be traced back to Stevan Harnad's 'Subversive proposal' he posted on the online mailing list for electronic journals (VPIEJ-L) at the Virginia Polytechnic Institute in 1994. Currently, Harnad is Professor of Cognitive Science at the University of Southampton, United Kingdom, founded the journal *Behavioural and Brain Sciences* which he was editor-in-chief from 1978 to 2002. He also founded the first electronic journal, *Psycoloquy* (sponsored by the American Psychological Association) in 1990, *CogPrints* (an electronic archive in the cognitive sciences at the University of Southampton) in 1997, and the American Scientist Open Access Forum in 1998 (Yiotis 2005: 158; Science 2.0 2015). In the proposal Harnad encouraged fellow scholars to take advantage of the Public file transfer protocol (FTP) and establish online archives or websites where they could self-archive all their refereed journal articles and make them freely available to a wider audience worldwide. His intention was to reduce journal production costs, increase and enable access to journal literature. Harnad alluded to the fact that scholars have, for centuries, allowed commercial publishers to put a price-tag on their works which resultantly created a barricade between their work and its small target readership since the printed journal was the only medium they could use for dissemination. The subversive proposal was;

> applicable only to ESOTERIC (non-trade, no-market) scientific and scholarly publication (but that is the lion's share of the academic corpus anyway), namely, that body of work for which the author does not and never has expected to SELL his words. He wants only to PUBLISH them, that is, to reach the eyes of his peers, his fellow esoteric scientists and scholars the world over, so that they can build on one another's work in that collaborative enterprise called learned inquiry (Harnad 1994: Abstract).

Harnad advocated for scholars not to agree to withdraw universally accessible preprint versions of their works from the public eye after acceptance of the refereed version for paper publication. By virtue of publishing a preprint of an article before submitting it to a journal, the author has leeway to negotiate to retain copyright instead of handing it over to the publisher (Yiotis 2005:158). Harnad (1994: Abstract) believed that this move would push commercial publishers to restructure their costs and come up with "minimal true costs and a fair return on electronic-only page costs." He estimated the costs to be lower than 25% of per-page costs instead of the publishers' 75% estimate. Harnad proposed that these costs should be paid out of advance funds charged on authors' per page charges and subscriptions from professional associations and university library budgets otherwise publishers risked losing business to a new willing generation of electronic-only

publishers. The strategy proposed by Stevan Harnad is what is today known as the green road to open access or self-archiving in institutional repositories and personal websites. The subversive proposal was largely disregarded as evidenced by a self-archiving rate of 15 to 20% of annual refereed research output in the subsequent decade (Harnad 2010). The ratio of OA journal articles was even lower. Attempts by other disciplinary archives such as Cogprints (for Cognitive Sciences), which were similar to arXiv, were unsuccessful in increasing the rate of OA self-archiving.

Following Harnad's subversive proposal, other initiatives began to emerge in a bid to solve the serials crisis by advocating for open access to peer reviewed journal literature. These include; the Open Archives initiative (OAI) in 1999, the BOAI in 2001 (Cullen and Chawner 2011:461), the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in 2003, and the Bethesda Statement on Open Access Publishing.

3.5.2.2 The Open Archives Initiative (OAI)

In 1999 a meeting, originally called the Universal Preprint Service, was held in Santa Fe with the aim to explore collaboration among scholarly e-print archives. The meeting resulted in the establishment of the Open Archives Initiative. Credit is given to Paul Ginsparg, Rick Luce and Herbert Van de Sompel who sent a call for participation at the meeting. OAI's intention is to tangibly contribute to the transformation of scholarly communication. The various archives that had been established were not interoperable, that is, they did not allow cross-archive searching, which was detrimental to research impact (Gustafson and Pitman 2004 cited in Yiotis 2005:159). So, the mission of the OAI was:

> to create a forum to discuss and solve matters of interoperability between author self-archiving solutions (also commonly referred to as e-print systems), as a way to promote their global acceptance (Van de Sompel and Lagoze 2000: From individual archives to an interoperable fabric, paragraph 3).

According to Van de Sompel and Lagoze (2000) interoperability encompasses many diverse features of archive initiatives which include their:

  i.   metadata formats;

  ii.   underlying architecture;

iii.   openness to the creation of third-party digital library services;

iv.   integration with the established mechanism of scholarly communication;

v.   usability in a cross-disciplinary context; and

vi.   ability to contribute to a collective metrics system for usage and citation, and so forth.

Interoperability enables users in different geographical settings throughout the world to search in repositories and archives in different locations also (Harnad 2001 cited in Yiotis 2005:159). Yiotis citing the Open Citation Project explains that interoperability engages use of a single Web interface where the depositor inputs XML (Extensible Markup Language) metadata tags for the author name, title, date, journal title and attachment of the full-text document. Despite the different formats in which the documents are presented, they are made interoperable by the XML metadata tags. The OAI devised a metadata-tagging protocol so that open archives would become interoperable. Therefore, depositing in a local individual archive "became equivalent to depositing centrally in one global, seamlessly searchable Open Archive" (Harnad 2010:87). In order for all universities to create their own OAI-compliant open archives, a free software – Eprints, adapted from the CogPrints software – was devised at the University of Southampton and the Massachusetts Institute of Technology (MIT). The OAI set up a registry for OAI-compliant distributed archives using this software. So, institutions could download the free Eprints software to establish their self-archiving repositories and register with the OAI. Universities began to establish electronic theses and dissertations repositories where faculty and students could publish their theses and dissertations. These OAI-compliant open archives are now known as institutional repositories, which form the basis for this study.

3.5.2.3 The Budapest Open Access Initiative (BOAI)

A landmark accomplishment in the open access movement was made by the BOAI in 2002. It advocated for the removal of access barriers to journal literature and proffered that this move will speed up research, enrich education, allow knowledge sharing between the rich and the poor, "make the literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge" (BOAI 2004:225). The BOAI was the first initiative to give the name 'open access' to the free and unlimited online availability, and it was the first to come up with a definition for open access. It advocated for all interested stakeholders (institutions and individual scholars) in scholarly communication to assist in opening access to

research literature and remove barriers (price barriers) that impede access. The literature that should be freely accessible is that which scholars avail to the global readership for no payment and this includes, peer reviewed journal articles and preprints that have not been reviewed which can be posted online for comments from peers or to alert them of important research findings. The BOAI requests signatures from institutions and individuals who want to participate in this cause through its website:

> With such an opportunity to save money and expand the scope of dissemination at the same time, there is today a strong incentive for professional associations, universities, libraries, foundations, and others to embrace open access as a means of advancing their mission (BOAI 2004:226).

BOAI recommended two strategies that can be engaged to achieve open access, namely, self-archiving and open access journals. Self-archiving in OAI-compliant institutional archives or repositories so that search engines, like Google, can treat the disconnected repositories as one. There is no need for users to know the repositories and their location in order to use their content. On open access journals, scholars would have to initiate open access journals and assist existing ones that chose to switch over to open access. Open access journals would not use copyright to restrict access and use but would use it to ensure enduring open access to all the literature they publish. No subscription fees would be charged by the journals but they would have to find ways to cover their production costs. The BOAI suggested that funding to cover production costs could alternatively come from:

> the foundations and governments that fund research, the universities and laboratories that employ researchers, endowments set up by discipline or institution, friends of the cause of open access, profits from the sale of add-ons to the basic texts, funds freed up by the demise or cancellation of journals charging traditional subscription or access fees, or even contributions from the researchers themselves (BOAI 2004:226).

It is, therefore, important to recognize the crucial role played by the BOAI in advocating for OA. It was the first initiative to:

i.   use the term "open access" for this purpose;
ii.   articulate a public definition;
iii.   propose complementary strategies for realizing OA;

iv. generalise the call for OA to all disciplines and countries; and

v. be accompanied by significant funding (BOAI 2012).

The BOAI held another meeting in Budapest in September 2012, ten years later, to reaffirm their original statements of principle, strategy and commitment. The participants expressed:

> We're no longer at the beginning of this worldwide campaign, and not yet at the end. We're solidly in the middle, and draw upon a decade of experience in order to make new recommendations for the next ten years (BOAI 2012).

They highlighted that there had not been any change in the decade that had passed that made OA less necessary or less opportune. Instead access barriers to scholarly literature remained firmly in place, benefitting mediators instead of authors, referees or editors, and costing research, scholars and research institutions. They underscored the increasing necessity to make knowledge available to all those who could utilize it, apply it, or build on it. A new goal was set stating that "within the next ten years, OA will become the default method for distributing new peer-reviewed research in every field and country" (BOAI 2012). Therefore, recommendations on policy, licensing and use, infrastructure and sustainability and, advocacy and coordination were made which included:

3.5.2.3.1 Policy

i. Every university should have a policy assuring that peer-reviewed versions of scholarly articles by faculty members are deposited in the institution's repository.

ii. Where the institution offers postgraduate degrees it should have a policy ensuring that theses and dissertations are deposited in the institutional repository upon acceptance, and that students who wish to publish or patent their works or discoveries should be allowed to do so after a reasonable waiting period.

iii. All research funding bodies should mandate deposit of peer-reviewed articles of funded research in an OA repository.

iv. All university and funder OA policies should mandate deposit in an appropriate OA repository between the date of acceptance and the date of publication. Deposit of the metadata should be done as soon as it is available and immediately made OA. The full-text of the article should be made OA as soon as permission is granted to the repository.

v. The initiative discouraged use of journal impact factors as substitutes for the quality of articles, journals or authors but encouraged development of alternative metrics for impact and quality which are more reliable, less simplistic, and totally open for use and reuse.

vi. For consideration for tenure, promotion and other assessments, universities should mandate deposit of all research articles in the repository. Where publishers do not provide OA, at least they should allow it through publishing their agreements.

3.5.2.3.2 Licensing and reuse

The initiative recommended the Creative Commons Attributions 3.0 License (CC-BY) or its equivalent as the best license for the publication, distribution, use, and reuse of scholarly work.

3.5.2.3.3 Infrastructure and sustainability

It was recommended that a university should have an OA repository, be involved in a consortium that has a consortial OA repository, or subcontract OA repository services. Publishing scholars in any discipline and country should have a right to deposit in an OA repository. OA repositories are to find ways of harvesting from and re-depositing to other OA repositories. These OA repositories should make available to their authors downloaded, usage, and citation data, and also make available the data to the tools that compute alternative impact metrics. Publishers of journal publishers are also encouraged to do likewise even though their journals may not be OA.

The initiative also recommended that funding agencies and universities should assist authors to pay reasonable publication fees for fee-based OA journals, and find similar ways to support or subsidize non-fee OA journals. Non-OA journals permitting self-archiving should explicitly state in layperson's language what they permit under an open standard. It should state the version allowed for deposit, when to deposit and the license to be attached to the deposited version. OA repositories have to provide freely available tools to convert PDF format deposits to machine-readable formats such as XML. Research institutions and funders have to support development and maintenance of the tools, directories, and resources necessary for the progress and sustainability of OA.

3.5.2.3.4 Advocacy and coordination

It was recommended that more should be done to make publishers, referees, editors and researchers aware of standards of professional conduct for OA publishing. Guidelines have to be developed

for universities and funding agencies considering OA policies, including recommended policy terms, best practices, and answers to frequently asked questions. They also recommended that OA communities should clearly explain the benefits of OA to research and researchers.

3.5.2.4 Bethesda Statement on Open Access Publishing (BSOA)

In April 2003 members of the biomedical research community met at the headquarters of the Howard Hughes Medical Institute in Chevy Chase, Maryland with a purpose to spark within the community on how to speedily move on to provide OA to the primary scientific literature. The meeting constituted the different stakeholders in the community, that is, publishers, librarians, scientific societies, funding agencies, research institutions and individual scientists. By definition, the meeting agreed that open access should meet two conditions, namely:

i.   The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.

ii. A complete version of the work has to be deposited immediately upon publication in an institutional repository supported by a scholarly society, academic institution, government or other organisation that seeks to provide OA, "unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository)" (BSOA 2003: Definition of open access publication).

The following statements of principle were made by the stakeholder groups:

The Institutions and Funding Agencies Working Group expressed that the mission to "share ideas and discoveries through publication… is only half-completed if the work is not made as widely available and as useful to society as possible" (BSOA 2003). The group, therefore, pledged to: encourage faculty/grantees to make their research results OA; pay for author publication fees in refereed journals; consider the intrinsic merit of an article, not the journal title, for promotion, tenure, merit awards or grants; and as service to the community by faculty, one's OA publication record will be considered for purposes of promotion, tenure and grants.

The Libraries and Publishers Working Group pledged to speed up the transition to OA in a manner that does not disturb dissemination of scientific information through: Development and support of mechanisms facilitating the move to open access publishing and to provide these mechanisms to the community; educate their clientele on benefits of OA and OA journals; and list and highlight OA journals in their catalogues and other relevant databases (BSOA 2003).

Journal publishers also proposed to provide an OA option for articles published in their journals; declare a precise timetable for conversion of journals to OA models; develop tools for authors and publishers for the publication of manuscripts in electronic formats ideal for archiving and efficient searching; and, reduce barriers to researchers who are financially disadvantaged, especially those from developing countries, where OA models require author fees (BSOA 2003).

The scientists and scientific societies working group endorsed the principles of the OA model; recognized the intertwined relationship between publishing and publishing costs to research and research costs; affirmed their support for OA and committed to achieving OA for all published works; publish in, review for and edit OA journals and those journals that are moving to OA; agreed to promote changes in tenure evaluation and promotion, recognize OA publishing and the intrinsic merit of each article disregarding the journal in which it is published; pledged to educate their colleagues, members and the public on the importance of OA (BSOA 2003).

3.5.2.5 The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003)

Following the Bethesda statement of June 2003 was the Berlin declaration in October of the same year. The Declaration was published online by the Max Planck Society and European Cultural Heritage. The declaration mirrored the Bethesda definition of an open access publication and the statements of principle. The participants also expressed that, "our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society" (Berlin Declaration 2003: Goals). They, therefore, underscored the need to support the new opportunities of knowledge dissemination through the open access model over the internet. They pledged to advance by:

i. Encouraging researchers/grant recipients to publish their work according to the principles of the open access model.

ii. Encouraging the holders of cultural heritage to support open access by providing their resources on the Internet.

iii. Developing means and ways to evaluate open access contributions and online journals in order to maintain the standards of quality assurance and good scientific practice.

iv. Advocating that open access publication be recognized in promotion and tenure evaluation.

v. Advocating the intrinsic merit of contributions to an open access infrastructure by software tool development, content provision, metadata creation, or the publication of individual articles (Berlin Declaration 2003: Supporting the transition to the open access paradigm).

Overall, the five policy statements on open access have made immense contributions to the advancement of the goals of the OA movement. According to Suber (2004: Bullet 1, sub-bullet 5) "the Budapest (February 2002), Bethesda (June 2003), and Berlin (October 2003) definitions of 'open access' are the most central and influential for the OA movement." Trotter et al. (2014:64) concede that there has been a global transformation in scholarly dialogue in the last few years which they attribute to the achievements of the OA movement, "which gained the scholarly, institutional and governmental support necessary to move from the activist fringe to the mainstream." Major research funding agencies, such as, the European Commission (EC), European Organisation for Nuclear Research (CERN), Max Planck Society, US government agencies and the World Bank, adopted policies which mandate that all research which they fund should be made OA. In addition, many universities across the globe have also adopted OA policies directing the dissemination of research output by their scholars and researchers. "These universities are contributing to a groundswell of institutionally based action endorsing OA principles… The growth of open dissemination platforms – such as OA journals and institutional repositories (IRs)" - has made the choice of openly communicating research more feasible (Trotter et al. (2014:65).

> What is remarkable about the open access movement is that despite having
> no formal structure, no official organisation, and no appointed leader, it has
> (in the teeth of opposition from incumbent publishers) triggered a radical
> transformation in a publishing system that had changed little in 350 years.
> Most notably, it has demonstrated that it is no longer rational, or even

necessary, for subscription paywalls to be built between researchers and research (Poynder 2011 cited in Lewis 2012:493).

According to Boissy and Schatz (2011:480), in the year 2000, commercial OA publishing started with BioMed Central. Sixty OA journals were launched in the same year with 254 OA articles having been published. Some of the journals were new titles while others were converted from a subscription base. Between 2000 and 2011 OA journals growth globally, as well as that of OA articles, has been significant. Laakso and Björk (2012) cited in Trotter et al. (2014:65), state that in the 2000, 20,700 articles were published in 744 journals; in 2011, 340,000 articles were published in 6, 713 full OA journals. Therefore, every year the ratio of OA articles increases by 1%, adding up to approximately 17% of the 1.66 million articles listed in the 2011 Scopus journal article index. Trotter et al. (2014) believe the expansion of university OA institutional repositories (to be discussed later in the section) has matched this growth.

3.5.3 Benefits of open access

OA has so many potentials from which scholars and institutions of higher learning across the globe and, Africa in particular, will benefit. Advocates of the OA movement argue that OA access to either pre-print or post-print format is "a more effective means of disseminating research and that it brings benefits to the researcher, to their institution, and to their individual discipline" (Cullen and Chawner 2011:461).

Open access facilitates visibility, discoverability and impact (see Figure 3.7), culminating in better usage of research knowledge by a broader readership (Pandita and Ramesha 2013:56) – of scholars working outside academia, undergraduate students and instructors and potentially interested publics (Fitzpatrick 2012:353). Scholars play a central role in OA publishing; their sole purpose for writing is to provoke dialogue on scholarship, therefore, it follows that their work has to be highly visible and accessible without cost for this to be achieved (Woutersen-Windhouwer 2013:106). Figure 3.7 illustrates six ways in which OA transforms the scholar's online identities.

> …the nature of the scholar's communication practices [changes]… A conscious commitment to an online academic identity adds additional expertise requirements to scholars' work. It is one of the new skills sets which the digital scholarship terrain introduces (Czerniewicz 2013:9).

The open access institutional repositories (IRs) technology requires new skills sets from scholars, hence, the need for this study to establish the preparedness of scholars to accept and use IRs in an endeavour to increase visibility, discoverability and impact of their research. Fitzpatrick (2012:358), citing the Ithaka report, puts forward that since publishing is integral to the core mission and activities of universities, scholars should support OA with an understanding that they will get a return on investment through increased visibility and goodwill towards their efforts. Kennan and Cecez-Kecmanov (2007), Swan and Chan (2010) and Albert (2006) believe that OA would motivate researchers to publish to gain wider exposure of their works and impact development. Therefore:

> For scholarly publishers and researchers in the South, OA is particularly important because it provides an unprecedented opportunity for South–South exchange and for local research to become an integral part of the global knowledge commons (Chan, Kursop and Arunachalam (2011:1).

Due to its 'free' nature, OA helps novice scholars to publish their research in a better and faster way with a wider audience (Pandita and Ramesha 2013:56), thereby removing the prejudices they experience in the conventional system which makes it very difficult for them to be published. OA makes the playing field even for all scholars without regard for their experience with scholarly writing.

The seamless boundaries and wider readership provided by OA have caused scholars to value their research results by allowing better use by the readership, thus fulfilling the sole purpose of conducting research and making it public. This aspect was missing in the conventional system which requires end users to pay a fee before they can access the information (Pandita and Ramesha 2013:56). Thus, OA presents a potential for researchers to help bridge the digital divided between the 'haves' and the 'have nots', "serving not only their own interests in getting their work into broader circulation, but also serving the public good" (Fitzpatrick 2012:350). If scholars treat their work as private property they strengthen the notion that the works are not a public good, therefore, access is at a price:

> The problem, of course, is that the more we close our work away from the public and the more we refuse to engage in dialogue across the boundaries of the academy, the more we undermine that public's willingness to fund our research and our institutions (Fitzpatrick 2012:353).

Figure 3.5: How OA increases visibility, discoverability and impact
Source: Kietzmann et al. (2011) in Czerniewicz (2013:9)

Therefore, OA helps scholars and institutions to increase discoverability and circulation of their works ultimately attracting more funding from research funders. Fitzpatrick (2012:353) opines that scholars can only convince governmental funding bodies and the general public of the value of their research through barrier free discourse. Scholars want to publish in prestigious journals which are associated with exclusivity; difficulty getting published has a higher value attached to it, giving the impression that the more exclusively distributed a publication is, the higher its value. Fitzpatrick (2012:355) regards this attitude in scholars as benign and self-defeating and warns them of finding their works failing to circulate; when that happens, the work's value declines. She encourages scholars to change and 'give it away' since all stakeholders (authors, editors, reviewers and publishers) in the scholarly communication cycle are always doing it; it's a question of how and to whom.

OA has opened up new gateways for creating, collecting and disseminating research knowledge. These gateways include, OA journals and repositories, which also allow free exploitation of the knowledge. It is by virtue of these gateways that OA presents a major potential to correct the academic evaluation and reward system obtaining in universities, determined by the journal impact factor (JIF) – a set of narrowly defined citation measures by the Thomson-Reuters WoS (Chan, Kirsop and Arunachalam (2011:2). According to Fitzpatrick (2012:353) and Panitch and Michalak (2005:5) several recent studies have shown that OA literature, in a variety of disciplines, is cited more than literature published in traditional closed-access forums. Pandita and Ramesha (2013:56) in support of this fact proffer that a manifold increase in OA journals citation and impact factors is being experienced. Therefore, the OA movement provides an opportunity to institutions of higher learning to reconsider the practice of valuing and measuring knowledge.

3.5.4 Challenges of open access

Mabe (2006:61) acknowledging that the two main characteristics of digital content; (i) uncontrollable infinite reproducibility and (ii) unlimited changeability without approval by any authority, present challenges in the OA scholarly publishing landscape. Content can be easily updated and new versions created and posted online, resulting in the final published journal version appearing different from the other versions (Czerniewicz 2013:4; Mabe 2006:61). This makes it difficult for the end-user to determine which of the versions is the authoritative one. In addition, citation is a challenge, particularly for articles that were earlier online without page numbers. The following questions have been asked:

> What exactly is the definitive version of an article, where can it be found and what counts as the official publication date? How can a secure digital archive be created? Who should maintain it? How can it be financed? Should authors be allowed to put versions of their articles onto public web sites? If so, which version, and does it matter? (Mabe 2006:61).

All stakeholders in the scholarly publishing cycle have been affected by the digital transition, particularly OA. The conventional system is immune to such problems which seem to be puzzling some individuals and causing debate in the library and publishing environment. In the pre-digital era "a document was published or it was not; if it was, then that version was the fixed official and final one" (Mabe 2006:61). Though it appears to be a mind boggling scenario, on the contrary, open access, by permitting deposit of pre-print versions of research articles (to be discussed below)

in repositories and personal websites, enables quicker access to research, thus, removing access barriers created by publication delays and publisher embargos on the final version.

Fitzpatrick (2012:353-354) alludes to the fact that OA bears risks, especially for scholars working in controversial areas of research, consequences for which may not be intended. For example, it risks exposing indigenous knowledge (IKS) "without fulfilling the steps stated by the Convention on Biological Diversity (CBD)" (Rossini 2007:20). The traditional knowledge advocates push forward the agenda seeking to protect some forms of indigenous knowledge which are not protected under Intellectual Property legislations, from unfair exploitation largely due to its nature. They advocate for ethical behaviour by scholars to recognize the rights and claims of the local (indigenous) communities by acknowledging their ownership and propriety of innovations and practices. This is rooted in Article 8(j) of the CBD which states:

> Article 8. In-situ Conservation: Each Contracting Party shall, as far as possible and as appropriate: (…) (j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices (Rossini 2007:20).

So, there is a likelihood that researchers could prematurely publish on OA platforms, results of research conducted in such communities, before agreeing with them on how all parties would benefit from the study and even giving them feedback on the research findings. OA, therefore, risks circulating information that is culturally protected by local communities whose consent may not have been sought, thereby, potentially violating the agreement between the community and the researcher. Rossini (2007), therefore, recommends that OA implementation has to be sensitive to issues of indigenous knowledge if it is to help developing countries.

Other challenges that OA presents for publishers are similar to those faced by publishers in the conventional system – subscription based (Boissy and Schatz 2011:483). Publishers have a challenge of maintaining content quality as there is a rapid increase in growth of submissions. They also have the task to manage timely peer-review processes and develop ways to deliver content to hand-held communication devices, such as, smart phones, ipads and tablets.

3.6 Routes to open access

There are two avenues to open access, namely, the 'gold' road and the 'green' road as demonstrated in Figure 3.8. The gold route involves publishing in an open access journal whilst the 'green' OA involves publishing in a subscription-based journal but also self-archiving a pre-print or post-print (after embargo period) copy of the article in an IR or post on a personal website (Pappalardo et al. 2008:8). These two modes of information dissemination "are the subject of an intense debate concerning which platform offers the most viable, sustainable and affordable OA dissemination mechanism going forward" (Trotter et al. 2014:66). Harnad (2010) argues that green OA self-archiving is the fastest and surest road to OA, therefore, it has to come first, before gold OA, and be mandated by institutions and funders universally. He gives two primary reasons for this view:

i. providing green OA is entirely under the charge (and interests) of the providers of the research itself, the worldwide research community, and green OA can be mandated; and

ii. gold OA is under the charge of the publishing community and cannot be mandated (Harnad 2010:88).

Harnad (2010) envisions a situation where, if mandatory green OA is adopted, positive ripple effects will result. Journal subscriptions will become unsustainable (for covering publishing costs), therefore, publishers will be forced to employ cost cutting measures by downsizing and adopting gold OA publishing. Academic libraries will save funds after having cancelled subscriptions, leaving the institution with funds to pay for their scholars' article costs for gold OA publishing. "All access-provision and archiving will have been offloaded onto the distributed network of green OA IRs" (Harnad 2010:88).

Figure 3.6: OA Decision Tree
Source: House of Lords Science and Technology Committee Report (2013:10)

3.6.1 Gold OA

As mentioned above, Gold OA involves publishing in open access journals. According to Lewis (2012) Gold OA is offered in different flavours, namely; direct OA, delayed Gold OA and hybrid OA. On the other hand, Bernius et al. (2009:105) consider hybrid OA models to comprise delayed OA, optional OA, retrospective OA and partial OA (see figure 3.8). What Lewis (2012) regards as hybrid OA is coined by Bernius et al. (2009) as optional OA. These models are considered to be the weak forms of OA since they do not fully meet the goal of the OA pronouncements (Bernius et al. 2009:105; Rizor 2014:326). Bernius et al. (2009:105) refer to open access journals as the true OA model and therefore, consider them to be gold OA since they meet the requirements of OA as

stated by the OA movement. It is this 'true OA model' which Lewis (2012) refers to as direct gold OA. Delayed OA refers to journals that make their articles OA after an embargo period, which usually lasts for 6, 12 or 24 months, after which the author retains exclusive rights of the article (Bernius et al. 2009:106; Lewis 2012). Partial OA refers to journals that allow free access to parts of their content, such as, the editorial, table of contents or abstract. Some journals also allow free provision of pre-prints of articles that are to be published in the forthcoming issue, for a short period.
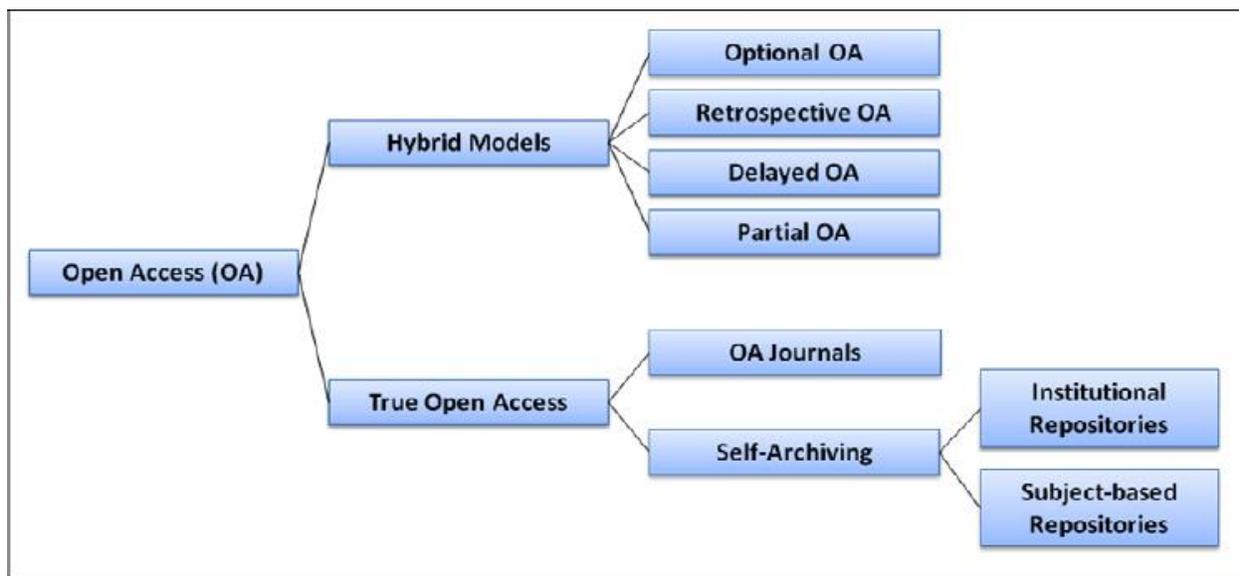
Figure 3.7: Open Acces models
Source: Bernius et al. (2009:105)

Optional (hybrid OA) refers to publishers who allow authors to decide whether to make their particular article openly available or not (Lewis 2012:494; Bernius et al. 2009:106). "Through payment of a fee, the author can assure the free accessibility of her [or his] work" (Bernius et al. 2009:106). Bernius et al. (2009) opine that the high publication fees of $3000 per article are likely to discourage authors from using the model. Hybrid OA and delayed OA journals could influence libraries to require publishers to lower subscription fees since some of the articles in the hybrid journals are free while for delayed OA journals, where mandates of funders and institutions require authors to deposit versions of articles, to institutional repositories, libraries could cancel subscriptions to journals that may be available in their repositories (Lewis 2012:504; Rizor 2014:327). Lewis (2012) projects a situation where the hybrid and delayed OA journals are likely

to switch to gold OA particularly so as indexing and discoverability of green OA articles improves (Rizor 2014:327). This confirms Harnad's (2010) view that green OA self-archiving should precede gold OA, if the war against exorbitant journal prices is to be won.

Retrospective OA, as another hybrid model, simply refers to the provision of access to digitalized older volumes of journals. Direct gold OA or OA journals refers to journals that make all their content free to readers on the internet as soon as they are published. The journals require authors to pay an article processing charge instead of charging subscriptions to recover publication costs (Boissy and Schatz 2011: 480). According to Bernius et al. (2009:106) some of the OA journals charge submission fees. "Gold OA uses a business model that does away with the overheads associated with restricting access to content and for collecting money from readers or their libraries" (Lewis 2012:494). Instead publishers of OA journals depend on producer funding from the authors or their host institutions. Fullard (2007:40) proffers that "the economics of open access focuses on costs at the production end of the publication cycle to free up costs on the distribution end." The article processing charge is grounded in the sentiment that the most direct beneficiaries of scholarly journal publications are the authors and their institutions. Therefore, the OA journal's publication costs are distributed by the article processing charge, across individuals and institutions benefiting from the article's publication (Open Society Institute 2004:17 cited in Fullard 2007: 44-45). The article processing fee charged by the publishers can range from a few hundreds of dollars to several thousands of dollars, which is funded from grants (awarded by the university or funding institutions) that would have produced the research output (Boissy and Schatz 2011:480). Sutton (2013) in Rizor (2014) reports thus, on Emerald's new gold OA policy:

> …the launch of new gold open access options in Emerald journals that will publish an article open access for a fee of $1,595 per article. As a result, Emerald authors who work at institutions with open access policies or receive research funding from agencies with open access requirements can either pay up front for immediate open access or endure a two-year embargo (Sutton 2013:470 in Rizor 2014:331).

Gold OA critics proffer that the author fees model, just as subscription fees, is unsustainable because author fees are not affordable, but on the other hand they make the gold OA route overally sustainable than green OA (Rizor 2014:328).

Fitzpatrick (2012:351) and Rizor (2014:329) argue that the humanities and the sciences have significant differences in funding systems and levels. While scientific research enjoys huge funding levels which have historically enabled the scientists to write publication costs, for images and page charges, into their grant proposals resulting in the funder paying for the publications, researchers in the humanities and social sciences rarely receive funding from outside. Most of their research is funded by the researcher's host institution or is self-funded through the individual's salary. Fitzpatrick (2012:352) opines that transition to open access for humanities would not be easy since "humanities publishing faces a set of financial constraints that are daunting at the best of times and crushing in times of economic retraction". However, it is a relief to realize that some OA publishers grant waivers for payment of publication fees, particularly to authors from developing countries and those who do not have other means of getting their research published (Boissy and Schatz 2011:480). The Wellcome Trust (2004:22 cited in Fullard 2007: 41), in its study of the author pays model, concluded that OA "author-pays models appear to be less costly and have the potential to serve the scientific community successfully". The Wellcome Trust, therefore, mandated that all its funded research be published in an OA journal or be deposited in an open archive.

Laakso et. al. (2011) cited in Lewis (2012:495-496) postulated that in 1993 there were 20 OA journals which published 247 articles and, by the year 2000, 741 journals published 35,519 articles. In 2005, 90,720 articles were published in 2,837 journals and, by 2009, 4,767 journals published 191,851 articles. This represents a 155.4% increase in articles between 2000 and 2005 and, between 2005 and 2009 the percentage increase was 111.5. The figure for articles in 2009 represents 7.7% of the articles published in that year. Using the 2000 to 2009 estimates, Lewis (2012) extrapolates that by 2017:

> It is likely that Gold OA journals will publish half of all scholarly articles…and will publish 90 percent of the articles by 2020. The second estimate, based on 2005 to 2009, shows that 50 percent of scholarly articles would be Gold OA by 2021 and over 90 percent by 2025 (Lewis 2012:501).

The Directory of Open Access Journals (DOAJ) documents and indexes open access journals. By July 2015 there were 10,410 OA journals with 1,887,875 articles; of these journals, 6,266 are searchable at article level. Africa has 108 journals and 30,583 articles indexed in DOAJ and

Zimbabwe does not have a single journal listed (DOAJ 2015), a situation which leaves Zimbabwe's research output highly invisible.

3.6.2 Green OA

As mentioned earlier, green OA involves self-archiving of an author's pre-print or post-print articles in a subject repository, institutional repository or personal website. This model has become the most desirable for OA (Swan 2007:200; Bernius 2009:107). Lewis (2012:494) posits that green OA does not try to replace the traditional subscription journal system, but rather, it sits alongside it. Green OA supplements providing a version (pre-print or post-print) of an article to a disadvantaged readership, that is, those who may have been unable to access the article. Therefore, it removes price barriers and increases the long-term preservation of scientific works. As a result, institutions of higher learning and their libraries were encouraged to establish institutional repositories and train their academics on how to deposit their research (Rizor 2014:323). Many universities in both developed and developing countries, including Zimbabwe, established institutional repositories in support of the OA movement agenda of making scholarly literature freely accessible on the internet and, also for long-term preservation of the institutions' intellectual output. Hence, the interest of this study to explore the utilisation of IRs in Zimbabwe's public universities, having invested in the technology.

According to Harnad (2010:88) the American Scientist Open Access Forum had proposed in 1998 that research funders and universities should require scholars to self-archive their research on OA. The first institution in the world to adopt an OA deposit mandate was the School of Electronics and Computer Science at Southampton University (United Kingdom (UK)) in 2002. Adoption was by a portion of the university community but in 2004 the Queensland University of Technology (Australia) was first in adopting a university-wide OA self-archiving mandate. In Europe, the first university-wide OA mandate was adopted by the University of Minho (Portugal) also in 2004. In the same year, the UK Parliamentary Select Committee on Science and Technology also made a recommendation, in 2004, for universities and research funders to mandate OA self-archiving; the government failed to act on this recommendation at the time but surprisingly all the research funders heeded the recommendation by adopting an OA mandate, with the Wellcome Trust being the first to do so in 2005 (Harnad 2010).

However, following the recommendations from the Finch Group (a working group set up to consider ways of expanding publicly funded research), the Research Council UK (RCUK) revised its policy on OA which recommends Gold OA. The policy reads as follows:

> RCUK is persuaded that 'at the current time, the Gold option provides the best way of delivering immediate, non-restricted access to research papers, which in turn provides potential value to UK research and the broader UK economy'. RCUK is not against the green model and supports a 'mixed approach to Open Access' (UK House of Lords Science and Technology Committee Report 2013:7-8).

The policy was criticized by the House of Lords for lacking clarity (House of Lords Science and Technology Committee Report 2013). In the United States, the House Appropriations Committee, also proposed that the National Institutes of Health (NIH) should mandate OA; to which they responded by adopting an 'OA Request' instead of OA publishing (Harnad 2011). This evidently shows the daunting challenges to adoption of green OA at the national level and by some funding bodies. It is left to be seen how governments in the developing world are responding to the OA policy agenda.

According to Bernius (2009:107) "self-archiving [unlike gold OA] saves a publication fee for the individual author, who can select between subject-based or institutional repositories to deposit his/[her] work." Rizor (2014:26) laments that indexing and discoverability of existing articles in these repositories is not yet perfect, as a result, finding the articles is still a challenge. Critics of green OA opine that it "offers only a temporary and flawed backdoor to OA that does not solve the deeper underlying issues with journal subscriptions" (Rizor 2014:327). Despite this critique, developing countries stand to benefit more from institutional repositories since they are hard hit by the crippling traditional journal subscriptions which they cannot afford and, therefore limiting their capacity to provide access to literature to further research efforts of their scholars. Harnad (2010, 2011) opines that universal OA can only be attained by mandating green OA first which he envisions will cause subscriptions to be unsustainable. Therefore, universal green OA is hoped to provoke changeover to gold OA publishing but will not destroy journal publishing (Houghton and Oppenheimer 2009; Harnad 2011).

3.7 Institutional repositories

As mentioned earlier, it was in 2001 that the BOAI conceived the idea of institutional repositories for self-archiving refereed scholarly research articles, as one strategy through which the literature can be made freely available and accessible to the public, searchable, harvestable, useable by a wider readership (on the internet); and visibility of both the researcher/scientist and the institution are increased by the IR (Onyancha 2011:58). It is now over one and a half decades since conceptualization of IRs and the success of the concept in developing countries is yet to be established. Scholars have proffered several definitions of an IR depending on their perceptions of the role of the IR. The first definition was coined by the Scholarly Publishing and Academic Resources Coalition (SPARC) and articulated by Crow (2002) as refering to "digital collections capturing and preserving the intellectual output of a single or multi-university community". Lynch (2003:328) in concurrence expounds on this statement and describes a university-based IR as:

> a set of services that a university offers 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.

In summary, an IR is a web-based database of scholarly material which is:

  i.   Institutionally defined (unlike a subject-based repository), though come countries have national repositories.

  ii.   Cumulative and perpetual making it an archive whose material is not deleted after a particular period of time but rather accumulates as more is added over time.

  iii. Has open access and is interoperable (for example, using OAI-compliant software), allowing search engines, such as Google, to view the content thereby giving access to a diverse readership outside the university.

  iv.   Collects, stores and disseminates the intellectual wealth of an institution, and

  v.   Includes long-term preservation of digital materials as a key function (Ware, 2004:5; Prosser, 2003:168).

Chisenga (2006:3) proffers that although IRs are associated with academic institutions and research institutes, other large organisations and corporate organisations such as government, non-

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governmental organisations (NGOs), as long as they generate digital documents can establish IRs. These organisations will use the repositories for purposes of archiving and preserving their institutional histories and administrative documents and these documents most likely remain proprietary and not OA (Drake 2004 and Chisenga 2006). IRs use the same open access and interoperable framework as e-print archives, such as, Arxiv, but instead of being discipline-specific, they represent the wide range of materials generated by an institution's scholars (Shearer 2002 and 2003). Therefore, they contain an institution's intellectual life. According to Prosser (2003) the elements of an IR outlined above represent the functions of institutional repositories.

Repositories conform to an internationally accepted set of technical metadata standards, that is, bibliographic details (author's name, institutional affiliation, title of article, abstract, keywords and so forth) of the entries. So, they follow the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). Web search engines like Google will then index the contents of the repositories, thereby enabling freely available global research through online OA databases (Swan n.d).

In a SPARC paper entitled *The Case for institutional repositories: A SPARC position paper,* Crow (2002) proffers that IRs are a convincing response to two strategic issues faced by academic institutions. They i) are a significant element in the transformation of the scholarly communication system as they broaden access to research, reaffirm scholars' control over scholarship, increase competition and reduce dominance by journals, bring economic relief and increased relevance to the universities and their libraries and; ii) potentially serve as concrete indicators of an institution's quality demonstrating the "scientific, societal, and economic relevance of its research activities, thus increasing the institution's visibility, status, and public value" (Crow 2002: Bullet 2). Therefore, institutions have the prerogative to support and nurture their faculty's innovative explorations of how the digital medium can be utilized to enhance teaching and learning by enabling access to their works of scholarship.

According to Lynch (2003), conservative faculty have utilized the internet for sharing their ideas with a wider audience. He also points to the fact that such faculty members even though their intention is to disseminate their books, chapters, journal article or monographs widely, they face a daunting task of exercising stewardship over the content and its metadata. For example, content migration whenever changes in format occur, metadata creation describing content and ensuring

that it appears in appropriate formats and protocol interfaces like open archives metadata harvesting. Lynch (2003:330) believes that "faculty are typically best at creating new knowledge, not maintaining the record of this process of creation." It is not a secret that the majority of scholars do not have the time, resources, or expertise to preserve their scholarly work either in the short term or long term extending beyond their careers. Therefore, institutions, such as, universities are best placed to take over the complex and time consuming job of the activities of system administration and content creation and, ensure continued access and preservation of the works by putting up the requisite infrastructure and resources for the development of institutional repositories.

Academic libraries play a significant role in the scholarly communication cycle, and have of late, due to conditions beyond their control, been persuaded by the OA movement to embrace IRs for purposes of promoting the research output of researchers/scientists in their own institutions on the global sphere. The ever increasing costs of journal subscriptions and the dwindling budget allocations for libraries have forced academic institutions to shift their focus and embrace the new technologies by developing individual institutional repositories. Institutional repositories, therefore, have become a new collection development strategy for academic libraries as they "expand this function from the identification and purchase of published materials, to the gathering and dissemination of the works of the faculty" (Gieseke 2011:530). In addition, universities and libraries were encouraged by the OA movement to establish repositories to promote and disseminate their scholars' research and ensure long-term preservation of the institutions' scientific works (Rizor 2014:323; Cullen and Chawner 2011:460). Many universities in both the developed and developing countries across the globe have invested both human and technical resources in establishing infrastructure for this invaluable technology of institutional repositories (Jantz and Wilson 2008:2). "The proliferation of repositories worldwide offers new possibilities for universities to take greater control of their scholarly communication destinies" (Trotter et al. 2014:66).

The history of IRs dates back to the the EPrints archive, now known as e-Prints Soton at Southampton, founded in 2001 and; the DSpace Initiative at the Massachusetts Institute of Technology in the United States of America (USA), founded in 2002, as the first institutional repository projects (Cullen and Chawner 2010:132; 2011:461). The University of Nottingham's

OpenDOAR database endeavours to list all repositories worldwide and has recorded exponential growth in the number of repositories over the years. By 2008 half of the European universities had institutional repositories (Vernooy-Gerritsen et al. 2009; Creasar et al. 2010:147). Statistics show that "by 2009, 192 IRs had been established in 28 developing countries" (Swan and Chan 2010: What progress has been made in establishing IRs so far?) and by January 2013, 1,567 repositories had been established worldwide (Ruiz-Conde and Calderon-Martinez 2014:1283) and as at February 2015, the number had risen to 2,615 repositories (DOAR) and out of this number Africa has 103 repositories. South Africa leads, with 29 repositories, Kenya has 12 IRs and Zimbabwe has six IRs. According to Kuchma et al. (2011) only two public universitieis in Zimbabwe do not have IRs and the University of Zimbabwe's repository is the only one listed on DOAR and accessible on the internet (Kuchma et al. 2011; Malapela 2015). Cullen and Chawner (2011:463) expressed that the rate of content recruitment in New Zealand's universities is not high at all with numbers in the range of 1300 to 5000 in the university collections. The authors question the viability and relevance of institutional repositories to the academic community. The items held in the repositories range from conference papers, multi-media and other audiovisual materials, working papers, datasets, theses and dissertations, to published research, books and book chapters. Cullen and Chawner (2011) also express that some of the items in the IRs are available in full-text, and not all have been peer reviewed.

> This seems on the surface to suggest that institutional repositories have been successfully introduced, and may indeed provide a solution to the concerns about the system of scholarly publishing identified …[earlier] (Cullen and Chawner 2010:132; 2011:461).

An exploratory study of IRs in South African institutions of higher learning entitled: *self-archiving by LIS schools in South Africa: practices, challenges and opportunities* was carried out by Onyancha (2011). The study engaged the survey and webometrics approaches to establish the existence and number of IRs; the document types indexed in the IRs; publication language; the software used to create the IRs; LIS departments' contributions in the IRs; factors motivating self-archiving; challenges faced by LIS scholars in self-archiving; and to determine the LIS scholars' attitudes and fears of self-archiving. The study found that some departments self-archived their documents on their websites instead of IRs, which posed preservation challenges. The researcher recommended regular evaluation of IRs in order to establish if they met the objectives for which they were created. He also recommended a follow-up study to include other departments and

academics in the universities. The current study included academics in all disciplines across the state universities in Zimbabwe and evaluated the IRs as a follow-up to Kusekwa and Mushowani's (2014) study.

Kocken and Wical (2013:153) lament that despite the establishment of institutional repositories by universities, content for these repositories remains elusive. The same sentiment is shared by Malapela (2015) with reference to repositories of Zimbabwe's public universities when he says that they are conspicuously absent on the web. The institutions established their repositories using the "build it and they will come" philosophy, but this has not paid off yet, since the researchers have not shown commitment to OA (Cullen and Chawner 2011:460). Cullen and Chawner (2011:462) lament that the concept of IRs has been unsuccessful at gaining much traction with scholars whom it was intended to benefit, despite it having appealed to librarians and university administrators. The same sentiment is shared by Jantz and Wilson (2008) and Westell (2006) who indicate that participation by faculty in the development and their awareness of IRs is extremely low.

According to Lynch (2003:328) for an IR to be effective, it is essential that collaboration among librarians, information technologists, archives and records managers, faculty, and university administrators and policymakers exists. Financial and staff resources are required for the establishment and the maintenance of the repository, advocacy for establishing its authority and value in the institution is necessary, and an overt awareness campaign in the scholarly community persuading individual scholars to deposit their research outputs is also required (Cullen and Chawner 2011:462). This can only be achieved through collaboration amongst the stakeholders to ensure maximum return on investment. Kocken and Wical (2013:141) further proffer that an academic IR's success can be measured by the level of content submission by its academic community which is attributed to the issue of awareness. In concurrence Mercer, Rosenblum and Emmett (2007:191) citing Shearer (2003) posit that an IR's success is determined by the proportion of items held to the number of scholars, and by the number of searches and downloads of archived items by others. Westell (2006) carried out a study of IRs in Canada entitled *Institutional repositories: proposed indicators of success* in which she developed a framework of indicators of IR success. These factors include:

    i.   Mandate;

ii.   Integration into institutional planning;

iii.   Funding model;

iv.   Relationship to digitization centres;

v.   Interoperability;

vi.   Measurement;

vii.   Promotion; and

viii. Preservation strategy (Westell 2006:212).

However, she excluded the aspect of user acceptance, as a measure of IR success in her study. Therefore, this study in addition to Westell's variables, focused on the issue of acceptance and use of the IR concept by scholars in Zimbabwe's public universities. Westell's study examined the websites of selected English speaking Canadian universities that participated in the Canadian Association of Research Libraries (CARL) Institutional Repository Project. The study also examined the university research services pages so as to determine the amount and scope of research available online and in the IR. Policy and planning documents from the university and library which were posted on the websites were analysed as well to establish how prominently the IR and general scholarly communication goals featured.

Even though there is increasing pressure from government and academic institutions to enable public access to research in order to expand knowledge and encourage discourse (Pappalardo et al. 2008:1), deposit rates are generally low (Creasar et al. 2010:145). This is supported by Kocken and Wical (2013) who acknowledge that most institutions of higher learning struggle with acquiring content for their IRs. It is quite important to ensure that the potential submitters of content understand fully what open access involves before university librarians can expect the repositories to flourish. This study also seeks to establish the attitudes of academics towards IRs that have been established in Zimbabwe's public universities. Attitudes of knowledge creators and innovators are critical to the success of the IR technology and the cost reduction (on access to research) drive being advocated for by the OA movement.

3.7.1 Benefits of IRs

Many advantages of IRs have been advanced by authors (Swan, Willmers and King 2014a; Swan and Chan 2010; Albert 2006; Antelman 2004). Islam and Chowdhury (2011:506) in their analysis of IRs in Bangladesh and literature review, noted that:

> while institutional repositories centralize, preserve, and make accessible an institution's intellectual capital, at the same time they can become a part of a global system of distributed, interoperable repositories.

IR's are a platform for individual researchers to self-archive or self-publish their own research, a practice which is common with general books publishing. Prosser (2003:168) suggests that IRs enable institutions to create archives (long term preservation) and avail their intellectual wealth. By collecting research output and bringing them together, the IR in fact produces a catalogue of the institution's research (Swan, Willmers and King 2014a). The IR, therefore, becomes a central archive for authors' works translating to a curriculum vitae (CV) providing a list of their research over the years (Swan, Willmers and King 2014a). By virtue of being OA, the IR increases the dissemination and impact of the authors' works. For institutions, it acts to preserve their intellectual wealth producing a ripple effect of increasing visibility and prestige of the authors (Cullen and Chawner 2011; Prosser 2003). Ultimately the IR can be used to attract funders and industrial sponsors. For academics, the IR takes care of and preserves their publications in digital form, thereby relieving them of "the need to maintain this content on a personal computer or website" (Cullen and Chawner 2011:461). However, a literature survey by Albert (2006) showed that educating authors of the benefits of OA and author self-archiving remains a challenge.

Another benefit of IRs is that they can help researchers from developing countries feature on the international research network scene, find their works and facilitate long term preservation (Islam and Chowdhury 2011:506; van Schalkwyk 2014:2). "Research-performing institutions benefit from greater visibility, usage and impact of their research, in terms of citations, social return and funding" (Swan, Willmers and King 2014a:20). Therefore, institutions stand to gain highly by leveraging their scholarly publishing investments for the best return in visibility and access (Phillips 2010:7-8). Institutions can also use the IR as a management information tool for monitoring and analysing their research activities.

3.8 Debate on IR content

The fact that institutional repositories, as an outgrowth of the OA movement, aim at disseminating scholarly material generated within an institution has caused a lot of concern in the scholarly fraternity pertaining to what should constitute their content. Ruiz-Condo and Calderon-Martinez (2014:1285), in their analysis of the top 100 universities repositories, lament that there is lack of consensus on the functions of these repositories and a debate is raging on the type of materials that should be stored in the repositories. This leaves one to wonder whether this can be a contributory factor to poor participation by faculty in the development of their institutions' IRs. Foster and Gibbons (2005:1) suggest that for a university IR to succeed, regardless of its focus, it should "be filled with scholarly work of enduring value that is searched and cited".

The primary contents of an institutional repository should include peer-reviewed journal articles and conference proceedings (Swan 2009). Increased visibility and impact of an institution on the global arena is realized by the ready exposure of a collection of journal articles emanating from it. The same benefits accrue to the authors of the articles. Another type of content found in a repository are datasets, including; diagrams, video and audio files, spreadsheets, photographs, charts, artwork representations and so forth (Swan 2009; Crow 2003). Most datasets these days are now being created in digital form. According to Swan (2009), most research funders require that data from research they have funded be made OA as soon as the researcher is done with analysis and has published results from the data to facilitate verification of the results by other researchers, comparison with their own results or re-use to generate new data and knowledge.

Monographs, books and book chapters are also found in IRs since they are creations of the institution's scholars. The metadata of the book, giving the title, author, synopsis and publisher details, is captured in the repository together with the deposit of the book. As Swan (2009) proffers, the visibility of the book's metadata translates to it being counted in the institutions' evaluation processes, increased awareness of its existence to potential readers who can locate it through Web search engines. Therefore, scholars may be reluctant to deposit their books since these are written for commercial gain. However, "evidence is accumulating…to show that when the entire content of a book is visible in a repository, sales of the book frequently rise" Swan (2009).

According to Crow (2003), even though the aim of an IR is to collect an institution's research output, it can also include as part of its content, all materials produced by the institution comprising, annual reports, teaching materials, computer programmes and any other digital content which the institution wants to preserve. This would include theses and dissertations. In concurrence with this view Lynch (2003) opines that:

> While early implementers of institutional repositories have chosen different paths to begin populating their repositories and to build campus community acceptance, support, and participation, I believe that a mature and fully realized institutional repository will contain the intellectual works of faculty and students—both research and teaching materials—and also documentation of the activities of the institution itself in the form of records of events and performance and of the ongoing intellectual life of the institution. It will also house experimental and observational data captured by members of the institution that support their scholarly activities (Lynch 2003:328).

Connell (2011) and Kocken and Wical (2013) believe that academic libraries are overly selective about the kind of content to be included in the repository thereby weakening their efforts of getting campus participation in the IR. They also attribute the problem to the libraries' policies which may be unclear. For example, a policy that says the repository is for "intellectual output"; a term they believe lacks universal agreement of its meaning. The term may be interpreted to refer to faculty research output. This, according to Connell (2011:253) and Kocken and Wical (2013:141-142), has "the potential to diminish a sense of ownership and participation among other units on campus".

Xia and Opperman (2010) carried out a study entitled: *Current trends in institutional repositories for institutions offering Master's and Baccalaureate Degrees* so to give an overall picture of the development of IRs in medium and small-sized academic libraries. One of the characteristics studied was the content composition of the repositories. They found that most of the contributions (almost 50%) to the repositories were from students in the form of theses and student journals (project papers). However, this practice was in line with the policies of the libraries on submission of student works. The study also found archives and special collections to be the second largest (20%) collections in the repositories, comprising digitised back issues of journals published by the institutions. Other repositories also contained teaching materials (syllabi), multimedia materials (art, images, sound, and video files). Overall, 40% of the repositories focused on content from

students which the authors perceived to be reflective of the institutions' emphasis on undergraduate education.

Swanepoel (2005) concludes that it is quite difficult to give an answer to the question of what should and what should not be included in an IR in as much as it is difficult to come to an agreed definition of an IR. This is clearly demonstrated in the typology (Figure 3.10) that was developed by Heery and Anderson (2005) cited in Swanepoel (2005).

Institutional Repositories			
Content	**Coverage**	**User Group**	**Functionality**
Raw data	Personal	Learners	Enhancing access
Derived data	Journal (single	Teachers	Preservation
Full text pre-print	or multiple)	Researchers	Dissemination
Full text peer-reviewed	Departmental		Asset management
E-theses	Institutional		Resource sharing
Learning objects	Inter-institutional		
Corporate records	National		
	International		

Figure 3.8: IR typology
Source: Swanepoel (2005:16)

3.8.1 Platform choice

According to Little (2012:66) institutions face a daunting task when selecting their repository's software platform. Little (2012) suggests that the following questions be asked in the decision process:

   i.   What are the user and systems requirements?
  ii.   Who is your target audience?
 iii.   How easy (or hard) is it to install, maintain, and use?
 iv.   What kinds of archival standards will you establish?
  v.   What do you expect people will do once they find your IR?
 vi.   What is the relationship between your IR, your OPAC, and your website? (Little 2012:66).

Most institutions have shown preference to use the open source IR software. Studies (Xia and Opperman 2010; Rieh et al. 2007) have shown that most universities prefer the DSpace platform due to its flexibility for customization, with bepress' Digital Commons and Eprints in the running. Witten et al. (2005) posit that Greenstone and DSpace are the most prominent digital library open source software. The DSpace was a conception of the Hewlett-Packard Labs and was developed in conjunction with MIT Libraries while the Computer Science Department of the University of Waikato, New Zealand in collaboration with the UNESCO 'information for all program' developed and distributed the Greenstone software for digital libraries. Witten et al. (2005) proffer that the goals and strengths of the two systems are different. The core business of DSpace is to support:

    i.   Repositories at an institutional level;

   ii.   Self-deposit of digital assets by faculty;

  iii.   End-user interface for depositors;

  iv.   Assets made available for searching and browsing;

   v.   Data retrievable many years in the future; and

  vi.   Institutional commitment to ensure the continued availability

         of certain named formats (Witten et al. 2005: DSpace, paragraph 3).

On the other hand, the core business of Greenstone is to support:

    i.   Design and construction of collections;

   ii.   Distribution on the web and/or removable media;

  iii.   Customized structure depending on available metadata;

  iv.   End-user collection-building interface for librarians;

   v.   Reader and librarian interfaces in many languages; and

  vi.   Multiplatform operation (Witten et al. 2005: Greenstone, paragraph 3).

The environments in which Greenstone and DSpace are designed to operate are the basis for the difference between the two systems. DSpace was designed to operate in an institutional setting, allows faculty members to self-archive and the model makes communities (departments, schools, faculties and so forth) build digital collections. "The software is ideal for planning, building and managing digital repositories for large institutions" (Ravikumar and Ramanan 2014:80). In turn,

Greenstone was designed for lay users "to produce single, individualised, collections. The model pictures a "librarian creating collections from existing 'resources' (comprising both 'items' and metadata resources) and distributing them over the Web or on removable media" (Witten et al. 2005: Differences, paragraph 12). It is these features which make Greenstone "highly suitable to preserve digitised collections like dissertations/ theses, manuscripts, rare materials, past examination papers, and other in-house documents" (Ravikumar and Ramanan 2014:80). The University of Zimbabwe uses the DSpace software to host its repository which in Kuchma et al.'s (2011) view is the most successful repository in the country.

Renowned institutions like the Public Library of Science, the Library of Congress, and OhioLINK are using Fedora Commons which was developed by Cornell and the Library of the University of Virginia (Little 2012:66). The Digital Commons is largely adopted by institutions that have journals as part of their content "presumably for its journal publishing strengths" (Xia and Opperman 2010:12). For small institutions, unable to maintain their repositories, Xia and Opperman (2010) citing Bankier and Percial (2008), postulate that:

> bepress has been providing services to individual repositories by storing all subscribers' digital content, assisting in their interface customization, facilitating data retrieval across its subscribers' sites, and offering some easy-to-use functions such as features tailored to journal publishing. With a hosted service like Digital Commons, the subscriber library can opt to receive all of the content in a viable format for another platform if budgeting becomes an issue for the annual fee (Xia and Opperman 2010:16).

The other factors influencing the platform choice proffered by Xia and Opperman are operational issues, such as the size of the institution (small or large) which also relates to resource capacity of the institution to maintain the IR. Some institutions might have limited resources, so they would work together and share an IR, others would pool their resources together in consortia, and there are others that can afford to maintain their own repository. Many "librarians still believe that several libraries working together to deal with a vendor or to develop their own tools can reduce costs, increase resource sharing, and enhance services" (Xia and Opperman 2010:15).

3.9 Attitudes and concerns of academics towards IRs

Most scholars are not depositing their research works in IRs (Jantz and Wilson 2008) not because the universities do not have the IRs in which to deposit them; most universities' IRs are 85% empty and deposit levels languish at 15% or below. Harnad (2011:35). This is despite the fact that 90% of journals endorse making pre-prints OA, while 63% allow immediate OA for the final, peer-reviewed accepted draft:

> The success of repositories… will be a function not so much of technical considerations as of attitudinal ones. Faculty remain unconvinced that repositories are important, and there is a critical need for outreach programs that point to repositories as an important step in solving the crisis in scholarly communication (Quinn 2010:67).

In Harnad's (2011) opinion author worries about journal copyright restrictions cannot explain the low deposit rate since IRs have a 'Fair Use' button which makes it possible for any authors who have copyright worries to deposit their papers as 'Closed Access' (CA) instead of OA" (Sale et al. 2010 and Harnad 2011). Sale et al. (2010) further propounds that because of this Button, it is worthwhile depositing CA papers since the button gives authors an opportunity to provide 'Almost OA' to the papers on request by individuals.

The origin of the 'Fair Use' button, according to Sale et al. (2010) is grounded in practices in scholarly communication dating back a long time ago where preprints of articles were distributed to collaborating universities by mail. This practice continued in the early 1980s with the advent of the internet where e-mail was now used to request and send the articles. This made possible the distribution of eprints in a fast and cost effective manner. Over time, with the growth of the OA movement it was realized that requests and provision of eprints could be done faster and effectively through authors' IRs and they would immediately be made OA so that any online user could access and download them whenever they so wished (Harnad 1994). This was possible for those journals that endorsed author self-archiving of their works but there remained other journals that offer an 'Almost OA' model. That is, they endorse self-archiving of unrefereed pre-prints or impose an embargo period ranging from 6 to12 months or more before full-text can be made OA. Readers are provided access to the metadata (bibliographic details or including the abstract) of the article only.

So, to circumvent this restriction on access to scholarly literature, an alternative way of provision was devised to deal with individual request to papers that had been deposited in the author's IR as Closed Access (CA) instead of Open Access (Hitchcock 2006; Sale et al. 2010). Thus, the concept of the 'Request-a-copy' ('fair Use' button) was birthed (Sale et al. (2010), where if a user shows interest in a CA article, they send an automated e-mail request for the final draft (for research purposes only), which can be authorized by the author through an automated e-mail response, with the article attached, to the user at the click of a button (Carr and Harnad 2005; Harnad 2011:35). Figure 3.11 demonstrates this. According to Sale et al (2010: History of the development, paragraph 1) "the Button was conceived as a further incentive for institutions and funders to adopt mandates requiring IR deposit of all refereed journal articles." However, despite the presence of the 'Fair Use' button which covers 30% of almost all OA papers, the 15% deposit rate is still quite puzzling (Harnad 2011).

Palladium-mediated organic synthesis using porous polymer monolith formed in situ as a continuous catalyst support structure for application in microfluidic devices

Gömann, A and Deverell, JA and Munting, KF and Jones, RC and Rodemann, T and Canty, AJ and Smith, JA and Guijt, RM (2009) *Palladium-mediated organic synthesis using porous polymer monolith formed in situ as a continuous catalyst support structure for application in microfluidic devices. Tetrahedron, 65 (7).* pp. 1450-1454. ISSN 0040-4020

PDF - Closed Access: Full text available on request
348Kb

Request a copy

Figure 3.9: The fair use dealing button as the viewer sees it
Source: Sale et al. (2010)

A survey was done across Europe by Creasar et al. (2010:159), of scholarly authors' awareness and attitudes towards OA repositories and the factors motivating their use. They used a mixed methods approach in the study involving questionnaires and focus groups. The researchers found that there was increasing support for OA repositories but were not sure of the extent to which that ethos might be leveraged to increase self-archiving rates.

Having observed that despite considerable investment of resources and strong advocacy campaigns from libraries, IRs were not as successful as was expected, Cullen and Chawner (2011) sought to

explore the underlying factors to this state of affairs in their study entitled *Institutional repositories, open access, and scholarly communication: a study of conflicting paradigms.* They explored the perceptions and attitudes toward IRs held by academics, drawn from all eight universities, some larger polytechnics and technical institutes in New Zealand. Their findings revealed a high (75%) awareness of OA amongst respondents but a small number showed willingness to deposit their works in the IRs.

Kim's (2007) study at ABC University, in the USA, entitled: *Motivating and impeding factors affecting faculty contribution to institutional repositories*, focused on reasons behind low submission of content by faculty in one university. The study population only included scholars who had contributed content but excluded those who had not submitted anything. "Surveying the active users does not give a complete picture of why faculty may be reluctant to self-archive" (Koken and Wical 2013:142). Kim's (2007) findings were that those members who were mandated by grant awarding bodies to self-archive were less willing to contribute to the IR. Those faculty members who had future plans to contribute had embraced the OA concept. Therefore, this study assessed author attitudes towards mandatory deposit in Zimbabwe's public universities.

These studies were conducted in developed countries where it can be assumed that with such a high rate of awareness of OA IRs this would translate into increased success for IRs. This gives rise to the need to explore the scenario in developing countries, such as, Zimbabwe, whose scholars are in dire need of increased access to relevant current scholarly literature to facilitate ongoing research. This study sought to establish if the same scenario exists amongst academics in Zimbabwe's public universities. The issue of scholars' apprehensions towards the IR innovation was explored in this study.

There have been "a number of long-standing misconceptions among authors about editorial quality and quality control mechanisms related to OA journals that have led to a lack of author acceptance" (Caruso, Nicol and Archambault 2013:32 and European Commission 2011). According to Caruso, Nicol and Archambault (2013) a number of high quality reputable OA journals have since been launched to date even though there is a negative perception by some that they lack peer review and this stigma still hovers among scholars and researchers. Commenting on the surveys that have been done on author perceptions of OA journals, Caruso, Nicol and Archambault (2013) say that the

findings implied that scholars perceive OA journals as not sufficiently prestigious. Contrary to this shared view, the authors, citing the European Commission (2008), posit that:

> OA journals employ various traditional as well as supplementary or alternative quality-assurance models—peer review, collaborative peer review, moderation, automatic assessment, and assessment by readers—and often a combination of models is used (Caruso, Nicol and Archambault (2013:32).

This study, therefore, established if scholars in Zimbabwe's universities perceive OA journals to be of questionable quality.

The other concern highlighted by Caruso, Nicol and Archambault (2013) is that of sprouting predatory journals. They proffer that unscrupulous publishers are taking advantage of the author pays model of OA publishing to lure unsuspecting scholars under false pretences yet they do not provide the peer-review service which is offered by genuine OA publishers. The strategies they use to lure scholars include; acting as vanity press, publishing content without the authors' formal agreement, making false claims regarding editorial boards or impact factors, plagiarism, and insufficient or inexistent peer review process (Caruso, Nicol and Archambault 2013; Beall 2012). Therefore, it is important that institutions make efforts to alert their scholars of these predators and provide a list of predatory journals like the Beall's (2013) list even though some scholars dispute the list's authoritativeness. The authors suggest that institutions should institute internet literacy training where they can create awareness amongst scholars of the existence of internet fraudulent activities including predatory journals and how they are lured by the journals. This fraudulent activity by predatory journals is attributed to have contributed to the misconceptions of the quality of OA journals that are thought to lack peer review.

3.9.1 IR deposit policies

Institutions face a daunting task of populating their IRs before they start realising return on their investment. One of the very important indicators of success of an IR is participation by contributors of content (Thomas and MacDonald 2007). Therefore, institutions have to seriously consider approaches they can engage to entice their scholars to participate in the development of the IR. There are basically two forms of policies in the OA IR deposit activity; namely, voluntary or mandatory deposit. Voluntary deposit is a situation where the author/researcher decides to deposit

his/her work free of coercion from any party, whereas mandatory deposit is a situation where the employing institution or funding body requires the author to deposit research articles (Sale 2006:1) in a repository. Concern has been raised over author deposit rates which remain quite low (Swan et al. 2014a; Harnad 2011; Sale 2006); an indicator of the complexity of motivating factors for authors to deposit their research. This is despite efforts made by some institutions to persuade their scholars to preserve and measure research output (Day 2004; Thomas and McDonald 2007). Several studies (Swan, et al. 2005; Foster and Gibbons 2005; Kennan and Wilson 2006) indicate that content depositors are not motivated by their institution's prestige or its desire to gauge scholarly productivity but intrinsic motivating factors such as their increased visibility, recognition and impact in their disciplines.

3.9.1.1 Voluntary deposit

Studies (Swan et al. 2014a:7; Giesecke 2011; Harnad 2009) have shown that poor voluntary deposit patterns amongst academics exist. Scholars lack motivation and are at times poorly informed on self-archiving on their own. This is particularly so when the institution does not offer any incentive for doing so:

> As scholars have not until recently been intimately involved in the research publication process outside of production and peer review duties, more active involvement with the dissemination process is unlikely to be adopted quickly by the majority of scholars, who can be sceptical of peers that 'push' their research too vigorously (Cook, Cook and Landrum 2013).

Therefore, for institutions that encourage voluntary deposit it is paramount, as pointed out by Quinn (2010), that outreach or awareness programmes aimed at promoting IRs be conducted; IRs are an important conduit to solving the scholarly communication crisis, that is, inaccessibility of research literature. Content harvestors/IR librarians would also have to actively solicit material from researchers; an activity which requires an investment, by the institution in human resources.

3.9.1.2 Mandated deposit

The primary objective of OA is to make publicly funded research freely available to a wider readership and facilitate further research and knowledge development. However, studies (Cullen and Chawner 2011; Swan et al. 2014b) have shown that despite the high level of awareness of OA by scholars, levels of unwillingness to deposit content in the IRs are quite high. Research carried out in the United Kingdom (UK) revealed that in the absence of a mandate, most researchers are

reluctant to upload papers onto institutional or subject repositories, (Albert 2006); as a result, the intellectual capital of institutions remains elusive. According to Xia et al. (2012), discussions by scholars of mandate policies for OA scholarly communication can be traced back to the early 2000s. The scholars "argued that a mandate policy issued by funders or institutions would be able to raise scholars' awareness of broad information sharing and improve self-archiving of intellectual outcomes" (Xia et al. 2012:86). As a result, "mandatory policies are now widely recognized as the only way to achieve close to 100% of content in institutional repositories" (Sale 2006). According to Xia et al. (2012) comparisons of repositories with mandates and those without have shown a difference in the amount of content in the repositories. The authors cite the Queensland University of Technology in Australia as having collected a larger number of items than other institutions which did not have a mandate. Therefore, mandates should assist institutions in mitigating resistance by faculty to participate in the development of IRs and rid themselves of a culture that is retrogressive.

Quinn (2010:67) opines that the challenge of faculty resistance to cooperation in IR development is primarily motivational characterized by indifference rather than active resistance. Foster and Gibbons (2005:3) in their study, *"Understanding faculty to improve content recruitment for institutional repositories",* established that academics felt overworked, resented clerical work and "any additional activity that cuts into their research and writing time". This is a clear indication of lack of motivation among scholars. Further to this view, in trying to establish the reasons for low deposit rates by authors, Harnad (2011:35) observed that inducements such as, incentives, encouragements, cash rewards from funders or scholars' institutions, information or assistance to authors have not been sufficient motivators for authors to deposit their works. In any case the inducements only accelerate the deposit rate to about 30% (Sale 2006). Harnad (2011), therefore, advocates for deposit mandates by authors' institutions and funder organisations as he believes this provides a cure for 'Zeno's Paralysis' (a paradox of motion attributed to a philosopher that purports that "no finite distance can ever be traveled, which is to say that all motion is impossible" Huggett (2010: 3.1 the dichotomy, paragraph 3). Harnad (2011:36), Jain (2010) and Rentier (2007) cite four reasons behind the Zeno's Paralysis affecting author attitudes towards making their works OA; they fear that OA could violate copyright, bypass the peer review process, destroy journal publishing and, could be time consuming and require effort.

However, mixed feelings have been expressed over the effect of the mandate policies on faculty participation:

> Some argue that … funder or institutional mandates requiring the deposit of publications in open access repositories even represent, as was suggested by the December 2011 introduction of the Research Works Act (RWA) in the United States Congress, an unreasonable infringement on publisher income. In fact, as the number of publishers who spoke out against RWA— leading to its February 2012 withdrawal—might indicate, a range of new financial models for open-access publishing are being developed (Fitzpatrick 2012:348).

Such statements clearly show selfishness by commercial publishers who want to continually have a grip on scholars' intellectual output. So, mandating deposit of research works is likely to cause positive behavior change from an attitude that says 'it's not possible' to one that says 'the sky is the limit', that is, all motion is possible. Drawing from their experience and understanding acquired from global policy making, Swan, Willmers and King (2014) encourage research funders in Southern Africa to develop mandatory OA policies. Quoting the Edem10 conference' motto, Harnad (2011) says:

> 'A revolution doesn't happen when a society adopts new tools. It happens when society adopts new behaviours' (Clay Shirky). It appears that when adopting the new tools entails some perceived risk and effort, as it does with providing OA to research, even when the risk and effort are illusory, institutions and funders may first have to adopt new rules to induce people to change their behaviours so as to begin to enjoy the benefits (Harnad 2011:37).

However, it remains to be established by this study whether such a move (mandates, for those universities that have them) will succeed in getting scholars in Zimbabwe to deposit their research in their institutions' IRs. It will also be of interest to find out how those institutions without mandates persuade their scholars to cooperate in self-archiving.

Xia et al. (2012:86) posits that OA policy mandates are distinguished "by content holders (e.g., institution, programme, or funder) or by type of deposit (e.g., e-print publications or student dissertations)." Arguments have been put forward that it is easier to implement policies that are adopted by programmes rather than those adopted by institutions (Xia et al. 2012; Sale 2007); others believe that policy effect varies with situations (Xia et al. 2012; Baker 2010). It is, however, interesting to note that "an increased rate of self-archiving in an institutional repository may be

because of reasons other than the adoption of a policy" Xia et al. (2012:87). These could include librarians playing an active role in the development of the repository by archiving works for the scholars or continually encourage scholars to self-archive. According to Xia et al. (2012) there is no evidence linking increased faculty awareness, and increased self-archiving with mandated deposit but an increase in self-archiving rates has been recorded after policy implementation.

In a study of three universities with mandatory policies entitled '*The acquisition of open access research articles'*, Sale (2006) analysed the self-archiving behaviour of authors in the repositories as they were still developing. The study established that the scale of the enterprise in which the mandatory deposit policy is applied determines the time it takes for it to become effective, that is, a university-wide scale takes longer (estimate of at least three years to be 80% effective if authors provide the documents themselves) than that at departmental level (few years or one). Sale (2006) believes that the transition can be speeded up if repository managers proactively upload missing papers on the authors' behalf, but warns that lack of direct author incentives and involvement is likely to slow down self-archiving. Therefore, under a mandatory policy, repository managers have to make themselves visible by promoting, following-up and assisting authors in uploading their works for a period of two to three years until the behaviour is imbibed (Sale 2006:11) to ensure 100% success of the IR. So, if the green road is to be effective, institutional depositing has to be obligatory but availability on OA can be optional (Rentier 2007). In Southern Africa, the University of Pretoria has been exemplary by mandating deposit of peer-reviewed articles by its staff to its IR; submission of other works by academics, students and affiliates is voluntary (Abrahams et al. 2010:25). As a result, the institution and its scholars become highly visible on the international sphere.

It can be concluded that the development and implementation of mandate policies by universities can be regarded as an important move towards improving awareness and participation by scholars in building sizeable IRs. It should be born in mind that mandate policies have an unpredictable effect. Xia et al. (2012:100) allude to the existence of policies that having "little or no visible impact on repository development, and different types of policies have varied levels of success." The authors recommend that policies ought to address the needs of scholars if they are to achieve success, while librarians (as OA managers) and advocates have to think outside the box by developing strategies for enforcing mandate policies effectively.

3.10 The role of academic librarians in IR development

The development of the OA IR concept brought with it so many changes to the working culture of librarians since in most universities, they have been tasked with the responsibility of the IR management and maintenance. These changes in communication are forcing librarians to shift their mental models and alter their services. "This requires substantial personal and organizational commitment to change" (Malenfant 2010:63). Mckay (2007) contends that studies have neglected this group regarding how they use software for IRs and how usable the software is for them, yet they play a crucial role in its development. Therefore, this study will attempt to establish the changing roles of librarians due to the introduction of the IR technology in academic libraries in Zimbabwe. It will also establish how they are coping with the use of the IR software adopted by their institutions.

According to Czerniewicz (2013:9) new roles and skills sets were introduced requiring IR managers to acquire such skills and adopt the new roles. Librarians in charge of IR development have assumed titles that are expressive of their roles, such as IR data creators or IR data maintainers (Mckay 2007). An IR's data creator/maintainer is responsible for creating metadata, uploading documents, general oversight of the IR content harvesting/recruitment. Mckay (2007) contends that librarians may be data maintainers as well as scholars/authors in universities where they self-archive their research works. Therefore, there arises a need for capacity building in numerous skills and activities (Czerniewicz 2013:11) for these players to be efficient and effective in their newly assumed roles and responsibilities. Mckay (2007) assumes that the role of the data creator/maintainer requires a combination of "technical expertise, an understanding of metadata and metadata standards, copyright knowledge [and licensing agreements] and the inclination to collate research publications". In addition, technical expertise is required in aggregation, harvesting, analytics and impact assessment.

> Also, as the use of open licenses (such as Creative Commons) become more commonplace, it will be necessary to understand how to publish, re-use, adapt and so on, especially when multiple licenses are at play (Czerniewicz 2013:10).

In concurrence Potvin (2013:69)) says that "OA work in libraries encompasses a shifting structural, technical, legal, interpretive, ethical, and political framework." Therefore, this calls for

academic librarians to acquire the requisite skills sets in OA for them to be relevant, effective and efficient in the OA environment.

> Any student graduating with an MLIS and without significant pre-professional work touching on the legal, publishing, subject-specific, and policy issues around OA will thus need to hone certain skills and sensibilities on the job and with the aid of continuing training and research (Potvin 2013:69).

The author alludes to the fact that subject specialists, reference librarians, and liaisons in academic libraries may shoulder OA responsibilities. Potvin (2013) also says that library units or positions involved in scholarly communication and those participating in digital projects, collection development, or electronic resources may also be assigned OA responsibilities.

Little (2012:66) opines that the most important role played by librarians brought about by the IR technology is outreach and drawing the attention of content depositors so that they build the IR and operationalise its work. The author proposes that librarians ought to think subversively as to whether they should publicise the scholarly communication crisis by preaching the OA and digital archiving gospel at their institutions or be diplomatic by working towards reaching consensus on the function of IRs and transform the attitudes of faculty and researchers. Mckay (2007) contends that librarians have demonstrated leadership skills in IR development and advocating for OA mandates in their institutions. This is compounded by Little's (2012:66) statement that his experience has proven that "where the library leads, others on campus often follow."

Librarians also play a critical role in overcoming academic and publisher resistance and advocating for the IRs to be searchable on various search engines. This is attributed to their positioning in scholarly communication; they link published literature to academics and also facilitate access to the works. In addition, the roles of librarians are being transformed in support of scholarly communication and dissemination of scholarly works. Czerniewicz (2013) suggests that a number of libraries have taken over the function of scholarly publishing. This is supported by Xia and Opperman's (2010:11) expose that Western Kentucky University (Bowling Green) and Illinois Wesleyan University (Bloomington) libraries, were collaborating with faculty editors to launch publishing projects and were quite hopeful about their potential. This implies that librarians in such institutions should to be equipped with publishing skills. This puts them in the limelight within their institutions and they gain more recognition from the academic community.

Mckay (2007) points out that IR development absorbs a significant amount of staff time given that academics are on record as being largely resistant to participation in the development of IRs. Therefore, it is paramount that the attitudes and behaviours of academic librarians towards OA take a positive shift to ensure success of the OA agenda in universities. Potvin (2013) advocates for every academic librarian to have an understanding of the OA and IR concepts and be at ease with depositing works into the IR. In addition, librarians should be well versed with uploading work to an IR and have basic understanding of legal language to enable them to interpret publishing agreements. This knowledge will motivate and enable them to carry out OA outreach activities beyond the library and provoke debate "within the library around the functionality of publishing platforms and the spectrum of OA" (Potvin 2013:70). Impartation of such knowledge, according to the author, can be achieved through self-study, workshops, webinars, and programming. The University of Zimbabwe's personell were the first to receive training on IRs which they were imparting to colleagues at other universities in the country (Kuchma et al 2011). As for Zimbabwe, Malapela (2015) opines that the country's academic libraries were affected by the brain drain which saw librarians who had received training on IRs leave the institutions in search of greener pastures. He claims that this factor contributed to the slow establishment of IRs in the country.

3.11 Challenges to IR development and mitigation measures

Studies (Sale 2006; Mckay 2007; Rentier 2007; Jain 2010; Geisecke 2011) have shown that IR development is fraught with a number of challenges. Geisecke (2011:531) in her paper, *Institutional repositories: keys to success* proffers that content recruitment, getting the right staff and faculty buy-in are some of the major challenges faced in IR development by academic libraries. Libraries experience difficulties convincing scholars to self-archive their research works in the repository. The same view is shared by Jain (2010) in her review of literature on benefits of IRs and possible challenges to their establishment entitled: *New trends and future applications/directions of institutional repositories in academic institutions*. She alludes to the fact that generating content in the beginning is quite daunting and that most scholars do not respond to calls for them to contribute content to the repository. This can be attributed to issues discussed earlier that scholars are often unwilling or lack motivation (both intrinsic and extrinsic) to do so (Jain 2010; Geisecke 2011) and it was because of this indifference that Harnad (2011), (a pioneer

of OA archiving), advocated for the institution of mandates. Lack of motivation can be attributed to the absence of incentives for the scholars, such as, financial incentives, which could prompt authors to provide even bibliographic details of their work, particularly so when other universities are doing so (Jain 2010).

Copyright management issues are another challenge for librarians in developing the IRs. In some instances, authors are apprehensive about breaching copyright and are not adequately versed about their intellectual property rights (Jain 2010; Geisecke 2011:537), so they are not sure whether they can deposit their work in the repository or not. It was discussed earlier that some publishers have embargo periods ranging from six to 12 months before a post-print of an article can be made OA. Others allow deposit of pre-prints while others do not allow at all. This call for librarians to check copyright, authors' rights, and permissions clearance, through SHERPA-RoMEO, a copyright directory (Hanlon and Ramirez 2011; Griscom et al. 2006), for scholars before depositing and identifying journals that allow archiving. In addition, in identification of articles by their scholars, they can contact them seeking permission to post their articles in the IR (Geisecke 2011). This challenge has, to some extent, been circumvented by the 'Fair Use' or 'Request a Copy' Button, where an interested user sends an automated request for full-text of an article that is Almost OA solely for academic purposes. However, as noted earlier, deposit rates remain low.

Geisecke (2011:531) identifies four models that emerged from studies, blogs and websites to mitigate the challenge of populating institutional repositories, but the author found that the models have not been successful in increasing faculty deposits. The first model, mentioned earlier, is the famous 'if you build it, they will come', but this was found to be unrealistic since faculty do not respond. A study by Xia (2008), *'A comparison of subject and institutional repositories in self-archiving practices',* reports that even where scholars were aware of self-archiving practices, they were not enthusiastic about depositing their works in the IR. One strategy that can be employed to get the attention of the scholars is to hold meetings with them to appraise them on OA and self-archiving of their articles. However, this activity was found to be time consuming and a proposal was made to develop a university-wide database system to generate annual reports on publications by academics and post the full-text article without contacting each author (Geisecke 2011).

The second model was to make article depositing appear to be fun and attractive, but this has not appealed to the scholars either. Both IR managers and scholars may face technical challenges with

adaption to "open source systems and compatibility of software to formatting documents in an appropriate long-term format" (Jain 2010:131). Some scholars may show willingness to participate but in the process they mess up things particularly in creating the metadata for the items at the time of deposit, where detailed metadata is required, which causes problems for the IR managers as well. This presents another challenge for the IR manager of ensuring accuracy in deposit of self-archived records since faculty have been found, in most studies, to be inaccurate in completing metadata fields (Geisecke 2011). Underscoring this view Mckay (2007) alludes to the fact that in one study:

> the detailed metadata input fields displayed by ePrints and DSpace in their document deposit interfaces were daunting to both academic staff and librarians. Both groups complained that they often did not have all the metadata, and that it was not clear from either system which elements were required and which were optional (Mckay (2007: usability for data creators and maintainers, Bullet 3).

In addition, the terminology used in IR software, such as, DSpace and ePrints, for the deposit and management interfaces can be confusing and inappropriate for the scholars and librarians while the deposit process can also be tedious and frustrating, particularly where the user is expected to click through a number of screens (Mckay 2007). Therefore, if the commitment of both librarians and scholars to IR development is to be maintained, it is important that attention be paid to their needs and experiences and that the task of uploading works is not daunting and frustrating. This calls for modifications to the data creator and maintainer interfaces and tailor-make them in such a way that they fit into the work practices of the stakeholders (Mckay 2007). There is need for adequate training of depositors (librarians and scholars) to avoid frustration.

The third model is that of mandates (discussed in 3.5.1.2). A number of universities and research funders across the globe have mandated deposit of research works by scholars in OA IRs. Geisecke (2011: 532) notes that scholars do not always respond to them and deposit rates remain slow. "An IR will only function to its optimal capacity when a mandate is in place to populate it. But clearly, researchers can react negatively to any suggestion of compulsion" (Jain 2010:130):

> Mandates rely on authority rather than persuasion to accomplish this and, as such, may represent a less-than-optimal solution to reducing user resistance. Mandates represent a failure to arrive at a meeting of the minds of advocates of open access, such as librarians, and the rest of the intellectual community (Quinn 2010:74).

In any case ensuring wide implementation of the mandatory policies presents another challenge for universities (Jain 2010; Xia 2009; Pickton and Barwick 2006).

The fourth model involves provision of services which include; metadata services, preservation services and technical support. Some academics feel overworked and therefore, may not feel like depositing their research to a 'self-service' site as they may view the activity as time-consuming and at times may be reluctant to learn to use a technology they will not use that often (Geisecke 2011). "They may be happy to contribute content but are reluctant to do it themselves" (Jain 2010:131). Therefore, this calls for librarians to be proactive by depositing the research for the academics. However, Jain (2010) posits that establishing the mediated deposit service may take time particularly where the maintenance of the IR is done by existing library staff who have this responsibility thrust upon them in addition to their usual duties. The library staff may find the IR development process to be time consuming and labour intensive, and end up developing resentment towards the IR, a factor which may hinder success of the IR (Jain 2010; Mckay 2007). Quinn (2010) in his article, *'Reducing psychological resistance to Institutional Repositories'*, suggests that success of IRs hinges on overcoming scholars' resistance to deposit their works in the repositories. Librarians can achieve this by getting some insights into the psychology of resistance in order to reduce it and persuade academics to cooperate in populating the repositories before they resort to mandates. Quinn (2010) suggests that librarians can engage counterintuitive approaches, such as, discussing the resistance with the scholars, highlighting the disadvantages of IRs in order to win them. However, he is quick to say that this technique may not necessarily eliminate the resistance totally but can reduce it.

The other challenge to IR development and management is that of getting adequate funding (Geisecke 2011) or sustainable support and commitment from the university management and scholars (Jain 2010). According to Jain (2010) and Pickton and Barwick (2006) it is often difficult to maintain continued support and commitment from these stakeholders. Lynch suggests that universities need to make serious considerations before installing IRs. He purports that "stewardship is easy and inexpensive to claim; it is expensive and difficult to honor, and perhaps it will prove to be all too easy to later abdicate" (Lynch 2003:334). One of the conditions for the success of an IR is commitment and support from management and staff of the institution, particularly academics as they are the ones who contribute content for the repository.

Lack of respectability of IRs is cited by Jain (2010) as one of the challenges faced by IR creators in developing repositories. Academics fear that they will not achieve the requisite recognition among their peers if they publish their works in their institutional repositories. So, it is paramount for scholars to be reassured that by depositing in the IR they are not publishing per se but are actually enabling access, availability and dissemination of their research. On the same note, it is also important to market the benefits of IRs to the content contributors and the university so that they appreciate the role of IRs in scholarly communication.

Geisecke (2011) also suggests that the IR can be cast as a publishing venture instead of a set of services in order to overcome some of these challenges. If a library takes this route, then the IR manager has to have a publishing background which enables her/him to understand the publishing process from manuscript solicitation, through the production process to the finished product, issues of copyright and permissions and, online dissemination (Geisecke 2011:537). The author believes that such skill enables the repository manager to create a powerful set of services that will attract academics and feel encouraged to support the development of the IR. Geisecke (2011) cites the example of the University of Nebraska–Lincoln libraries, which hired the former director of the University of Nebraska Press as the Coordinator for Scholarly Communication. The director used his experience as a publisher, armed with knowledge of authors' behaviour, to get buy-in from the academics, using various marketing and promotion strategies which generated a high IR success rate. The coordinator appealed to the self-interest of the authors by marketing the repository as a means of getting concrete evidence of use statistics of their works whose visibility would increase through Google and Google Scholar. The coordinator asked academics to send their curriculum vitaes to him by e-mail. Download statistics increased and those academics who participated began to encourage their colleagues to follow suit resulting in competition amongst departments. This concurs with the social influence construct of the UTAUT model which attributes user intention to accept and use technology to the influence of the significant others. "By creating a "buzz" around the publishing work, the coordinator was able to change the viewpoint from why participate to how to participate (Geisecke 2011:537). This study probed the Zimbabwean state university libraries approach to promoting acceptance and use of their repositories by their academics.

3.12 OA promotion within universities

One of the measurements of success of an institutional repository is its population. Content recruitment is at the centre of the development of an IR. It is acknowledged that persuading faculty to deposit their research in the repository remains a challenge (Mercer, Rosenblum and Emmett 2007). In concurrence Ware (2004) expresses that:

> The biggest problem facing those setting up IRs is persuading faculty to use them. Outside a few disciplines (e.g. physics, computer science and economics) there is little tradition of preprints or working papers and apparently still little interest in self-archiving. Academics may be radical in their thought but they are conservative in their behaviour, and there is a great deal of inertia in the current publishing systems (Ware 2004:17).

This calls for action from the institutional stakeholders to take the initiative to promote and create awareness of OA IRs in order to populate the repositories in and increase visibility, availability and accessibility of the research and; get a return on their investment. Returns on investments in information technology by organizations are just not encouraging at all largely due to low usage of installed systems (Venkatesh and Davis 2000:186). Therefore, marketing and promotion of the IR in the university is central to its success.

As mentioned earlier, studies have reported low deposit rates in IRs by scholars which prompted Harnad (2011), an early self-archiving advocate, to forcefully argue for mandating deposit. Deposit mandates can be regarded as one strategy of promoting an institution's repository. A mandate policy creates awareness amongst stakeholders of the institution of the existence and importance of the IR but Jantz and Wilson (2007) urge caution to be taken since they feel it goes against the fundamentals of academic freedom. Mercer, Rosenblum and Emmett (2007) believe that:

> in the absence of those mandates (and perhaps as a necessary preliminary to them) institutions operating IRs will continue to employ a variety of small- and large-scale, labor-intensive methods to reach out to faculty, solicit their material, and further engage them in applying alternative methods to disseminate their research (Mercer, Rosenblum and Emmett 2007:191).

Mandating is regarded as somewhat slow and incremental process (Mercer, Rosenblum and Emmett (2007:191; Salo 2006). Academics have been reported to respond negatively to compulsion (Jain 2010), therefore, a university mandate void of 'incentive structures' is bound to

fail (Jantz and Wilson 2007). However, this should not stop institutions from mandating deposit if they want to get a return on their investment and also push forward the OA movement's agenda.

Another approach to promoting the repository is for librarians to "take time to plant the idea of …[IRs], to allow it to take root and then to nourish it" (Jantz and Wilson 2008:189). This calls for the establishment of relationships with academics across the university through which they continually communicate issues in scholarly communication. Flyers explaining how to start depositing documents and also giving information on which publishers allow self-archiving, and creating a blogging site to encourage dialogue and using the platform to explain IR issues would contribute tremendously in establishing such a relationship. In their paper, Griscom et al. (2006), explain how at the Pennsylvania State University Library, they created flyers and a website called the *Winning Independence site,* which they used for purposes of discussing scholarly communication issues with faculty. The library staff, through this strategy can inform academics by distinguishing between the functions of the IR and the peer review function in formal journal publication and explaining that IRs are not displacing the traditional system of scholarly communication. This strategy allows librarians to understand behaviours and attitudes of the scholars towards self-archiving and work out strategies of encouraging scholars to deposit. Therefore, relationship building between faculty and the library is central to the promotion of IRs.

In order for them to succeed in marketing the innovation, librarians have to get insights into the culture of scholarship occurring in the different disciplines across the university. Jantz and Wilson (2007) propose that they take a market segmented approach to deliver targeted services. They can utilize the services of early adopters of the IR technology or retired academics, as change agents who can influence their colleagues to follow suit. Mercer, Rosenblum and Emmett (2007) in their paper tell the story of the Kansa University where they involved early adopters in the planning and development of their ScholarWorks repository. The early adopters were asked to identify scholars from across the university, who could "learn to use the system, submit some items, and provide feedback to refine the IR" (Mercer, Rosenblum and Emmett 2007:193). This approach tallies well with the social influence construct of the UTAUT model which has been used to inform the current study. According to UTAUT, individuals adopt certain behaviours because of the influence of peers or the significant others.

Library staff can also communicate both formally and informally with scholars through presentations at faculty meetings, workshops, assisting individual scholars to archive their works in the IR and also take advantage of personal relationships. Generally, the library staff can also look for opportunities to discuss OA IR issues with the university staff (Mercer, Rosenblum and Emmett (2007. Faculty liaison librarians are better suited to engage this approach since they are in constant contact with the departments and faculties they serve.

Marketing of the IR requires time and concerted effort from the librarians and university administrators in order to realise success. Where an IR policy exists, Cryer and Collins (2011) advocate for librarians to put some policy support programmes in place which will facilitate awareness creation in the university community on compliance issues which include;" one-on-one researcher consultations, online guides or Web sites, printed or printable handouts, group training sessions and third-party submission services" (Cryer and Collins 2011:104). Library websites can offer faculty support by providing detailed guides explaining IR policy issues such as mandatory deposit. OA policies adopted by the institution promote or kill the impetus of use and impact of the institution's repository which ultimately should contribute to visibility, access and availability of the institution's research output, its scholars and the institution itself.

Another strategy that can be engaged by librarians in marketing and promotion of OA IRs is to hold Open Access Week celebrations in their institutions. This is an event celebrated by libraries across the globe in the last full week of October every year. Cryer and Collins (2011:104) in their article '*Incorporating Open Access into Libraries'* postulate that hosting events for Open Access Week at the Duke University Medical Centre library "proved to be an excellent way to introduce the concepts behind open access to a broad swath of library patrons." The events that can be lined up for the celebrations workshops, discussion panels, displaying SPARC Webcasts and wearing t-shirts with the open access emblem colours and buttons. This strategy, according to Cryer and Collins (2011), proved to be an effective method of promoting and spreading the OA message. Also amongst the events they organised speakers from the local community whom they asked to engage their peers (scholars and researchers) to appeal to them to participate in promoting OA.

3.13 Summary of the chapter

The chapter reviewed existing literature on scholarly communication from a broad scholarly and historical perspective narrowing down to the open access publishing model, with emphasis on the institutional repositories concept which is the basis of this study. It discussed the transformation of the scholarly communication landscape over the years, through the internet technologies, which gave rise to the open access movement. The OA movement's agenda is for researchers and scholars to provide open access to their research findings by publishing them either in online open access journals or by depositing their work in institutional repositories which enable free availability of their content over the internet, thereby, facilitating dissemination of research, increased availability and visibility of research to a wide readership and abate the serials crisis. Studies have shown that research from Africa is not highly visible giving the impression that little or no research is happening on the continent. Institutional repositories play a critical role in filling this void by enabling the exchange of locally developed knowledge for sustainable development at low cost to the institutions of higher learning and also increase their visibility and impact on the global scholarly sphere. This review focused on issues surrounding acceptance and use of institutional repository technology in academic institutions across the globe. The following chapter will discuss the methodology employed in the study.

CHAPTER IV: RESEARCH METHODOLOGY

4.1 Introduction

This chapter discusses the research methodology that has been adopted to investigate the status of institutional repositories in Zimbabwe's public universities. According to Kothari (2004) the term 'research' is used to refer to:

> The systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions towards the concerned problem or in certain generalisations for some theoretical formulation (Kothari 2004:1-2).

Having enunciated the problem and hypothesis in Chapter 1, this chapter endeavours to provide a detailed description of the methodology and justification for its selection. The worldview informing the present study is deliberated on as well as the adopted design for collecting and analysing data. The population and sampling procedure is described, including the research methods and instruments to be used. Finally, the data collection and analysis procedures are discussed as well.

4.2 Selection of methodology

The term 'research methods' refers to the techniques and procedures used in collecting data while 'methodology' aims to describe the strategies surrounding the use of various methods of collecting data which is reliable and valid (Connaway and Powell, 2010; Cohen, Manion and Morrison, 2007). Research methodology does not only include the research methods used but also considers the logic behind the choice of the methods in the context of the study, explaining why a particular technique or method has been used over others to enable evaluation of the research results by others (Kothari, 2004:8). Teddlie and Tashakkori (2009:21) define methodology as:

> a broad approach to scientific inquiry specifying how research questions should be asked and answered. This includes worldview considerations, general preferences for designs, sampling logic, data collection and analysis

strategies, guidelines for making inferences, and the criteria for assessing and improving quality.

Therefore, the aim of this section is to explain the processes and procedures followed in collecting data for the study.

This study takes the form of basic research, alternatively known as scientific, pure or theoretical research. Basic research focuses primarily on generating new ideas and thinking and is indirectly concerned with application of the knowledge to specific, practical, or real problems (Neuman 2007:11; Connaway and Powell 2010). According to Neuman (2007:11) it focuses on rejection or acceptance of theories "that explain how the social world operates, what makes things happen, why social relations are a certain way, and why society changes." The knowledge generated from this research can be generalised. The current study aims to generate knowledge and understanding of the acceptance and use of institutional repositories in Zimbabwe's public universities by exploring the attitudes and perceptions of the scholars, administrators and librarians (gatekeepers) towards the technology. This is particularly important in that it will inform policies and strategies that can be developed or employed by the universities to maximize return on their investment in the IR technology while simultaneously increasing access to and visibility of the country's research output on the international arena, in response to the recommendations of the SARUA reports (Abrahams et al. 2008; Mouton et al. 2008; Abrahams, Burke and Mouton 2010).

4.2.1 The research paradigm

The practice of research is guided by the researcher's belief systems or perceptions of social reality as she/he tries to make sense of a phenomenon under study. Such mental frames are referred to as paradigms or worldviews and they are the foundation on which the web of epistemological, ontological and methodological decisions of a researcher are formed (Denzin and Loncoln, 2008 in Hennik, Hutter and Bailey 2011:11). These perceptions of social reality lead the researcher to adopt qualitative, quantitative or mixed methods research (Creswell 2009:6).

Several definitions of a paradigm have been proffered by gurus in research. Neuman (2007:41) defines a paradigm as "an integrated set of assumptions, beliefs, models of doing good research, and techniques for gathering and analysing data. It organizes core ideas, theoretical frameworks, and research methods." Feilzer (2010:7) refers to a paradigm as an "organising structure, a deeper

philosophical position relating to the nature of social phenomena and social structures". In concurrence, Babbie (2011:25) says that paradigms are essential models or frames of reference used to organize observations and reasoning. Therefore, paradigms direct the researcher's attention to look at specific issues in specific ways.

Pragmatism is a worldview concerned with practically solving a problem and is strongly associated with mixed methods research (Cameron, 2011:101; Feilzer, 2009). According to Cameron (2011), pragmatism can be regarded as a linking pin between paradigm and methodology. The pragmatist worldview bridges the positivist-constructivist or quantitative-qualitative divide by accepting that "there are singular and multiple realities that are open to empirical inquiry and orients itself toward solving practical problems in the 'real world'" (Feilzer 2010:8). Thus, pragmatism, according to Creswell (2009:10) "arises out of actions, situations and consequences rather than antecedent conditions (as in post-positivism)." Pragmatism places emphasis on the research problem and makes use of all available approaches to understand the problem (Teddlie and Tashakkori 2009:10). It is:

> A deconstructive paradigm that debunks concepts such as 'truth' and 'reality' and focuses instead on 'what works' as the truth regarding the research questions under investigation. Pragmatism rejects the either/or choices associated with the paradigm wars, advocates for the mixed methods in research, and acknowledges that the values of the researcher play a large role in interpretation of results (Tashakkori and Teddlie 2003:713).

In this worldview, the researcher is not constrained by the prescriptive nature of positivism and constructivism, but has the flexibility of selecting methods, techniques and procedures of research that will help the researcher to find out what s/he wants to know. The present study was guided by the pragmatist paradigm as the researcher had the flexibility of mixing various "research methods as well as modes of analysis and a continuous cycle of abductive reasoning while being guided primarily by the … desire to produce socially useful knowledge" (Feilzer 2010:6) on the acceptance and use of institutional repositories in Zimbabwe's public universities. The mixed methods approach is strongly associated with this worldview and thus was ideal for the present study.

4.2.2 Research design

"A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure" (Khotari 2004:31). According to Bhattacherjee (2012:35), research design is a 'blueprint' for empirical research whose aim is to answer particular research questions or test particular hypotheses, and therefore, should "specify at least three processes; the data collection process, the instrument development process, and the sampling process (Bhattacherjee 2012:35). The mixed methods research (MMR) design was adopted for the present study.

Mixed methods research has recently gained popularity in social science research practice and has been recognized as the third major research approach/paradigm combining elements of quantitative and qualitative research to answer complex questions (Heyvaert, Maes and Onghena, 2011; Tashakkori and Creswel, 2007; Teddlie and Tashakkori 2009; Creswell and Plano Clark, 2011; Johnson, Onwuegbzie and Turner 2007; Bazeley 2008; Ngulube 2010). The mixed methods approach integrates a different set of ideas and practices that distinguish it from the other major paradigms (Denscombe 2008:270). It applies to any situation in which several methodological approaches are combined "usually, but not essentially, involving a combination of at least some elements drawn from each of qualitative and quantitative approaches to research" (Bazeley 2008:133).

Several other definitions have been generated for mixed methods research without achieving convergence on a definite definition. Tashakkori and Creswell (2007) proffer that mixed methods research is:

> research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both quantitative and qualitative approaches or methods in a single study or program of inquiry (Tashakkori and Creswell 2007:4).

On the other hand, Johnson, Onwuegbuzie and Turner (2007) in their article *Toward a Definition of Mixed Methods Research* examined how the field of MMR is being defined by leaders in the field. They provide a summative definition of MMR after examining 19 definitions that have been put forward by MMR gurus as follows:

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative

research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Johnson, Onwuegbuzie and Turner 2007:123).

Other scholars (Creswell 2003, 2009; Creswell & Plano Clark 2011; Teddlie and Tashakkori, 2003, 2009) defined MMR by its distinct characteristics, which were summarized by Denscombe (2008), as MMR's use of:

a) Quantitative (QUAN) and qualitative (QUAL) methods within the same research project;

b) A research design that clearly specifies the sequencing and priority that is given to the QUAN and QUAL elements of data collection and analysis;

c) An explicit account of the manner in which the QUAN and QUAL aspects of research relate to each other with heightened emphasis on the manner in which triangulation is used; and

d) Pragmatism as the philosophical underpinning for the research (Denscombe 2008:272).

Bazeley (2004:5) proffers that:

mixed methods often combine nomothetic and idiographic approaches in an attempt to serve the dual purposes of generalization and understanding – to gain an overview of social regularities from a larger sample while understanding the other through detailed study of a smaller sample.

In the present study, mixed methods were utilised to gain a comprehensive view of the level of utilisation of institutional repositories in Zimbabwe's public universities by breaking down the study population into sub-groups to get a deeper understanding of the social influences and facilitating conditions influencing behavioural intentions of the individuals to use IRs. The various groups in the population included lecturers (contributors of contents to the repositories as well as users), librarians (guardians or gatekeepers of the IRs and content), Research directors (policy makers in scholarly communication) and analysis of the repositories' contents.

Combining quantitative and qualitative research brought together the strengths of both approaches which resulted in a better understanding of the research problem than either approach alone (Creswell and Garrett 2008 cited in Ngulube 2010:253). In Library and Information Science (LIS), it is not yet known if and how MMR has shaped research (Fidel 2008:265) and there is no significant discourse around the use of MMR in LIS research discourse in Sub-Saharan Africa

(Ngulube 2010:253; 2012). A study by Ngulube's (2012:125) explored utilisation of MMR in articles in LIS journal published in Sub-Saharan Africa (SSA) from 2004 to 2008. He found that 7% of the articles used MMR but with the quantitative approach predominating (Ngulube's 2012:125). Manda (2003) did a content analysis of journal articles published in the *African journal of Library, Archives and Information Science* between 1991 to 1999. The study findings were unable to show a pattern of research in LIS developing towards quantitative or qualitative methodology. Studies (Feehan, et al. 1985; Ngulube, Mokwatlo & Ndwandwe 2009) found that the historical and survey methods dominated. Therefore, this study contributes to the discourse around MMR in LIS research in Southern Africa

Hennik Hutter and Bailey (2011:8-9) broadly define qualitative research as:

> an approach that allows you to examine people's experiences in detail, by using a set of research methods such as in-depth interviews, focus group discussions, observation, content analysis, visual methods, and life histories or biographies.

It also helps to understand the distinct characteristics of qualitative research which are that:

i) It tries to understand why participants react as they do;

ii) It also tends to give more attention to the subjective aspects of human experience and behaviour;

iii) Small samples are often acceptable in qualitative studies (Connaway and Powell 2010:77); and

iv) It seeks to accept and understand the underlying influences on the research issues (Hennik, Hutter and Bailey 2011:9).

Overall, qualitative research collects descriptive data and is inductive; data collection tools associated with this method include observations, interviews and documents, and it employs interpretive data analysis through themes. On the other hand, quantitative research is primarily concerned with measurement issues and therefore, collects numeric data, metrics and so on to measure concepts and relationships between variables in order to derive meaning. Quantitative research is deductive. Data collection tools associated with this approach include questionnaires, structured interviews and tests (Bhattacherjee 2012:6).

Qualitative research emphasizes interpretation of data giving it more meaning so that it is understandable whereas the quantitative approach gives meaning to data by rearranging, scrutinizing and discussing the numerical data by using charts and statistics to explain the relationships between the patterns in the data and the research question (Neuman 2007:90). The emphasis of MMR is the use of multiple research methods (qualitative and quantitative approaches) in tandem and philosophical assumptions (Ngulube 2010:254; Creswell 2009:4) that guide the collection and analysis of data in research and facilitates understanding of a phenomenon or problem. It was therefore hoped that the use of this method in the present study would assist in understanding the issues around the acceptance and use of institutional repositories for scholarly communication in Zimbabwe's public universities.

The motivation to use mixed methods in this study was "the belief that the quality of [the] study can be improved when the biases, limitations, and weaknesses of a method following an approach counterbalance each other" (Fidel 2008:265). The weakness of quantitative research is that it does not understand the circumstances under which people talk and their voices are not directly audible while the researcher's interpretations and biases are excluded. This deficiency is countered by the qualitative research approach which relies on the researcher's individual interpretations and subsequent biases. In addition, it is difficult to generalize the results of a qualitative study due to the small number of respondents; this deficiency is compensated for by quantitative research (Creswell and Plano Clark 2011:12). The other advantage of using mixed methods is that MMR exhibits more proof for studying a research problem than would quantitative or qualitative alone. The researcher has leeway to use various available data collection tools without being restricted to prescribed tools for qualitative or quantitative methods.

According to Katsirikou and Skiadas (2010:15), and as mentioned earlier, evidence of MMR use in Library and Information Science (LIS) is scarce. As a typology of MMR, 154riangulation (tests the validity and accuracy of a study) has been often used by LIS researchers (Fidel 2008; Katsirikou and Skiadas 2010). The use of MMR by LIS researchers enables them to tackle issues more broadly and wholly, in turn amplifying the richness and complexity of the research findings (Katsirikou and Skiadas 2010:15; Fidel 2008:266). This typology was used for the purposes of this study in assessing influencers of behavioural intentions amongst researchers, scholars, policy

makers and the guardians (librarians) and promoters of open access institutional repositories in public universities in Zimbabwe.

> Triangulation seeks convergence and corroboration of findings through the use of more than one method of gathering and analising data about the same phenomenon in order to eliminate the inherent biases associated with using only one method (Ngulube 2010:255).

The originator of the term triangulation, Denzin, posited that the result of triangulation is convergence, inconsistency and contradiction. Whichever outcome triumphs, the researcher can derive superior explanations of the phenomena explored.

This study used the simultaneous methodological triangulation in which qualitative and quantitative methods were used simultaneously with limited interaction between them during data collection. However, the findings complemented each other at the stage of data interpretation (Morse 1991 cited in Johnson, Onwuegbuzie and Turner 2007:115). Triangulation enabled the researcher to have a deeper understanding of the research problem and be confident of the results.

4.2.3 The survey method

A survey was carried out with the aid of questionnaires for academics, Faculty and IR librarians; interviews involving research and library directors, and document analysis (policy documents and literature review), to gather data on attitudes and behavioural intentions of the stakeholders towards acceptance and use of institutional repositories in the country. Connaway and Powell (2010:78) define survey research as "the research strategy where one collects data from all or part of a population to assess the relative incidence, distribution, and interrelations of naturally occurring variables." Data is gathered at a particular interval with the intention to describe "the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events" (Cohen, Manion and Morrison 2007:205).

Through surveys, beliefs and attitudes of a study population can be examined and also a wide audience can be reached. The present study sought to aggregate the views of the stakeholders in scholarly communication in Zimbabwe's universities. The choice of this method was influenced by the fact that it permitted collection of data using multiple methods of data collection and

multiple sampling strategies in relation to the mixed methods approach (Katsirikou and Skiadas 2010). This survey was both exploratory and descriptive.

An exploratory survey is concerned with examining a new area of inquiry for the purposes of determining the magnitude of the problem, deriving new knowledge about the problem and generating questions for future research (Bhattacherjee 2012:6; Neuman 2007:16). Through exploration, the researcher's familiarity with a phenomenon increases and concepts can be clarified. Therefore, a literature review was done (Chapter 3) to gain understanding of OA IR developments globally, regionally and in the country. The literature review was also used to identify the theoretical model (UTAUT) that was deemed ideal for identification of variables to be measured and also development of research questions for the study. The experiences of academics, librarians and directors responsible for research in the universities were also capitalized on to get useful insights into the research problem. On the other hand, a descriptive survey is concerned with:

> conditions or relationships that exist; practices that prevail; beliefs, points of views, or attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing. At times, descriptive research is concerned with how *what is* or *what exists* is related to some preceding event that has influenced or affected a present condition or event (Best, 1970 cited in Cohen, Manion and Morrison 2007:205).

This description is shared by Connaway and Powell (2010:110) who proffer that the purpose of descriptive surveys is to describe the study population's traits, "estimate proportions in the population, make specific predictions, and test associational relationships." Therefore, a descriptive survey is concerned with presentation of a detailed impression of a given phenomenon by documenting the 'how' and 'who' aspects of a phenomenon (Bhattacherjee 2012; Neuman 2007) by studying a representative sample of the population. Therefore, importance is attached to the sampling method used in coming up with the population sample.

This survey is also cross-sectional as it sought to examine adoption and use of Irs in public universities across Zimbabwe. A cross-sectional study, according to Cohen, Manion and Morrison (2007:213), is one that "produces a 'snapshot' of a population at a particular point in time." In essence, it involves selecting a representative sample of different categories of the target population. The sample for the present study was drawn from academics (Professors, Lecturers, Teaching assistants, Staff development fellows and Research fellows), Directors of research and

librarians. The strength of a cross-sectional survey is that independent and dependent variables get to be measured at the same time by using the same instrument (Bhattacherjee, 2012:39).

One challenge with a cross-sectional survey is that sampling is complicated and therefore requires caution to be taken to ensure comprehensiveness of the information. The division of the category of academics into various strata will hopefully result in achieving comprehensiveness in the data. Cross-sectional surveys also run the risk of some potential respondents refusing to participate while others may not provide answers to certain questions or provide wrong answers. The researcher availed a letter (Appendix 7) explaining the purpose of the study and asked them to sign an informed consent form (Appendices 8 and 9). The instruments were designed using literature and questionnaires used by other researchers in their studies; these were pilot tested to ensure that questions were clear to the respondents so that they provided the correct information.

This study capitalised on the inherent strengths of survey research. Firstly, surveys present an opportunity for measuring several unobservable data, such as individuals' attitudes towards open access and institutional repositories, their beliefs and preferences in scholarly communication practice, character traits (such as, self-esteem), behaviours towards adoption of new technologies, or factual information about OA. Secondly, the method enabled remote collection of data through electronic mail and telephone interviews. Given that the universities are spatially populated across the country and that some respondents could not be reachable at designated times, the researcher engaged colleagues based in the institutions to distribute and collect questionnaires. Thirdly, the inherent strengths of interviews and questionnaires (to be discussed later here) further strengthen survey research.

Fourthly, because the sample size of this study was large, the survey allowed "detection of small effects even while analysing multiple variables, and…also allow[ed] comparative analysis of population subgroups" (Bhattacherjee 2012:73), particularly subgroups in the category of academics, that is, behaviours and attitudes of senior researchers compared with those of junior researchers. An analysis of the effects of social influence, facilitating conditions, effort expectancy and performance expectancy and the moderators (age, gender, experience and voluntariness of use) was done to determine the scholars' behavioural intentions to adopt and use Irs. These factors were used to derive frequencies. Finally, in terms of time, effort and cost, survey research is economical and efficient. The discussion will now move to the study population.

4.3 The study population and sampling methods

This section provides a detailed description of the population of the study and the sampling methods that were employed by the study.

4.3.1 Population

Bhattacherjee (2012:65) defines a population as "all people or items (unit of analysis) with the characteristics that one wishes to study." Zimbabwe has ten public universities but for this study only eight were involved, namely; Bindura University of Science Education (BUSE), Chinhoyi University of Technology (CUT), Great Zimbabwe University (GZU), Harare Institute of Technology (HIT), Lupane State University (LSU), Midlands State University (MSU), National University of Science and Technology (NUST) and the Zimbabwe Open University (ZOU). One major university, the first to be established in Zimbabwe, the University of Zimbabwe (UZ), refused to participate in the study (see Appendix 18), while the other, Gwanda State University (GSU), is still in its infancy and is under the tutelage of NUST. These universities are situated across nine provinces of the country, with ZOU having regional offices in all ten provinces. Information was obtained from the institutions. Letters of request for statistics of the academic staff establishments were written to the universities to which the figures were availed to the researcher (Table 4.1). Statistics of the number of faculty and IR librarians were also obtained from the libraries. Participants of the study were drawn from a total of 2,226 members of the academic community, eight directors of research centres, eight directors of libraries and 40 assistant librarians. The institutional repositories of these institutions were also included in the study to measure their success. The academic community comprised 38 Professors, 44 Associate professors, 1879 Lecturers, 265 Research fellows (RFs), teaching assistants (Tas) and staff development fellows (SDFs) (see Table 4.1). The last category was lumped together because some institutions did not provide a breakdown of these.

Table 4.1: Population size

Institution	Research Directors	Library Directors	Academic Librarians	IR Librarians	Academics					
					Professors	Associate Professors	Lecturers	RFs, Tas, SDFs	Total	Percent
BUSE	1	1	4	1	8	3	192	16	219	9.8
CUT	1	1	3	1	7	5	215	47	274	12.3
GZU	1	1	6	1	3	4	303	20	330	14.8
HIT	1	1	3	1	2	0	222	23	247	11.1
LSU	1	1	2	1	0	0	70	4	74	3.3
MSU	1	1	5	1	7	9	391	57	464	20.9
NUST	1	1	6	1	4	9	304	96	413	18.6
ZOU	1	1	3	1	7	14	182	2	205	9.2
Total	8	8	32	8	38	44	1879	265	2226	100

Source: Field data (2016)

4.3.1 Sample size

Using the Krejcie and Morgan (1970) table for determining a representative sample for the population to be studied, the sample size for academics was 327. However, on computing, the figures had to be rounded off giving a total of 328 (Table 4.2). When broken down into various strata the sample sizes included six professors, seven associate professors, 276 lecturers and thirty-nine RFs/TAs/SDFs. Determination of the sample size took into consideration the size of the population, the varied characteristics of the population and the sample's subgroups whose estimates were required (Salant and Dillman, 1994; Chuan, 2006). The sample size was assumed to be relatively large enough to increase the confidence level of the research results. There were eight research directors, eight library directors, 32 faculty librarians and eight IR librarians. Therefore, the total sample size for this study was 384. The sample sizes of the study population are shown in Table 4.2 below. Nine (one university has two registered repositories) institutional repositories at these universities were also analysed.

Institution	Census				Probability sampling (random stratified)							
	Research Director	Library Director	Faculty Librarian	IR Librarian	Academics							
					Professors		Associate Professors		Lecturers		Research Fellows, Teaching Assistants	
BUSE	1	1	4	1	8	1	3	1	192	28	16	2
CUT	1	1	3	1	7	1	5	1	215	32	47	7
GZU	1	1	6	1	3	1	4	1	303	44	20	3
HIT	1	1	3	1	2	0	0	0	222	33	23	3
LSU	1	1	2	1	0	0	0	0	70	10	4	1
MSU	1	1	5	1	7	1	9	1	391	57	57	9
NUST	1	1	6	1	4	1	9	1	304	45	96	14
ZOU	1	1	3	1	7	1	14	2	182	27	2	0
Total	8	8	32	8	38	6	44	7	1879	276	265	39
Total sample	8	8	32	8	38/2226=1.7%		44/2226=2%		1879/2226=84.4%		265/2226=11.9%	
					1.7*327= 6		2%*327= 7		84.4%*327= 276		11.9%*327= 39	

*Sample for given population of N2226 = S327. Source Krejcie and Morgan (1970)
Academics: Black = Population   Blue = Sample

4.3.2 Choice of participants

Academics (Professors, Lecturers, Staff development fellows, Research fellows and Teaching assistants) were an important target for the survey because they are the creators and users of the scholarly content. They are viewed as prime agents of change who influence adoption and use of OA IRs in scholarly communication. Research directors were also considered an important target population since they are involved in formulation of policies that influence the publishing behaviours of academics including adoption of OA innovations. Librarians were also included by virtue of being content harvesters and maintainers of IRs. They work closely with the academic community, so their participation contributed significantly to understanding the problem. The

introduction of IRs has also affected their working culture and job descriptions. Their attitudes, behaviours and perceptions were worth capturing as they have a bearing on the success of the IRs.

4.3.3 Sampling method

Two types of sampling were adopted depending on the category of the population. Given the relatively small size of the population a census was conducted on the Research Directors, Library Directors, Faculty Librarians and IR Librarians. Through a census, sampling error is eliminated and a desirable level of precision was achieved (Israel 1992).

Probability sampling was used for the academic staff given their large number. Probability sampling involves "selecting a relatively large number of units from a population, or from specific subgroups (strata) of a population, in a random manner where the probability of inclusion for every member of the population is determinable" (Tashakkori and Teddlie 2003:713; 2009:171). The type of probability sampling used in the study was stratified sampling as this allowed each member of the study population to be assigned into a group (Professors, Lecturers, Teaching assistants, Research fellows and Staff development fellows). This was followed by a simple random sampling or systematic sampling technique which was used to select participants from each group or stratum. For each institution, convenience sampling was used for selection of participants based on their availability at the time of distribution of questionnaires. However, the researcher, as a first step, divided the number of participants by the number of departments in the institution, then conveniently identified participants with the assistance of secretaries and colleagues in the departments.

4.4 Data collection instruments

The nature of instruments used in data collection affects the research findings, resulting in them losing their validity (Connaway and Powell, 2010:146). Since the study focused on establishing the status of IRs, several data collection instruments were used in order to obtain a comprehensive picture of their status. Questionnaires for academics and librarians, interviews for research directors, library directors and the chairperson of The Zimbabwe University Libraries Consortium (ZULC) were used to collect data. Documentary analysis was done involving research and OA/IR policy documents, review of existing literature and bibliometric analysis of the institutions' IRs,

OpenDoar and ROAR were also done. A ZULC workshop was also attended. This section therefore, discusses the various research instruments used.

4.4.1 Questionnaires

As one of the categories of survey research, a questionnaire is described as a research instrument comprising "a set of questions (items) intended to capture responses from respondents in a standardized manner" (Bhattacherjee 2012:74). Respondents complete these questionnaires in writing.

Self-administered questionnaires were used and they comprised both closed or structured questions and open-ended/unstructured questions. Closed-ended questions required respondents to select the most appropriate response(s) from a list of choices whereas open-ended questions provided respondents with an opportunity to provide answers in their own words and also give detailed explanations. Given the sample size of academics (328) the questionnaire proved to be an economic means of collecting data in terms of its cost, time and coverage of the target population. The questionnaire allowed respondents to provide responses to questions at their convenience without the influence of the researcher.

Two sets of questionnaires were designed for the different categories of participants in the study. One was for librarians, while the other was for academics. The questionnaire for librarians (Appendix 2) was divided into three sections based on the type of data sought. Section A solicited information on the establishment of the IR by the institution. The purpose of this section was to establish the effects of the IR establishment on the jobs of the librarians and ascertain their attitudes towards the technology. The second section (Section B) sought to establish the marketing and promotion strategies being employed by the librarians to increase acceptance and use of the IRs. Lastly, Section C explored the factors influencing content recruitment in the institution. All these aspects were used to measure the success of the IRs.

The questionnaire for academics (Appendix 1) also comprised three sections, namely, demographic data, awareness of open access and perceptions of IRs. Demographic data was particularly important in establishing if the constructs of discipline, age, experience and gender had an effect on acceptance and use of the IRs. Section B intended to measure the academic community's level of awareness of the concept of open access and particularly institutional

repositories. The last section (section C) sought to establish the respondents' attitudes toward IRs and their perceptions of IRs.

4.4.2 Interviews

Interviews are a more personalized form of collecting data (Bhattacherjee 2012:78) which can be conducted either face-to-face or by telephone. In this form of data collection, the interviewer interacts with the interviewee to discuss issues in-depth involving the interviewer asking questions and recording the responses either by noting down or using a recorder. Hennink, Hutter and Bailey (2011:109) describe an in-depth interview as a conversation with a purpose where "the researcher's purpose is to gain insight into certain issues using a semi-structured interview guide." This study used semi-structured interviews involving Research Directors and Library Directors to obtain in depth insight into the acceptance and use of IRs in the country's public universities.

The interview allowed the researcher to probe for more detail or ask follow-up questions to responses that were given by the respondent while the respondent was also afforded the opportunity to seek clarification on ambiguous questions. Therefore, an in-depth interview is:

> a meaning-making partnership between interviewers and their respondents…The interviewer and interviewee thus co-create knowledge and meaning in the interview setting and thereby co-construct reality (Hennink, Hutter and Bailey 2010: 109).

This brings to the fore the fact that collaboration takes place between the interviewer and the respondent (Legard, Keegan and Ward, 2003). Therefore, for this study the researcher engaged with the Research and Library Directors to obtain an overview of the attitudes and perceptions of policy makers towards IRs and also to establish how they intended to ensure maximum return on investment in established IRs. The interview guide for the Library Directors (Appendix 3) comprised three sections. Section A sought information on factors around the establishment of the IR. The second section was concerned with roles assumed by the library staff and the challenges they faced in content recruitment/harvesting. Section C of the guide was concerned with establishing the marketing and promotion strategies adopted by the library in raising awareness of the IR and increasing content deposit.

The interview guide for Research Directors (Appendix 4) aimed to establish the position of the institution regarding promotion of acceptance and use of IRs as a platform for sharing and disseminating research output by its scholars.

4.4.3 Documentary analysis

One important aspect of data collection in a qualitative study involves gathering background and historical data through reviewing documents. Document reviewing assists the researcher in understanding "the history, philosophy, and operation of the [system] and the organization in which it operates" (ETA Evaluation brief 2009). Marshall and Rossman (2006:107) postulate that:

> Researchers supplement participant observation, interviewing, and observation with gathering and analysing documents produced in the course of everyday events or constructed specifically for the research at hand. As such, the review of documents is an unobtrusive method, rich in portraying the values and beliefs of participants in the setting.

Documents worth reviewing that can assist the researcher to understand the setting include, policy statements, minutes of meetings, letters, circulars and so forth. According to Marshall and Rossman (2006:107) other informative sources of information on the problem include scholarly journals and samples of free writing. Documentary analysis was done in order to understand facilitating conditions to acceptance and use of IRs in Zimbabwe's public universities. Documentary sources used in this study included policy documents, existing literature and the bibliometric analysis of the institutional repositories, the Directory of Open Access Repositories (OpenDoar) and the Registry of Open Access Repositories (ROAR). These are discussed below.

4.4.3.1 Policy documents

In order to obtain a holistic view of the institutions' role in promoting open access publishing, the researcher analysed the contents of the OA/IR policy documents of six institutions which were availed to her. Two institutions were yet to complete compilation of their policies. She could not secure research policies from seven institutions. One of the institutions was waiting for the policy to be adopted by the university Council. The researcher managed to get the research policy of one university from its website and also used an open access report from another university's research web portal. Of particular concern was the tenure and promotion considerations and also the research dissemination requirements. That is, if at all there were funding mandates which had to

be observed by the scholars. This had a bearing on the success of the IR programmes of the institutions.

4.4.3.2 Literature review

Secondary sources were used to obtain the world view of IRs and general developments in OA and this information was expected to inform and guide the study and this was achieved through synthesising existing literature. A literature review, as described by Busha and Harter (1980:19), is "an attempt to identify, locate, and synthesise completed research reports, articles, books and other materials about the specific problems of a research topic." Wentz (2014) further postulates that:

> A literature review is a synthesis (not a summary) of previous work in a specific area(s). A synthesis means you are bringing together different aspects of the literature and creating something new with it. The result is a critical evaluation of the current theory ad methods of a particular topic reflecting what is known, how it is known, and what is unknown (Wentz 2014:81).

The literature was used to identify concepts and relationships, similarities and differences in opinions of scholars on particular issues that could be compared against data to be collected in the study. It also facilitated stimulation of questions which were used to develop questionnaires and interview guides for data collection and was expected to play a similar role later in data analysis. By reviewing other scholars' works the researcher was able to understand the research problem. It was also found useful in that it played a supplementary role in validating and explaining why the research findings support or differ from the existing literature (Silverman 2013:341). Therefore, reading and synthesis of existing literature assisted the researcher in gaining an understanding of issues surrounding the IR technology and also helped in shaping the course of the study.

4.4.3.3 Bibliometrics

The bibliometric analysis of the IRs, OpenDoar and the ROAR was done in order to obtain data on the universities' repositories. Bibliometrics also known as informetrics or scientometrics is a documentary inquiry into LIS tools. It is described as "the application of mathematics and statistical methods to books and other media of communication" (Connaway and Powell 2010:81). Therefore, quantitative data is collected through this method. According to Okubo (1997)

> Bibliometrics is a tool by which the state of science and technology can be observed through the overall production of scientific literature, at a given

level of specialisation. It is a means for situating a country in relation to the world, an institution in relation to a country, and even individual scientists in relation to their own communities (Okubo 1997:6).

Bibliometrics were used in the study of Web documents, Websites, search engines (information retrieval tools) and in user studies. As mentioned earlier, the researcher chose to collect data from the DOAR and the ROAR because OpenDOAR lists and categorises academic IRs from across the globe while they are registries of individual institutional repositories which can be used to track data of their size, growth and type of content. Each institutional repository was analysed to determine the software used in setting it up, the administrator, content categories, development and accessibility. The researcher also searched and downloaded content from the repositories to determine accessibility and availability of contents in full-text.

4.4.4 Workshops

The researcher attended a workshop on open access on 30 November 2015 which was hosted by the ZULC at the Holiday Inn hotel in Bulawayo, where various stakeholders had been invited to participate. These included the Minister of Higher and Tertiary Education, Science & Technology Development, University and College librarians, Vice Chancellors of universities and the Research Council of Zimbabwe. The workshop's theme was Advocacy for a National Mandate on Open Access and Management of Open Research Data in Zimbabwe. The workshop gave insights into the developments in OA acceptance and usage in higher education in the country.

4.4.5 Reliability and validity of the instruments

According to Powell (1997:37) validity and reliability are prerequisite for the design and measurement of research. They are in essence, "yardsticks against which the adequacy and accuracy of our measurement procedures are evaluated in scientific research" (Bhattercherjee, 2012:55). Babbie (2014:153-155) further postulates that reliability is a matter of "whether repeated application of a particular technique on the same object" produces the same results each time, whereas "validity is concerned with the level to which an empirical measure adequately reflects the real meaning of the concept under consideration."

During the design of the research instruments, the researcher adapted questions from previous studies with the assumption that they had been tested already, thereby making the instruments valid and reliable. However, it is also worth mentioning that some questions were developed by

the researcher in order to meet the objectives of the study and this called for pre-testing of the instruments to increase validity and reliability of the instruments.

The questionnaires and interview guides were pre-tested on staff in the University of KwaZulu-Natal School of Social Sciences, College of Humanities and Pietermaritzburg library staff. The purpose of pre-testing survey instruments is to eliminate ambiguous phrases, awkward wordings, missing response categories and issues that are unknown to the target respondents (Presser et al. 2004:110). This was done to ensure that respondents did not misinterpret questions. Suggestions on improvements were solicited from the respondents.

Given that the study used several data collection instruments, these were triangulated in order to eliminate bias and, strengthen reliability and validity of the instruments. Triangulation is "the combination of multiple data sources, data collection and analysis procedures, research methods, investigators and inferences that occur at the end of the study" (Teddlie and Tashakkori 2009:27) in "order to eliminate the inherent biases associated with using only one method" (Ngulube 2010:255).

4.4.6 Clearance to undertake research

The initial step taken by the researcher was to seek ethical clearance to carry out the study from the University of KwaZulu-Natal's Humanities and Social Sciences Research Ethics Committee. Full approval was granted (Appendix 6). The researcher then proceeded to seek permission to carry out the study from the nine public universities in Zimbabwe. Application letters (Appendix 10) requesting permission to conduct research were written and sent to the Registrars of the institutions. The letters explained the purpose of the study and its expected outcome and, specified when data collection was expected to commence. Permission was granted by eight universities, namely, BUSE, CUT, GZU, HIT, LSU, MSU, NUST and ZOU (Appendices 11 to 18) on condition that a copy of the thesis be availed to them. Despite being the oldest and leading university in the country, the University of Zimbabwe did not grant the researcher permission to carry out the study in the institution and therefore, was excluded from the study. The clearance letters were shown to respondents so that they were comfortable to participate in the study knowing that the institutions were aware of the research.

Informed consent was sought from the participants by availing a letter introducing the researcher and explaining the purpose of the study (Appendices 7-9). Informed consent refers to "the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decisions" (Diener and Crandall 1978 cited in Cohen, Manion & Morrison 2007:52). Participants were informed that participation was voluntary and they could withdraw whenever they wished to do so. In data collection, presentation, interpretation and analysis, anonymity of respondents and confidentiality of responses were maintained and the research ethical guidelines of the University of KwaZulu-Natal were observed.

4.4.6.1 Administration of the instruments

The questionnaires were distributed to academics with the assistance of colleagues based at the universities. Visits were made to the different departments in the universities and with the help of secretaries and academics present at the time of distribution, the questionnaires were given to respondents. A cover letter (Appendix 7) was attached to the questionnaires explaining the purpose of the study and its expected outcome. A consent form (Appendix 8) was also given to the respondents stating that participation was purely voluntary and assured them of their anonymity and confidentiality of the information they supplied. Participants were required to sign the consent form which was also countersigned by the researcher. However, some participants refused to sign the consent form citing anonymity issues despite assurance by the researcher that the letter would not be attached to the questionnaire, but they agreed to participate in the study. A similar procedure was followed in distributing questionnaires to the Faculty and IR Librarians.

Initially respondents were given a week in which to complete the questionnaires, but due to inconveniences caused by the examination sessions which were running in all the universities, they ended up taking as long as 4 months, after which they were collected. However, where possible the respondents were encouraged to complete the questionnaire immediately since the instruments were short enough to be completed at the time. Constant reminders were given in order to achieve a high response rate and in instances where respondents lost the questionnaire, soft copies were emailed to them.

Before embarking on the interviews, the researcher phoned the directors to make appointments for the interviews. All the interviews were held face-to-face and before commencing the interview, the interviewer explained to the interviewees the purpose of the study and expected outcomes.

They were also given the consent forms for them to complete and sign before the interview commenced. All the interviews were recorded and six lasted for an average of forty minutes while the rest were within the projected thirty minutes to complete.

The researcher requested the Research Directors to provide her with the research policy guidelines in order for her to analyse the contents and obtain background information to the problem under study. The documents were not availed to her. A similar request was made to the Library Directors to provide her with their IR policies, which they gladly provided.

4.5 Data analysis procedure

This section will discuss how data collected using the various research instruments discussed above was analysed. Marshall and Rossman (1999: 150) postulate that data analysis involves:

> bringing order, structure and interpretation to the mass of collected data. …
> It is the search for general statements about relationships among categories
> of data … it is the search among data to identify content.

Qualitative researchers in most cases prefer using the thematic content analysis technique. This technique was adopted for this study. Quantitative data were analysed using SPSS. These are discussed below.

4.5.1 Qualitative data analysis

Thematic content analysis as mentioned earlier is a descriptive form of presenting qualitative data. The thematic content analysis approach was used in analysing data obtained from interview transcripts and open-ended questions in the questionnaires. According to Eisner (1998:104 cited in Tedlie and Tashakkori 2009:252):

> formulation of themes within an educational criticism means identifying the
> recurring messages that pervade the situation about which the critic
> writes… in a sense a theme is a pervasive quality…[which] tend to permeate
> and unify situations and objects.

Themes were generated from the research questions and reviewed literature while others were generated from the collected data. According to Anderson (2007) the researcher in using thematic content analysis, is objective in her/his epistemological stance. The researcher categorised and extracted common themes from the text "in order to give expression to the communality of voices

across participants" (Anderson 2007:1). Anderson alludes to the fact that there are a number of software programmes that can be used to automate the labelling and categorizing of texts and also to analyse the qualitative data. Software such as Microsoft Word and NVIVO can be used effectively. Microsoft Word was used to categorise text.

4.5.2 Quantitative data analysis

Quantitative data analysis can be said to be a systematic approach to transformation of collected data into numerical data (statistics). During this process the researcher measures or counts attributes in the data. Chamblis and Schutt (2015: 155) define a statistic as "a numerical description of a population, usually based on a sample of that population… a *statistic* specifically describes a sample." Descriptive statistics were used in the study. Statistics are used in a description of results that measure single variables or for construction of multi-item scales. Therefore, graphs, frequency distribution tables, variations and measures of central tendency were utilized in analysis of data of this nature. Cross-tabulations were used to measure association of UTAUT constructs.

Returned questionnaires were combed for missing information and coded. Numerical data were used to describe and discover patterns in the data. The coded data were analysed using SPSS version 23 to generate frequency tables, graphs and charts.

4.6 Summary of the chapter

This chapter discussed the methodology that was adopted for the study and justified its choice. The study took the form of basic research as it sought to generate knowledge and understanding of the acceptance and use of OA IRs by exploring the attitudes and perceptions of university administrators, librarians and scholars towards the technology. The chapter also deliberated on the pragmatist worldview informing the study and is strongly associated with the mixed methods research design which was used for data collection and analysis. The population and sampling procedures were also described, including the research method that was adopted for the study and instruments used in collecting data. The choice of the population was also justified. The chapter also discussed the data analysis procedure. The next chapter will present the results of the study.

CHAPTER V: PRESENTATION OF RESULTS

5.1 Introduction

This chapter presents the research results of a survey that was carried out through questionnaires and interviews to explore the utilisation of institutional repositories in Zimbabwe's public universities, and ascertain the reasons why scholars are not depositing their works to their IRs in order to establish strategies that can be adopted in policy and practice to increase acceptance and usage of IRs. The objectives of the study were to assess the utilisation of institutional repositories in Zimbabwe's public universities, and ascertain the reasons why scholars are not depositing their works to their IRs. These objectives and the research questions guided the presentation of the results.

The study, therefore, sought to answer the following questions:

1. What categories of documents were included in the IRs?
2. What was the role of the academic librarian in promoting the institutional repository?
3. How has the institution contributed to the promotion of OA?
4. What were the attitudes and concerns of academics towards IRs?
5. What challenges did the academics and librarians face in contributing to and managing the IRs?
6. What strategies could be employed to overcome the challenges?

As mentioned in Chapter 4, this study employed a mixed methods design which combined aspects of qualitative and quantitative research approaches to obtain a better and deeper understanding of the research problem. Multiple instruments were used in data collection in order to obtain a holistic picture of the status of IRs in Zimbabwe's public universities. These included two questionnaires for academics and faculty/IR librarians, two interview guides for library and research directors respectively, analysis of OpenDoar, ROAR, the university IRs and policy documents analysis. The researcher also attended a workshop on OA in Zimbabwe which was hosted by the Zimbabwe University Libraries Consortium (ZULC). A thematic presentation of results is made with the aid of frequency tables, charts and graphs. Justification for each question that was asked will be

provided followed by the presentation of the results. Descriptive statistics are used to present quantitative data using SPSS 23. The names of institutions, and directors will be identified by pseudonyms in the order determined by the researcher.

5.2 Response rate

As indicated in the methodological chapter, 328 questionnaires were distributed to academics in eight public universities which included BUSE, CUT, GZU, HIT, LSU, MSU, NUST, and ZOU. This was achieved through the assistance of colleagues based in the institutions. Of the 328 questionnaires, only 187 were returned which yielded a response rate of 57%. A further break down of responses from academics by their different strata is shown in Table 5.1. The results show that out of 276 lecturers there were 159 (57.6%) responses, four (66.7%) out of six from professors, three (42.9%) out of seven associate professors and 21 (53.9%) TAs/SDFs/RFs participated in the study. This can be attributed to the timing of the data collection. At the time of collecting data, all the universities were in the examination session, so following up on respondents was quite a challenge since some were either invigilating examinations while others had started marking the examinations away from their offices. This period was immediately followed by the end of year vacation (Christmas holiday) which aggravated the situation. According to Bhattarcherjee (2012:80) "Survey research is generally notorious for its low response rates." Questionnaires were also distributed to faculty and IR librarians across the eight universities. Of the 40 questionnaires distributed to librarians, 25 were returned giving a response rate of 62.5%. A total of 16 interviews were conducted involving eight Library directors and eight Directors of research in the universities. One of the directors was also the chairperson of the Zimbabwe University Libraries Consortium (ZULC) and therefore, the researcher used the opportunity to find out the role being played by ZULC in promoting OA and IRs in the country. Therefore, a 100% response rate was achieved. This response rate was achieved through the researcher's persistence in trying to secure these interviews, particularly with those directors who were not easily reachable.

Table 5.1: Response rate

	Census			Probability sampling (random stratified)				
	Research Directors	Library Directors	Academic /IR Librarians	Academics				
				Professors	Associate Professors	Lecturers	RF, TAs, SDFs	Total
Sample Population	8	8	40	6	7	276	39	328
Responses	8	8	25	4	3	159	21	187
Percentage	100%	100%	62.5%	66.7%	42.9%	57.6%	53.8%	57%
Data collection instrument	Interview	Interview	Questionnaire	Questionnaire				

RF = Research Fellow   TA = Teaching Assistant   SDF = Staff development fellow

The researcher also managed to scrutinize six OA/IR policy documents that were availed to her by the library directors of six universities. Two universities did not avail their policies because they were still drafting them and were yet to be approved by their university Senates. Data on the IRs was also retrieved from the universities' websites, OpenDoar and ROAR. The researcher also attended one ZULC OA workshop on 30 November 2015.

5.3 The results

This section will present data obtained through questionnaires, interviews, document analysis and IR content analysis. Two sets of questionnaires were used, one for academics and the other for librarians and, two sets of interviews were used with Library directors and Directors of research respectively. The instruments were divided into sections and comprised both open-ended and closed questions.

5.3.1 The utilisations of institutional repositories in Zimbabwe's public universities

The first objective of the study was to establish the utilisation of IRs in the eight public universities. From this objective three questions were generated as follows:

1. What categories of documents are included in the IRs?
2. What is the role of the academic librarian in promoting the institutional repository?
3. How has the institution contributed to the promotion of OA?

Data for this question was collected through IR content analysis, policy document analysis, questionnaires and interviews. The results will be presented in the sub-questions below.

5.3.1.1 Categories of documents included in the IRs

This research question sought to establish the various kinds of documents that had been included in the repositories of the eight universities. This research question is informed by the UTAUT construct of performance expectancy. Differing views have been expressed on what kind of materials should be incorporated in institutional repositories. So, the researcher was interested in finding out if the local universities were in agreement on the contents to be included in the repositories and also assumed that this factor could have an influence on acceptance and usage of the repositories by scholars and researchers. The researcher also sought to establish the history and composition of the repositories besides identifying the documents.

5.3.1.1.1 IR establishment in the universities

The researcher sought to establish the number of institutional repositories in each university, so question 2 of the Research directors interview guide required them to state the number of IRs they had in their institutions. Seven (87.5%) library directors mentioned that they had two repositories, that is one for the public domain and the other one for the local (intranet) university community. Six (75%) universities referred to the repositories that were internal as unofficial repositories whilst those on the public domain were the official IRs. One (12.5%) university had only one IR for the public domain which also contained items that were only for internal use by the university community. A follow-up question (Q3.) required the library directors to state the date of establishment of their IRs. Two IRs were established between 2007 to 2009, therefore, they were more than six to10 years old and seven IRs were established between 2010 to 2012, therefore, they are two to five years old.

For IR/faculty librarians question 5 required them to state the time-span in which the IR has been operational. The results in Figure 5.1 indicate that seven universities' IRs have been operational for a period of one to five years and one university's IR was six to 10 years old.

N = 25
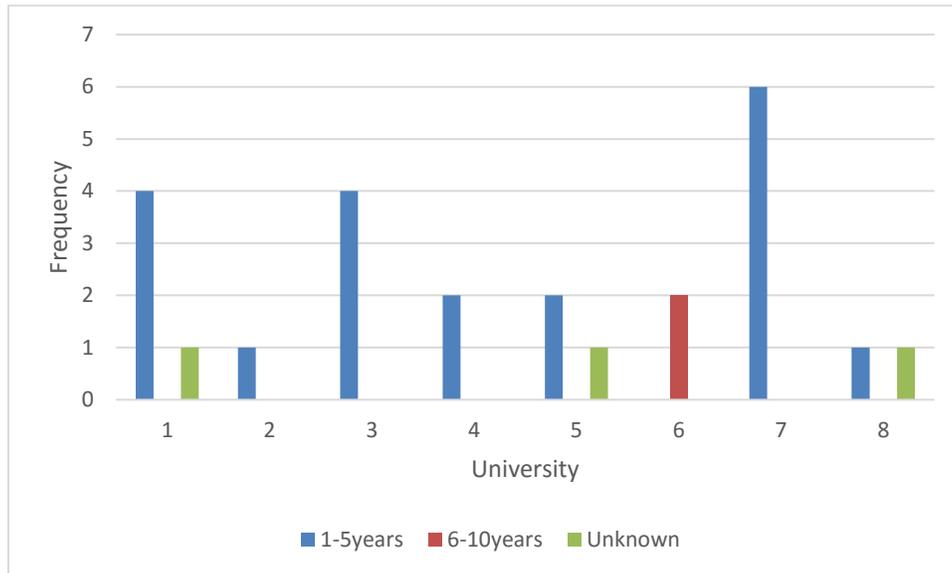
Figure 5.1: Period IR has been operational

The responses given in both instances are in concurrence and, therefore, reflect that IRs in Zimbabwe's public universities have only been around for a very short while. A follow-up question to this was directed at Library directors in question 6 which was, how long did it take you to have the repository functional from the time you conceived the idea? Four library directors (of universities 3, 4, 6 and 8) said it took them six months to one year and, according to one (12.5%) of them, they did not face any internal resistance. The Director of university number 6 said their advantage was that the Vice-Chancellor had attended an OA workshop a few months before. Three (37.5%) directors (1, 2 and 7) said they conceived the idea around 2005/2006 but it took a long time for them to establish the IRs. The Director of university 7 cited internal resistance as the major drawback saying:

> *"People were not interested, people thought that now we were creating an opportunity for those people who want to plagiarise, if you are going to put our work on the internet, those negative tones. It was not well received in 2006/7. So we had then to continue working on those perceptions. I think eventually when top management started talking the same language as the library, that's when we sort of realised that we could be going somewhere."*

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The Director of university 1 said it took them a long time because the talk of the concept started during the time of DATAD but because they did not have an IT person to deal with the technical challenges they were facing (Greenstone software), the kick-off phase had to be delayed. The Director of university 5 said they started talking about the idea in 2009 when they joined ZULC where other universities were dialoguing and training on IR issues but they started around 2010/2011.

5.3.1.1.2 Platform choice

Question 2 in the checklist for repository analysis and question 4 for Library directors was, what software is used to host the IR? This question was important in that the capabilities and requirements of a software determine the level of maintenance and format of the items that can be captured and stored on a system, that is, text, video, audio or datasets. Data gathered from interviews, OA/IR policies, OpenDOAR and ROAR revealed that all the eight universities used the DSpace open source software. However, four Library directors also mentioned that they initially started with the Greenstone software and two of them discarded it along the way citing challenges they faced with the software. This is explicitly stated in a quote of one of the Directors who said:

> *"We had problems with Greenstone, technical problems. Staff had challenges, then in terms of speed and ease of use we had reservations again. So, last year we decided to move to Dspace…. we got the training and we tried using Greenstone but we had problems in installing it and so on. It was not friendly then, I think now it has improved but we had already decided to move to Dspace. Besides, Dspace seems to be more popular than Greenstone. Most of our colleagues in other institutions are using Dspace. So, we said let's move to Dspace which is more common, and when we face problems it's easier to get assistance from others."*

Despite challenges faced with the Greenstone software two universities were still using it for their intranet repositories but had also adopted the DSpace for the public domain IRs. Table 5.5 provides detailed information on the public domain repositories.

5.3.1.1.3 Content type

Question 4 of the IR analysis checklist was what type of content is uploaded to the repository? Library directors (Q14) and IR/faculty librarians (Q29) were also asked the same question. The results presented in Table 5.2 below show a diverse list of items included in the eight universities' repositories. These lists were extracted from OA/IR policy documents, OpenDoar and some were listed by the Library directors. According to the Library directors of universities 5 and 6, they did

not include non-peer-reviewed material and localised material in the OA repository but they placed them in the intranet repository. When it comes to theses and dissertations the Library directors of six (75%) universities said they uploaded first class undergraduate dissertations and postgraduate theses on the public domain IR. The Library director of university 8 indicated that they only included PhD theses in the public domain repository while the Director of university 2 said that they excluded undergraduate dissertations from the OA IR but only considered the postgraduate level. For the intranet repositories, all the Library directors concurred that they housed past examination papers, undergraduate dissertations and in one case Masters dissertations.

Library directors were asked in question 5, If you have two or more repositories, are they discipline specific or general repositories? The responses given by the directors were confirmed by a cross-check with OpenDoar and a search in some of the repositories that they are all multi-discipline oriented and the contents are organized by discipline in what are called communities which have further sub-divisions for specific subjects. The faculties, schools, institutes or centres within a university constitute the communities, then departments or sections form the sub-groups called sub-units on the DSpace platform. For example, the Faculty of Communication and Information Science in one university is classified as a community in the IR. The departments of Journalism and Media Studies and the department of Publishing Studies are the sub-units of the faculty community. According to the director of the university that has one repository, they had created a community of theses and dissertations/technical reports and another community for past examinations within that repository.

Table 5.2: Types of content in university repositories
N = 8

Item	Institution							
	1	2	3	4	5	6	7	8
Post print articles	*	*	*	*	*	*	*	*
Pre-print articles	*		*	*	*	*		*
Conference/workshop presentations	*	*	*	*	*		*	
Books/Book chapter/Book review	*		*			*	*	
Journal of the university	*		*			*		
Conferences hosted by the university			*			*	*	*
Theses and dissertations	*	*	*		*	*		*
Multimedia/audio-visual materials						*	*	*
University annual reports/speeches						*	*	
Datasets						*		*
Inaugural/Public lectures						*		
Technical reports					*			*
Lecture notes/courseware						*		
Newspaper clippings						*		
Grey literature/Unpublished works					*	*		
Working papers					*			
Reports for industrial design and technology innovation					*			

The researcher also established through interviews with Library directors and policy documents that for all the institutions the contributors of content to the repositories include scholars, researchers, non-teaching staff and registered students of the universities. One (12.5%) university, according to its IR policy, allowed external researchers affiliated to the university at the time of publication to deposit materials in the IR.

5.3.1.1.4 Size of the repositories

IR/faculty librarians were asked (Q6) to state the number of items in their repositories. This question was important to the researcher in that the results would reflect the level of acceptance of the IRs by the academic community given the time span in which the IR had been operational against the expected research output of the universities every year. The results are reflected in Table 5.3 below but it's important to note that respondents from one (12.5%) university did not provide the number of items in their IR. So, the institution is not listed in the table. The IRs with

the least (50) number of items were for universities number 2 and 3. Respondents from three (37.5%) universities (1, 5 and 7) gave conflicting figures, that is, 800 and 1721 respectively (1), 84, 85 and 87 respectively (5) and, 200, 400 and 402 respectively (7).

Table 5.3: Number of items in IR
N = 16

Institution represented	Number of items in IR											Total
	50	84	85	87	101	160	200	400	402	800	1721	
1	0	0	0	0	0	0	0	0	0	1	1	2
2	1	0	0	0	0	0	0	0	0	0	0	1
3	2	0	0	0	0	0	0	0	0	0	0	2
4	0	0	0	0	1	0	0	0	0	0	0	1
5	0	1	1	1	0	0	0	0	0	0	0	3
7	0	0	0	0	0	0	1	1	3	0	0	5
8	0	0	0	0	0	2	0	0	0	0	0	2
Total	3	1	1	1	1	2	1	1	3	1	1	16

The researcher also checked OpenDoar and ROAR for the statistics of records held in the repositories. The results in Table 5.4 show that university 7 had the highest statistic of 450 records having established the IR in 2010. The official figure for this university was close to the estimated figures given by IR/faculty librarians. The least number of records was 37 for university number 2 having established the IR in 2011. This figure was below the one that was given by the IR/faculty librarians. Since university number 5 was not registered with OpenDOAR or ROAR the researcher averaged the figures to give an estimate of 85 records (Table 5.4). A comparison of the figures provided by the IR/faculty librarian (800-1721) of university number 2 with those from OpenDOAR and ROAR (394) shows that the librarians had inflated their figures. So, the researcher settled for the official figures in OpenDOAR and ROAR since they were also current (see Table 5.4). The Library director of university 2 in an interview lamented:

> *"I think considering what we are producing within the university and what we have at the moment, I think statistics, they don't match. These academics produce many publications,*

A follow-up question (Q7) for IR/faculty librarians asked about the currency of the IR content. Twelve (48%) IR/faculty librarians indicated that the content was current, three (12%) mentioned that the content was constantly updated, seven (28%) expressed the currency by giving dates, for example, 2015, 2016, five years and seven years. Four (16%) participants did not mention anything. The results in Table 5.4 from OpenDoar corroborate this response by showing five IRs having been last updated in 2016.

Table 5.4: Official IRs of public universities
N = 8

Institution	Date Established	Registry	No. of records	Last updated	Software	Internet availability
1	2010	OpenDoar/*ROARMap	394	Feb. 2016	DSpace	Searchable
2	2011	OpenDoar	37	July 2015	DSpace	Searchable
3	2012	None	50	2014	DSpace	Unsearchable
4	2011	None	101	2016	DSpace	Unsearchable
5	2012	None	85	-	DSpace	Unsearchable
6	2009	OpenDoar/ROARMap	401	Feb. 2016	DSpace	Searchable
7	2007	OpenDoar	121	Nov. 2013	Greenstone	Searchable
	2010	OpenDoar, ROAR	450	Mar. 2016	DSpace	Searchable
8	2012	OpenDoar, ROAR	175	Feb.2016	DSpace	Searchable

*Registry of Open Access Repository Mandates and Policies

5.3.1.1.5 Interoperability of the repositories

Question 5 of the IR checklist sought to establish if the repositories were searchable on the intranet. Library directors were also asked (Q8) if the repository was available on the internet and or intranet and, IR/faculty librarians were asked (Q8) how the IR was discoverable. They had to select between internet and intranet. The results in Table 5.4 show that three (37.5%) universities’ IRs were not discoverable on the internet and those of five (62.5%) universities were searchable. Of the three (37.5%) universities with repositories that were not searchable on the internet one (12.5%) of the Library directors had insisted that their IR was searchable but at the time of the interview they were experiencing technical problems but assured the researcher that the problem would be short-lived. However, the researcher on attempting to search the repository seven months

later could not access it. For the repositories that were on the intranet and available to the local communities of the universities, the Library directors justified their position of maintaining an internal repository and this is expressed in a statement made by one of the interviewees that;

> "So, *we wouldn't want to jeopardise our efforts of being that premier university by putting things that are not really that premier or that world standard* [on the internet]*."*

Question 6 of the IR checklist sought to find out if the IR was user friendly. IR/faculty librarians were asked the same question (Q9). The researcher found it easy to navigate through the repositories. Ninety-six percent (24) of IR/faculty librarians said 'Yes' their IRs were user-friendly and one (4%) said 'No'.

The IR/faculty librarians qualified their 'Yes' response by making the following statements:

- *Fairly user-friendly for the average users. However, orientation and training is required particularly to enable depositors to submit their work independently;*
- *Has several access points that can be used by researcher to discover items; author, title, subject, date and universal subject box;*
- *It allows users to browse the different options. for example, they can browse by title, author etc. It also gives an option to search alphabetically;*
- *It is easy to get desired articles, e.g. one can browse by title or by collection. Collection is arranged by faculties to departments;*
- *It is easy to navigate the IR site and get information;*
- *It is subdivided into communities by faculty. It is searchable by author, keyword, title etc.;*
- *Library users can access it easily on the university website;*
- *Links are clear to guide the researcher on faculty he/she wants, topics, subject, year plus one has the option to search across the faculties and subject and get what he wants; and*
- *Uses DSpace software which is easy to manage and has user-friendly interface.*

In summary, the statements made by the IR/faculty librarians refer to the fact that the interfaces of the IRs enabled easy navigation through various access/entry points such as the author, title, discipline/community and so forth.

Question 7 in both the IR checklist and interview guide for library directors sought to establish if the repositories were registered with OpenDOAR, the ROAR or any other open source platform.

Again the results are presented in Table 5.4 above. Five (62.5%) universities had registered their repositories with OpenDoar and of these five, two (40%) are also registered with ROAR. For the three (37.5%) unregistered IRs, one (12.5%) Library director said the delay for registering with OpenDoar was because they wanted to have their IR policy in place then they would register. Another Director said they were waiting for their IR URL handle to be registered by the University of Zimbabwe which has the responsibility of allocating URLs for all institutions in the country. From Table 5.5 it was interesting to note that two (25%) universities had registered their OA/IR policies with the Registry of Open Access Repositories Mandates and Policies (ROARMap). The policies were registered in 2014.

5.3.1.1.6 Success of the repositories

Library directors were asked (Q29) if they thought their IR had been successful so far. All directors said they had not been successful but were cautious of their success. The first Director said their IR had grown in terms of its population (over 500 items), and their presence on the public domain was a positive development to institutional visibility and web rankings of the institution. The second Director said they were not happy considering the academics they have and output being produced in the institution, they expected to have the best IR in the country in terms of content. The third Director said they had successfully pushed for the adoption of the IR policy which spoke volumes of the institution's readiness but lamented their failure to be visible on the public domain due to a technical hick-up in the system. The fourth Director expressed that the success they wanted ultimately is for their IR to be accessible outside and "*that's the last mile that we are fighting for and also the continuous depositing of articles as they become published by our academics and researchers*". The fifth director expressed that *given where we are right now in terms of where we're supposed to be we're still far away… We're still trying to find our feet*." He further said that the hardest part of installing the system and advocacy had been done, so going forward it was just a matter of collecting and populating the IR. The sixth director said they had successfully implemented the IR initiative but felt they were still far behind in terms of content harvesting in comparison to universities such as Stellenbosch. He said that their scholars were now being invited everywhere due to their visible research output. The seventh director had this to say:

> "*I think it's very successful given what we set out to do and what we got. We set out to create a facility that would house research output of* [the institution]. *It is being done, it has been launched. We might not have a piece of paper in place but its' operating.*"

The eighth director expressed satisfaction with the milestones they had achieved so far.

5.3.1.2 The role of the academic librarian in promoting the institutional repository

This research question sought to establish the changing roles of librarians due to the establishment of IRs and ascertain how they were coping with the system. This question is informed by two variables from the UTAUT model, that is, effort expectancy and facilitating conditions as determinants of usage. Effort expectancy is concerned with the degree of ease of use of the system whilst facilitating conditions is concerned with the extent of one's belief that an organisational and technical infrastructure is there to support use of the system. Data for this question was collected through questionnaires for IR/faculty librarians, interviews with library directors and OA/IR policy documents.

5.3.1.2.1 Responsibility for the IR

Question 2 of the questionnaire for IR/faculty librarians required respondents to indicate their designation. The researcher wanted to find out the mix of people who were managing and running the IRs in the academic libraries. There were 11 (44%) faculty librarians, two (8%) IR librarians and 12 (48%) 'Other' respondents. Those who selected the option 'Other' had to specify their designations. There were three (25%) Deputy librarians/managers, two (16.7%) Research services librarians, one (8.3%) Documentalist, an Assistant librarian (8.3%) and two (16.7%) Senior library assistants. Three (25%) respondents did not specify their designations.

In Question 3 respondents had to state the disciplines they represented. Since the instrument involved Faculty librarians, it was important to establish if all disciplines were represented. The results would be cross-examined with the academics' awareness levels by discipline. The results in Figure 5.2 show that all disciplines had representation. The other category comprised library staff who do not shoulder responsibility for faculties.

N = 25
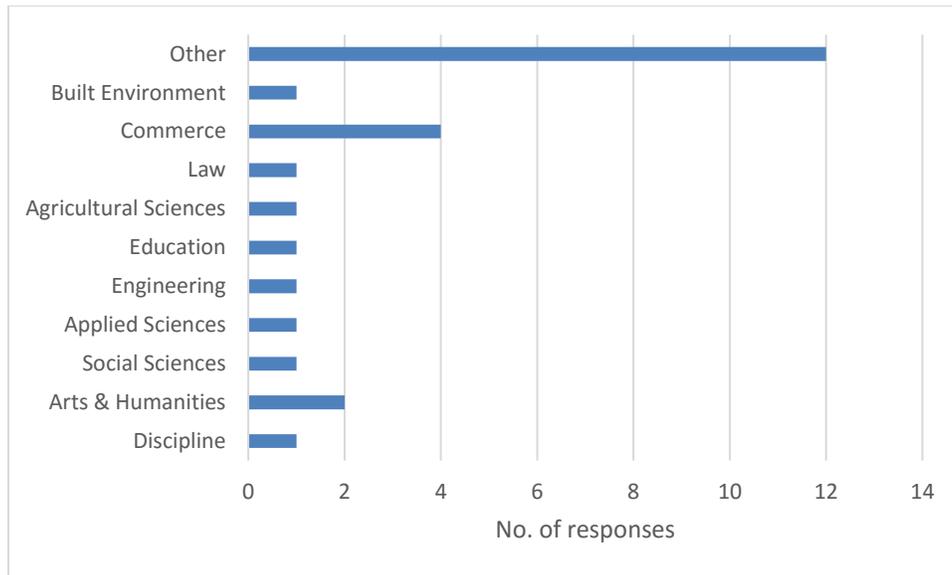
Figure 5.2: Discipline represented by IR/faculty librarians

Library directors were asked (Q10) if they had established an IR team/committee and they were required to explain the criteria they used to select the team. All the directors said they had IR committees whose compositions differ slightly but in all these teams there was an Information Technology (IT) person, an IR librarian/manager or a person in charge of the running of the IR and faculty librarians. Three (37.5%) universities' committees had representation from the academic community, that is, they had faculty representatives and the Pro-Vice Chancellor academic. One (12.5%) university's committee was composed of library staff and a law faculty member whose role it was to offer legal advice. Another university had a quality assurance team in the library whose job was to deal with issues of quality in the library but subsequently reports to the university's quality assurance committee. Two (25%) universities' OA/IR policies made mention of the IR management committee and specified the functions of such a committee while other policies did not. For example, one policy stated the functions of the committee were:

i. *To determine the policies on submission and dissemination of content, licensing and copyright issues for approval by the University.*
ii. *To ensure the smooth running of the ...IR services.*

On the criteria used to come up with the team, those whose committees included academic staff expressed that they wanted to involve all stakeholders. One (12.5%) library director whose team was largely composed of library staff said they considered:

> *"People that are directly involved with e.g. the identification of material, the IT practices that are involved in the creation of the IR and also the involvement of users. That's basically what was in the background."*

5.3.1.2.2 Attitudes of librarians towards IRs

Question 11 for IR/faculty librarians was, what is your perception of IRs as information resources for academic research? This question was meant to determine the attitudes of the librarians towards the technology they were facilitating and its use by the university community. An extract of responses given is shown below:

- *It gives current and local information with local examples for students to understand*

- *It's good because they are peer reviewed articles which have been published as well*

- *The IR can be used as an information resource as some articles are published by databases we subscribe to. It provides relevant information for academic purposes as these are produced by academics*

- *They are good. They promote research and access to research output. They promote the OA movement*

- *They are ideal as other academics learn from what is uploaded*

- *They are reliable source as the research papers have been produced by researchers i.e. academics themselves knowledgeable or experts in their fields of specialty.*

- *They are rich sources of scholarly information*

- *They bring together research generated in the institution by its academics. Therefore, they enable easy access to research.*

- *Very important because researchers share information locally and internationally. They give local content with local examples but also give room to compare with what others are doing elsewhere and room for partnership across the globe.*

The responses given point to the fact that IRs provide access to and enable sharing of locally produced content amongst academics. The question (Q12) that followed asked the IR/faculty librarians if their work was affected when the IR was established. Results showed that 72% (18) said 'Yes' and only 28% (seven) said 'No'.

A follow-up question (Q13) sought to establish how they were affected by the IR technology. This was a multiple choice question where respondents could tick one or two responses. Eleven (44%) respondents had extra responsibilities added to the existing ones. Eight (32%) were assigned new responsibilities and six (24%)were not affected at all.

Library directors were asked (Q11) what implications the establishment of the repository had on staffing and related to it was question 16 which sought to establish if staff were reorganized and if new duties were assigned. All the library directors mentioned that the job freeze had stopped them from recruiting new staff. They had to move staff around and spread the old and new duties to the existing staff, an exercise which resulted in job enlargement for some individuals in the library. One (12.5%) director summed it all up when he said:

> *"We just allocated extra duties to the existing members of staff. You know the environment we are operating in where because of the harsh economic climate the staffing situation has remained stagnant, particularly for service or support systems. So, recruitment of personnel has been frozen. So, we don't have the leisure, if you want, of recruiting people that are specifically or with specific skills."*

However, one (12.5%) director said they did not have an IT person so they had to recruit and the reason was amply stated by one director "*the IT were required because the software had to be noted, defined, modified and they had to train the people that were going to be doing this on a daily basis"*. Another director said they also had to recruit two assistant librarians but other staff were moved and assigned new duties. Question 17 for Library directors was, what IR responsibilities were fulfilled by your staff? The new responsibilities that came with the establishment of the IRs as stated by the directors and corroborated by IR/faculty librarians in question 4 which required them to state the role they play with regards to the IR included:

- Advise and encourage faculty to submit their research papers to the IR;
- Collect and request for metadata to be put on IR from faculty;
- IR awareness campaigns; Sit in committees that decide what goes in the IR;
- Quality control of content in IR;
- Solicit for and collect articles from academics and uploading on IR;
- Alert new students of the existence of the IR;

- IR administration, Oversea the IR, Coordination and Supervision of IR activities;

- Maintenance;

- Show and demonstrate to students and other researchers how to search on the database;

- Managing and uploading articles;

- Convey information on how they get their documents to be uploaded in the IR;

- Marketing the IR and making sure the contents are of high quality in terms of content description; and

- Teaching/instruction on how to search IR.

Library directors were asked in question 12, which categories of staff were involved in the management of the IR? Two (25%) universities had their Deputy librarians supervising IR issues, the Systems librarian in charge of training and Faculty librarians managing the IR. Two (25%) directors said they considered the talent or skills of individuals to identify the champions of the IR so they both had an Assistant librarian and a Senior library assistant who were IT competent managing the IR. Another two (25%) directors said they had assistant librarians and the reader services section staff managing the IR. All the directors said they had an IT expert to maintain the system and train library staff on IR issues.

5.3.1.2.3 Need for a professional position

A follow-up question to this one was directed at IR/faculty librarians. Questions 14 was a five point Likert scale which required the librarians to state the extent to which they agreed with the notion that 'libraries should create professional positions for the management of OA initiatives, projects and repositories'. This question was meant to measure their attitudes toward IRs on the backdrop of the added responsibilities they brought for them.

Twelve (48%) respondents strongly agreed with the statement, five (20%) agreed and six (24%) strongly disagreed. Respondents had to give explanations for their responses. For those in agreement with the statement, two (18.2%) respondents stated that:

i. *IR comes with a lot of responsibilities. It is therefore, weird and seemingly insurmountable, for example, for one man to shoulder all its responsibilities. This compromises its effectiveness. A full-fledged IR unit is needed.*

ii. *So that we can have specialists in OA who understand the principles and adhere to common protocols like open archives initiative, protocol for metadata harvesting.*

Table 5.5: Need for professional position

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Agree that academic libraries should create professional positions	25	1	5	3.64	1.680	2.823	-.808	.464
Valid N (listwise)	25							

These statements point to the fact that the IR required a special skilled person to manage it as demonstrated by a mean of 3.64 respondents in Table 5.5 showing the need to create a professional position. An excerpt is also taken from those who disagree with the statement. One respondent was quoted saying:

> *"The library world has moved greatly towards electronic information and subsequently towards OA. Management of this portfolio is greatly important for modern libraries."*

5.3.1.2.4 Content recruitment

The IR/faculty librarians were further asked (Q15) if they had received any training on IR maintenance and content recruitment and, to state the mode of training where such had been received. Similarly, Library directors were also asked (Q13) if their staff had been trained to run the IRs. Fourteen respondents said 'Yes" while 11 said 'No'. Library directors concurred that their staff had been trained either in-house or externally.

For those IR/faculty librarians who said 'Yes' question 16 required them to state the mode of training they had received. The modes of training they mentioned were also corroborated by the Library directors and they included; training on Greenstone and DSpace software; INASP workshops; ZULC workshops; in-house or on-the-job training by Systems librarians and Senior library staff; self-training and, contact visits to universities such as UZ and MSU.

Library directors were asked (Q15) if they liaised with faculty regarding the deposit of research materials and use of the IR. Related to this question was also question 18 which asked if the IR

librarian liaised with faculty librarians. All the directors said they liaised with faculty through their Faculty librarians whom they encouraged to talk about the IR to them even at faculty board meetings. One (12.5%) director said he was at the forefront of encouraging faculty to deposit content in the IR. He said that the acting manager had the responsibility to communicate with faculty and obtains articles from them. Another director said that the IR librarian was supposed to liaise with faculty but of late that element had been slack. One (12.5%) director said at the informal, level they were using some influential researchers to convince others to submit content to the library for deposit in the IR. Another director said subject librarians visited departments and schools to collect publications for deposit in the IR. Another librarian also said even though they encouraged faculty librarians to liaise with faculty the responsibility had largely been relegated to the IR librarian who also liaised with the research office. Another (12.5%) director said the IR librarian constantly liaised with faculty librarians who kept a close relationship with their faculties.

IR/faculty librarians were then asked (Q17) if they thought IRs were important drivers of scholarly publishing and they were required to explain their answer. All respondents said 'Yes' and they gave varied explanations as follows:

- *As content increases, so is the localisation of scholarly information and subsequently publishing of the same;*
- *because IRs make it possible for making academic research visible to the public especially other researchers;*
- *Indeed, I guess it starts at a small scale, confidence increasing from internal reviews etc. It also encourages others to write or research seeing other people's output;*
- *It all starts from publishing at institutional level and the author grows and publishes with known and big publishers;*
- *Researchers are encouraged, motivated to publish because their work is exposed to researchers around the world who would not otherwise have access to it through traditional channels; and*
- *They are the starting point in publishing through self-archiving.*

The explanations point to the fact that IRs could motivate scholars to publish once their works start to be visible to a wide readership. Question 18 asked IR/faculty librarians if they had any

qualifications in publishing. The researcher felt that the management of the IR requires somebody with a background in publishing to understand the nature of materials being handled as scholarly publications. According to the results, five (20%) respondents said 'Yes' and the majority, 20 (80%)) said 'No'.

Question 19 was a five point Likert scale requiring IR/faculty librarians to state the extent to which they thought the statement that the principles of OA are in tandem with the role of academic libraries. They were also required to explain their choice. The majority, 16 (64%) of respondents strongly agreed with the statement while three (12%) strongly disagreed.

The explanation given for highly agreeing with the statement was that, in the words of one respondent:

> *"The role of academic libraries is to disseminate information to everyone without restrictions and with open access it serves to do that. Open access promotes the five laws of Ranganathan without which information could not reach its intended recipients."*

Lastly, question 20 was a five point Likert scale also requiring the librarians to indicate the degree to which they agreed with the statement that OA IRs would fail without the active involvement of academic libraries. They were also required to provide an explanation for their choice.

Results showed that the majority of respondents, 11 (44%), were in agreement with the statement and 10 (40%) strongly agreed. Only 4 (16%) strongly disagreed and amongst these, one respondent qualified this response by pointing out that *"IR will fail without academics because they are very important IR stakeholders. They provide the content that is uploaded in the IR."* For respondents who agreed, some of them made the following remarks:

i.   *Academic libraries are responsible for indexing and abstracting materials for quick access which is similar to IR goals which ensure that materials are indexed and abstracted;*

ii. *Academic librarians are the ones who are fully knowledgeable in terms of IRs; Besides they are there to disseminate information produced within or outside the institution; No-one will ever know about IRs without academic librarians;*

iii. *Academic libraries are natural custodians of IRs as they are well versed with bibliographic descriptions, meta-data creation and preservation of library materials; and*

iv. *It is a fact that since academic libraries are part of the highest learning institutions on the lands they are expected to assume a leading role. Again the majority of research output emanates from universities. So, these libraries are strategically positioned to amass content and do well.*

These statements were alluding to the fact that academic libraries facilitate easy access to and dissemination of information to the readership and therefore, such libraries are important for the success of IRs.

5.3.1.3 Contribution of the institution to the promotion of OA

The third research question sought to establish how the institutions in question have contributed to the promotion of the IR initiative and subsequently to its acceptance and usage. This question was particularly important in that the researcher intended to establish if the institutions had put in place measures that would support the OA initiative and in response to the recommendations of SARUA (2010) and ultimately the IR infrastructure they had invested in. The variable 'facilitating conditions' as a determinant of technology usage in the UTAUT model informed this question. Facilitating conditions is concerned with the extent to which individuals believe "that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al. 2003:453) and in this case, usage of IRs is the focus of the study. Interviews were conducted with Directors of research and Library directors. Research and OA/IR policy documents and the websites of these universities were also scrutinized for data relating to the question. Directors of research were the main respondents to this question because the researcher regarded them as policy makers and implementers of the institution's research policy.

5.3.1.3.1 Policy makers' understanding of OA

Question 2 of the research directors' interview guide sought to establish if the directors understood and appreciated the concept of open access. The question was also meant to gauge the attitudes of the directors as administrators, towards OA. The question was, what is your understanding of open access publishing? Seven (87.5%) directors demonstrated that they understood what OA was except one (12.5%) acting director who expressed ignorance of the concept and said the institution

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did not have a research office yet, so he was just a member of the research board. Another director, even though he demonstrated knowledge of OA, was quick to say OA issues in the university were part of the librarian's portfolio and the research office only encouraged its members to cooperate. Overall, the seven (87.5%) directors expressed that, in the words of one director, "*OA from what I know is availability of materials published by institutions and so on, without payment, without obligations*". However, their undertones revealed enthusiasm in some (three, 37.5%) and reservations in others (three, 37.5%) towards the OA initiative. One (12.5%) enthusiastic director said:

> *"My understanding of OA is that it is a situation where research output and even research outcome is readily available to anyone who would benefit from that research. Research is done in order to effect change and development in society. It's not research just for its own sake, but basically universities particularly in Zimbabwe have been doing research and e.g. we have people doing PhDs like you. You do your PhD you pass and you pack your thesis in the library. Who accesses that, it's other PhD candidates. They want to see how you did it and so forth. So, in those libraries in my view, the conventional libraries, there is not much OA to people. Research which is viable should actually bring about change… Without a problem, there's no research to talk about. And the problems should be the challenges that face or confront a community and we are part of that community. We want to assist them to tackle their challenges and to solve their problems and then to move forward. That's what we should be doing, particularly in universities. Universities are supposed to be factories for the production of knowledge and knowledge that you innovate or invent. So, once you discover a solution to a problem, you need others who will benefit from that to access that and if it's locked up in a university library, it's not accessible. So, the concept of OA is a concept which is very useful because you are saying, you are doing research for society, society must access your research output."*

Of the three (37.5%) directors who seemed to have reservations about OA, one (12.5%) remarked:

> *"I think members have been caught up with the development in that we now have these publishing companies, houses that publish journals, even the traditional ones, they have also gone the OA route. However, there are also new journals that have also gone through the same route of OA. So, the major issue here at the moment has been of quality assurance to say how credible are the papers that are published through OA."*

Overall, as stated earlier these administrators understand the OA concept and have an appreciation of the initiative.

5.3.1.3.2 Support for scholars publishing in OA

The next question (Q3) asked for the research directors opinion of the implications of OA publishing on peer review and career advancement for the academics in the universities. Seven (87.5%) Research Directors responded to this question while one (12.5%) did not respond citing that he was not the director of research but just a member of the research board. Of the seven (87.5%) directors who responded to this question, on the implications of OA on the peer review process, four (50%) felt that the peer review process is not in any way affected by OA especially with accredited journals but one (12.5%) of them also expressed reservations, in concurrence with the other three who were sceptical about the rigour of the peer review process in the OA domain and also raised the issue of predatory journals affecting credibility of the process. One (12.5%) of the directors expressly said:

> *"In-between there's a grey area, you've got the guy that is purely there just to make money and there's the other guy who's there for the advancement of knowledge and in-between there's a lot of grey ... So coming to your peer review when you say OA I would like to qualify it. If you say it is an accredited journal, I don't have any problem with the peer review process because I think in general they are robust and they are good. But when it comes to OA that is the predatory publishers then I have my serious doubts about it. There could be some, I think there are some that are really trying to do it, publishing houses, but there are others that are there just for the money."*

The directors who were wary of predatory journals were particularly concerned about the issue of the author paying for article publication. One (12.5%) of them pointed out that some of these publishers can publish an article a week or two after payment for publication. Contrary to this cautioned approach to OA publications and adding flavor to the debate on predatory journals, one (12.5%) director who believed that OA does not negatively affect the peer review process, was quoted saying:

> *"The problem with people who take a meal within perspective is that you are already labeling other people's stuff as fascist or predatory whatever. As far as I'm concerned, what is your understanding of predatory? Because it's not published in the West, because it's not published at oxford University, because it's not published at Harvard, because it's not published at UCT, then it's predatory. That is a very skewed view and that's very serious. There is this perception that if something is not from these sort of established publications, anything new is regarded as predatory, as something which is not of value and so on. This feeds particularly to African 3rd world scholars, those who come from the developing world are regarded as third world poor and therefore even intellectually poor and anything*

they publish is of lower standard than the journal of History from Oxford and so on… So, having said that it is important to recognise that academia is no longer a luxury many people publish. It depends on the reasons for publishing… But if you are publishing like in the academia for a certain clientele and in most cases, also for a certain purpose of promotion and so on in order to be a senior lecturer, associate professor and so on. Therefore, there are certain standards which are expected in terms of the rigour of your arguments, in terms of the fruitfulness of your arguments and in terms of the positiveness of your arguments."

Two (25%) directors were in support of authors paying fees for publication of their articles so that the article would be made OA. One (12.5%) of them categorically stated:

"No, payment is not given to the reviewer. It's for the journal to publish because if you are paying subscription, they use that money to pay for the journal to make it available. But now if no-one is paying, even the journals themselves might stop producing those journals, so somebody has to pay. In this case, it will be the author but it does not mean that the money is given to the reviewer. So, there should be no difference at all."

However, on the issue of career advancement of academics, five (62.5%) directors were quite positive by saying that OA increases visibility and increased citation which will prop up career prospects and advancement of scholars and researchers. One (12.5%) of the directors said:

"the lack of OA denies people a broader perspective of the world because it restricts the sources one can have to tackle a problem. So, for career advancement you are not as broad as you are supposed to be. OA means you appreciate the world much better because it's much more open to you."

One (12.5%) director of research expressed that he was not sure if OA would affect career advancement of academics but was quick to say "*it depends on where they are and what level they are at,*" implying that it depends on the institution and level of scholarship of the individual.

Question 4 of the interview guide for Directors of research sought to establish if the universities had policies that support academics publishing in OA sources. In response to this question five (62.5%) Research directors concurred that their institutions accepted publication in accredited journals regardless of whether they were OA or traditional and as long as they had an impact factor, they were acceptable. They all expressed that they had come up with lists of accredited journals which they advised their academics to publish in. One (12.5%) director pointed out that they did not pay page fees for journals on the Greener list and another cited Lambert Academic Publishing as not being credible. So, they did not accept publications from this publisher for promotion. A third director said their institution has adopted the Higher Education of South Africa (HESA) list

of journals, that are recognized in the South African universities, for purposes of promotion and payment of article publication fees. If a publication did not appear in that list, they did not consider it. One (12.5%) of the Research directors was quoted saying:

> *"Really as long as it's through the traditional system, those journals that have established a niche, people don't query that, but if they are new like, Vol. 1, Vol. 2 maybe to Vol. 3 indication is it has not accrued impact factor yet and it's OA, then people raise eyebrows. So, what we've done here is to direct our members. We have sort of developed a list of what we call institutionally accredited journals, a database that we have established in the institution to say we encourage our members to publish in these journals. These include OA journals, but we have just worried about the ratification of the journals, whether OA or not, is not the issue as long as they are properly indexed, have properly constituted editorial board and they observe sort of some standards of peer review, we have directed our members…the challenge there has been that you find that annually you get new journals coming up as OA journals coming on board especially these days most of them are coming up as OA journals. They wouldn't have accrued any impact factor, as you know impact factor accrues over a period. Now the question is, do you automatically say if a journal is OA and is published by Elsevier, do we automatically accept it as a reputable journal even though it has not like produced many volumes. The question is, Yes, we've just said for these publishing houses which are reputable, which have set standards, we'll accept their OA papers."*

The researcher observed that none of the universities had the lists of predatory journals readily available from the website for the university community to see. One (12.5%) research director stated that their institution discouraged their academics from publishing in free journals. This is what the director had to say:

> *"Well we encourage our researchers to publish in journals that have impact factor. It doesn't have to be very high as long as there is an impact factor. That's what we encourage them to do because we have noticed that a lot of them were publishing in these journals where they would want to pay. Because they come to us, they ask for funds to publish but we have said there's no need for you to publish in those free journals."*

Data for this question was also collected from an OA report downloaded from university 7's research web portal. In the report, a representative of the promotions and tenure committee is quoted saying that the board accepts OA journals as long as they are peer reviewed. To corroborate the responses of the Directors of research, Library directors were also asked question 26 which said; Have you made any efforts to encourage university administration to adopt tenure and

promotion policies that support a faculty member's decision to publish in open access sources? (see 5.3.2.3).

Research directors were further asked (Q5) if their institutions had signed the Berlin Declaration on open access to knowledge in the Sciences and Humanities. Of the eight universities, only two (25%) directors were aware of the declaration and one (12.5%) of them attended the Berlin10 conference that was held at Stellenbosch university in South Africa in 2012. The director said their institution was represented by the Vice-Chancellor, the Library director, an IT representative and herself. The other six (75%) directors were not sure if their institutions had signed the declaration. The researcher sought clarification with the Library directors of these institutions. The Library director of university 4 confirmed signing the declaration as the library but not university-wide. The library director of university 5 indicated that even though they had not yet signed the declaration, they believed in its principles and were highly informed by it. The other (50%) library directors confirmed that they had not signed the declaration. So, three universities in Zimbabwe have signed the Berlin Declaration on open access to knowledge in the Sciences and Humanities.

Question 6 for Directors of research was, your institution has established an institutional repository (IR), what benefits does it bring to the university? By asking this question the researcher's intention was to ascertain if the research office had an appreciation for IRs and responses to the question would be used to determine if the office was likely to accept and encourage usage of the technology. The researcher regarded the research office as an agent that influences usage of technologies by the academic community. Two (25%) Research directors could not say what benefits accrued to the institution but referred the researcher to the librarian whom they believed holds the OA portfolio. However, six (75%) directors concurred that there were benefits accruing from the IR to the institution. They all mentioned that the institutions had experienced increased visibility internationally through Google Scholar. Two (25%) directors of research highlighted the benefit to students and scholars and one of them interestingly and philosophically stated that the IR would cause a shift in mindsets on the view that knowledge is generated in the North by saying:

> *"I think in the first instance it's going to change the mindset that books are written by people studying at the University of KwaZulu-Natal and not them. There will be slowly a mind shift in acknowledging self-generated knowledge. Which I think is the first step to moving forward and one of the things is that people will be encouraged to make their knowledge accessible to others, students, teachers and*

so forth… So, what this OA repository might mean, it might mean also that our publishers gain self- confidence, (2). they get pride in their own institutions (3) scholars begin to see their goal in their learning resources, warehouses, OA, libraries and whatever to look for things …What really is worrying now is that most of the teaching now is done using books from elsewhere. This is why we've these shortages, shortages, shortages, and if we can have our own knowledge which can be put together, put in the library, accessed through here and we use it genuinely for students to have, for students to research and for students to get their distinctions. So, there's a whole array of things which can be achieved by using or developing our own repository in that many African students now rely on the lecturer's notes. If there's something there they will get other perspectives and they will realise that knowledge is not from England, no, our lecturers."

Another Director of research also brought out the fact that the increased visibility of the institution's research output would ultimately influence the ranking of the institution. He boasted of the fact that amongst the IRs in Zimbabwe their IR was ranked in 3rd place by the international webometrics of ranking repositories. He also said that even though they had not yet followed up on citation statistics, he believed that there was a possibility of increased citations as well. The same director and another one highlighted also the fact that there had been increased cases of collaborative research due to visibility of individuals' research output through the IR.

5.3.1.3.3 Content type for the repository

The researcher also sought to establish the policy makers' views on the kinds of materials that should be included in the university's IR. This was believed to also have a bearing on the attitudes of management towards use of the IR by the academic community. Therefore, question 7 asked, which types of materials should academics deposit in the IR? Varied views were expressed by the Directors of research on what should be constituted in the university's repository. Out of the seven (87.5%) Directors of research, one (12.5%) could not be drawn into contributing to this question since he felt that it was in the purview of the librarian and that the university at large should draw up criteria as to what to include and what not to include in the IR. Four (50%) directors concurred that dissertations should be included but one (12.5%) emphasized that they have to be of good quality. He therefore, suggested that the library should work together with the research office in identifying which dissertations meet the expected standard before they are uploaded on the repository. On post-print articles, the philosophical director said that the issue of copyright has to be observed since most journals place locks (embargoes) on their pages. One (12.5%) director presented his list of materials from two perspectives, that is, the academic background to include

patents, journal articles, books, conference proceedings and abstracts and, from the teaching point of view to include slides, teaching notes and modules. Another director felt that *"anything that is not published in academic circles is not right,"* and coined it 'clutter' and therefore, she preferred published materials. The director went on to say that *"if it's just anything, it cannot stand the test of time".* However, this director said pre-prints of journal articles can be included and in the words of another director who also pointed out pre-prints; *"some publishers allow you to deposit pre-prints of published papers in the IR."* Another director also suggested that on-going research be included in the IR even before it has output.

Overall, the list of the types of materials highlighted by the Directors of research included; theses and dissertations, post-print journal articles, pre-print journal articles, occasional papers, patents and unpatented research, books, conference proceedings and abstracts, slides or powerpoint presentations, lecture notes, modules, extension services reports and documentaries.

5.3.1.3.4 Participation in content recruitment

The next question (Q8) for Directors of research sought to establish if there is collaboration between the research office and the library in content harvesting and recruitment. This question was important in that the researcher felt that the research office had close contact with academics and it is their responsibility to collate the research output of an institution, therefore, the office could play a significant role in facilitating or creating an enabling environment for the library to get content for the repository from academics. Five (62.5%) directors said that their office collaborated with the library while three (37.5%) admitted that they did not work together with the library. For those who did not work with the library, one (12.5%) of them said that there was no research management in the institution largely because there is no individual who is solely in charge of research business. The institution did not have a research office. The other director said that their office had not promoted collaboration even though the library had approached them on several occasions asking for publications. However, he was quick to say that he intended to give the library the whole record of research output of the institution but lamented that this was just a list of articles, so the library would have to follow-up individual researchers to obtain the full-text articles.

For the directors who were collaborating with the library (62.5%) one (12.5%) of them said that they were currently creating a database of research output produced in the last five years and that it was a requirement that researchers submit their papers to the library first before doing so with the research office. A second director said that collaboration between their office and the library was overseen by a committee in the institution called the institutional visibility committee. The research office, ICT and the library come together to discuss visibility of the IR. At the committee meetings, the library presents a report of what they are doing and the research office monitors what the library is doing because it is of interest to them. The director said that the research office also supplied the library with research papers it would have collected from the academics. So, the moment the papers accrue the research office sends them to the library. Another director also mentioned that their research office works together with the library when it holds OA workshops by encouraging academics to appreciate OA. Another director said that they help promote the IR through the newsletter published by their office where they encouraged scholars to deposit their research output but highlighted that they had challenges. The director was quoted saying:

> *"The next challenge is having what's called having teeth you see. You can tell people, for example, ...*[Chidho] *is my friend. I say William can you put your staff in the repository, Yaa aa ok. Have you done it? I have been busy. Have you done it? I was at a conference for 2 weeks. So, you can't hold a gun to anybody's head to say do it now. You can't force it. That has been a major challenge. Encouragement is good description, demand is difficult for us to do but that research policy will have that, that ok go for OA but also we expect your paper as long as it has...* [university] *affiliation we want it in... the repository."*

When the Director was asked about offering incentives to increase deposits he said that administration and management do not think offering a monetary incentive is the right way to go; the incentive should just be the research culture. The Director further mentioned that their office demands that before money can be released for one to attend a conference funded by the research board, a copy of the abstract must be received in the library for the repository and that includes published papers whose publication costs have been covered by the research board. Two (25%) other directors also mentioned that they also have the same deposit mandate in their institutions.

The researcher also took the liberty to ask Library directors if they were collaborating with the research office in promoting the IR. The directors confirmed that they collaborated with the research offices. One director, even though she acknowledged that they get some articles from the

research office, lamented that they faced challenges particularly from the research office's attitude toward OA.

> *"Our biggest challenge is the Research office, because the person there doesn't support OA, he's not supportive. You can tell him that, he's not supportive, he doesn't believe in it and as a result we have challenges with our academic community. Because when he does his research seminars he trashes OA publishing, he trashes anything OA because I suppose he came through the hard way of publishing through the refereed, not just the refereed journals but the real [interruption] Elsevier."*

This was despite affirmations made by the Research director of the same institution that the two offices worked well together in promoting the IR to the academic community. The other directors, except one whose institution does not have a research office, confirmed that they collaborated with the research office.

Question 10 was also related to the above question in that it asked if the tenure and promotion conditions of the institution encourage academics to deposit research to the IR, that is, can the IR be used to produce a list of publications by an individual for consideration of promotion? Responses to this question from all the Directors of research were that their tenure and promotion conditions did not require one to deposit research output to the library in order for them to be considered for promotion. However, two directors showed enthusiasm over the idea of tying promotion and tenure to deposit and one of them expressed that they would want to recommend to the university management that if someone wants to be tenured or promoted, all their papers should be appearing in the repository. The other one *said, "by putting a condition to promotion I think that way we can get more people to deposit material."* One (12.5%) of the Directors of research made reference to the fact that currently promotion is not happening in institutions. She said:

> *"We have a challenge. There are many people that are due but might not be tenured because of the freeze. Government says maintain the same wage bill year in year out…There are many people that are crying foul that I should have been promoted but we have no calls for promotion. There was one that was made recently, I don't know how they are going to pay but tenure is happening, people are being tenured."*

As a follow-up to this question Directors of research were asked (Q11) If there is a mandate for the academics to deposit materials into the IR. Library directors were also asked the same question (Q25) to make sure that the two offices (Research and the library) were operating on the same

page. The research and OA/IR policy documents were also examined for any clauses that mandate content deposit by the university community since this is one strategy that could help to increase content deposit (see 5.3.2.3). IR/faculty librarians were also asked the same question (Q21) in an endeavor to establish if they were aware of the existence of a mandate in the institution, particularly in universities that have a mandate. Knowledge of this was assumed to empower them to seriously pursue academics for articles (presented in 5.3.2.3). Academics were asked the same question (Q33 & 36) in order to establish if they were aware of any mandates and also to establish their attitudes towards mandates (presented in 5.3.2.1). One (12.5%) Research director, as earlier mentioned, said that he was just a member of the research board and that the institution did not have a research office, professed ignorance of such a mandate. Another director just mentioned that members of the university community were encouraged to deposit their works in the IR. Six (75%) directors concurred that their research policies mandated that for any research or conference that was funded by the university through research board, the conference abstract and published papers should be submitted to the research office and a copy deposited to the library but they could not force people to deposit works of research that had not been funded by the institution.

> *"I think I'm trying to emphasise the point that because we are providing the money we can control it. When you are not providing the money, you can't control it. But that can only be if we have a policy and then the policy can lead to implementation."*

One (12.5%) Director of research pointed out that in their new research policy which had just been adopted, there is a clause that requires that as long as a member of the university uses the institution's affiliation, the output should be deposited to the IR and in turn inform the research office. This is what the director said:

> *"But we still have a problem of people who do not have the right attitude, that if you say that you got this research publication done or you got the money because you are at…* [this university]. *If you said you're working from home the donor might not have given you that money, so you cannot say* [the university] *did not give me the money and therefore I don't want to tell…* [the institution] *what I did with it, it's none of their business. Equally because you work at…* [this institution], *so we trying to close these gaps."*

The researcher also looked at the research policy document of one university and found that it did not mention anything about depositing research output neither to the research office nor the library. One (12.5%) Director of research said that in order to entice the academics to submit papers to the

research office the institution gave a cash publication incentive for articles published in accredited journals. However, the director was not at liberty to disclose the amount of the monetary incentive. On the same note of publication incentives, another director also indicated that their institution used to give an incentive of US$20.00 for submission of published articles but the incentive has since been withdrawn.

> *"Now we are facing challenges, so when it was in place, we were getting so many papers but now that it has been scrapped, people are saying there is nothing, why should we give you? But now we are trying to handle the matter to say that you are obliged to do so because you are using university time and everything, still it's not working."*

5.3.1.3.5. Concerns of academics

The last question (Q9) which directors of research were asked required them to spell out the measures that have been put in place by the institutions to address the concerns of academics pertaining to issues of IPR, authenticity, data integrity, peer review and so on, with reference to IRs as platforms for access and dissemination of intellectual output. The respondents highlighted varied measures that had been employed by the institutions to address the concerns. Three (37.5%) Directors of research said that they had established an ethics committee within the institution to ensure that all research done in the institution is cleared by this body. Three (37.5%) directors indicated that they had IP policies which guide researchers on the issues of ownership. However, two (25%) of the directors indicated that their draft IP policies were being finalized d were expected to be operational soon while the other added that they also use the Turnitin anti-plagiarism software through which all Masters and DPhil theses pass before they are accepted. One (12.5%) director said their research board was yet to come up with an IP policy but they have largely relied on the quality assurance committee. The same director was quick to point out that they realise that that measure in itself is not enough. He said that they are operating on the assumption that reputable (accredited) journals like Springer, Elsevier and SCOPUS indexed journals have guaranteed quality but they realise that there are disciplines like Police and Intelligence Studies whose journals are not indexed there but have an impact factor of 2.3 or 3. So they were yet to come up with a policy. Two (25%) directors did not say what measures had been put in place. One (12.5%) of them remarked that "*we really don't ask them to give us their research publications"*, while the other alluded to the fact that the Zimbabwe Council for Higher Education (ZIMCHE) has put in place a policy which should be followed. In summary, the measures that

were highlighted to have been employed by the institutions in response to the academic community's concerns as stated by the Directors of research include; IP policies, ethics committees, quality assurance committees, accredited journals and anti-plagiarism software.

5.3.1.3.6 Other comments

Lastly the Directors of research were asked to make any comments (Q12) regarding issues discussed in the interview concerning OA and IRs. Of the eight (100%) directors two (25%) not have any comments to make, so six (75%) highlighted issues of concern to them. The first director said that OA is being abused by predatory journals and sees this as causing potential danger to career advancement, academic writing and the quality of academics was going to slide unless universities put measures in place to curb this slide. This sentiment was shared by two other directors with one asking how the issue of predatory journals was being handled. The other director questioned: *"Aren't there behaviours threatening the credibility of OA publication?"* He made reference to errors being made in some of the publications particularly poor spellings and evidence of little or lack of peer review. The first director suggested that there was a need to have a person dedicated to identifying author research output and check if it was going to predatory publishers. He indicated that this had implications on a researcher's accreditation, not only with SCOPUS ranking but also collaborations with others may not materialize if the list of your publications happened to be in 'fuzzy' journals. The director also said *"but in general OA is going to now create what are really poor class universities where people are going to have hundreds of publications which mean nothing."*

Another (12.5%) Director of research highlighted three issues, namely; a) that there was need to use the IR more than the current IR; b) She would recommend that tenure and promotion conditions should be revised and make it mandatory for members to submit their papers to the library for uploading in the IR; c) lamented that copyright clearance was taking too long, hence discouraging academics who wanted to participate in populating the IR. On this the director was quoted saying:

> *"Like now we have 300 articles but the IR can be having 100, it means a lot of articles have not been deposited. But now the problem was the library, because you ask them "look I gave you my papers how come they are not appearing in the IR?" They are saying it takes long to talk to publishers."*

This director's last issue was that management in the university had cancelled the US$20.00 incentive which had increased deposits. Commenting on the issue of incentives, another director said:

> *"South Africa is one country that recognizes publication but Zimbabwe does not. Remuneration for publication is the key or underlying component to deposit rate. So Zimbabwe should emulate the South African situation so that the rate of deposits increases."*

The same director also said that junior lecturers wanted to publish for promotion whereas professors published for the sustenance of their professorship. Another director bringing in a bit of controversy to the discourse said:

> *"In as much as there are proponents for OA, you also need to know that there are protagonists to that. I'm sure even today, there is an interested stakeholder, the publishers. When we talk about academics doing their research, take away the publishing industry, academics are severely affected. Can you see the role of the publishing industry? The publishing industry and the academia, I think they should co-exist. So I think when these publishers raise their own concerns it may not be easy that way to consider their concerns unreasonable. So I think there are concerns either side. It's something that is on-going, yes academics should have access to this intellectual property, yes that is true. But the academics have this kind of support from industry and so forth. But of course one cannot rule out that there are also fraudulent activities that are bent on benefiting from the activities that are carried out by others."*

One (12.5%) of the directors of research emphasized the need to inculcate understanding in academics that when they conduct research it has to be widely disseminated and shared rather than keep in drawers. She said that the idea behind research is not only to impact on the individual but on society and the university. The director also lamented shallow funding reserves of the research board on the backdrop of the economic challenges currently facing the country, thereby limiting the university's capacity to fund research. She said that academics need to be educated that there are limitations to the level to which universities can fund research, therefore, the onus is upon them to look for external funding and do the research. The academics also have to understand that when they are sourcing external funding, they are using the institution as an affiliation and they are also using the university's time. So the university might not have contributed in cash but has contributed in kind. Another director commented that in their university people are overloaded with

teaching loads and as a result research board funds are not utilized. She suggested that there is need for ratification of teaching loads so that more research activity takes place. Lastly, one (12.5%) director advised the researcher to consider the national database of the Research Council of Zimbabwe in her study.

5.3.2 Impediments to deposit of research output in IRs by scholars

The second objective of the study was to ascertain the reasons as to why scholars were not depositing their works to IRs in the universities. This is against the backdrop that institutions have invested in the IR technologies and therefore, they have to get a return on the investment. That can only be achieved through deposit of research output generated by their scholars and researchers into the repositories. Three questions were generated from this objective and they were:

1. What are the attitudes and concerns of academics towards IRs?
2. What challenges do the academics and librarians face in contributing to and managing the IRs?
3. What strategies can be employed to overcome the challenges?

Thus, data that was obtained for the three questions is presented in this section following the order of the research questions.

5.3.2.1 Attitudes and concerns of academics towards IRs

In order to answer this question, a questionnaire was designed specifically for academics (Appendix 3). The questionnaire comprised three subdivisions, namely, section A was on demographic data, section B - awareness of open access and section C - perceptions of IRs. Interviews with directors of research and Library directors also sought their opinion on the attitudes and concerns of academics. The data is presented in the subdivisions below.

5.3.2.1.1 Profile of respondents

It was found to be of importance to give a profile of the respondents as this has a bearing on their behavioral intentions to accept and use open access platforms, particularly IRs that had been established in their universities. This section is largely informed by the mediating variables of the determinants of acceptance and use of technology in the UTAUT model which are age, gender, experience and voluntariness of use. However, the researcher added the construct of discipline to see if the rate of adoption of technology was also influenced by one's discipline.

Question 1 and 2 required respondents to indicate their institution and job title. This enabled the researcher to determine the level of acceptance and use of IRs by institution and rank of the participants. The construct of rank (job title) is assumed to have a moderating effect on acceptance and use of OA and IRs by academics. Even though all the universities in Zimbabwe have established IRs, the rate of acceptance and use of the technology was assumed to be different as determined by effort expectancy, facilitating conditions, social influence, performance expectancy and voluntariness of use. The results are reflected in Table 5.6 below.

Table 5.6: Responses from each institution
N = 187

Institution		Professor	Associate professor	Senior lecturer	Lecturer	*RF	*TA	*SDF	Total
					Job Title				
1	Count	0	0	1	17	0	0	0	18
	%	0.0%	0.0%	5.6%	94.4%	0.0%	0.0%	0.0%	100.0%
2	Count	1	1	5	7	0	2	0	16
	%	6.3%	6.3%	31.3%	43.8%	0.0%	12.5%	0.0%	100.0%
3	Count	0	1	3	30	0	4	1	39
	%	0.0%	2.6%	7.7%	76.9%	0.0%	10.3%	2.6%	100.0%
4	Count	0	0	0	12	0	0	0	12
	%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
5	Count	0	0	1	6	0	1	0	8
	%	0.0%	0.0%	12.5%	75.0%	0.0%	12.5%	0.0%	100.0%
6	Count	0	0	3	22	0	3	0	28
	%	0.0%	0.0%	10.7%	78.6%	0.0%	10.7%	0.0%	100.0%
7	Count	2	0	2	28	5	2	2	41
	%	4.9%	0.0%	4.9%	68.3%	12.2%	4.9%	4.9%	100.0%
8	Count	1	1	9	13	0	1	0	25
	%	4.0%	4.0%	36.0%	52.0%	0.0%	4.0%	0.0%	100.0%
Total	Count	4	3	24	135	5	13	3	187
	%	2.1%	1.6%	12.8%	72.2%	2.7%	7.0%	1.6%	100.0%

*TA = Teaching Assistant   SDF= Staff Development Fellow   RF = Research Fellow

Question 4 and 5 solicited for the respondents' age and gender. From Figure 5.3 there were more males, 145 (75.9%) than females, 45 (24.1%) and the highest, 91 (48.7%) number of respondents emanates from the 31-40 years age group for both females, 17 (18.7%) and males, 74 (81.3%)

respectively followed by the 41-50 years, 44 (23.5%), age group. In the 61+ years age group there was only one (11.1%) females against eight (88.9%) males.

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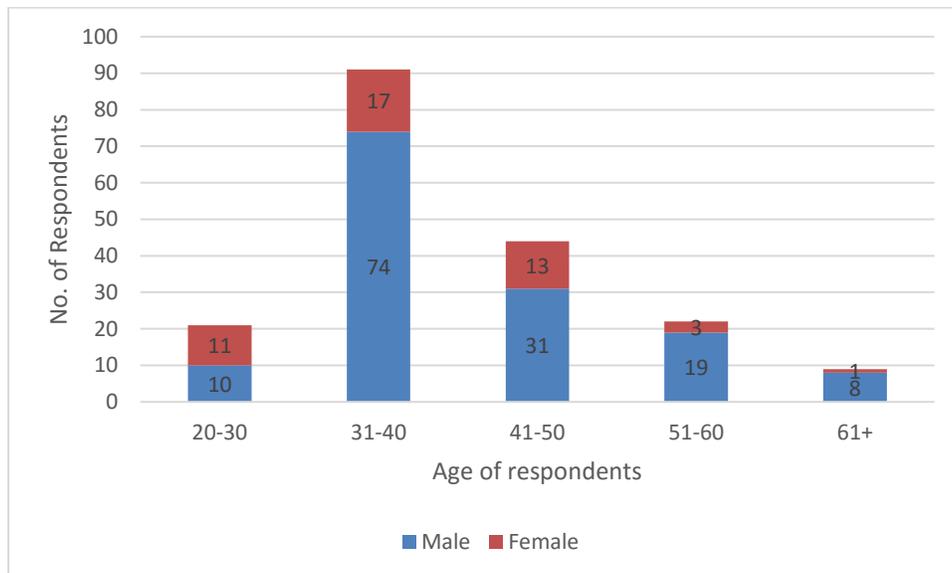
Figure 5.3: Age and gender of respondents

Questions 3, 6 and 7 required respondents to indicate their level of education, period of employment by the institution and post qualification experience and were assumed to have a bearing on participant's level of research activity and experience in scholarly communication.

Table 5.7: Qualifications of respondents
N = 187

Qualification		Job Title							Total
		Professor	Associate professor	Senior lecturer	Lecturer	*RF	*TA	*SDF	
Masters	Count	1	1	12	120	5	6	1	146
	% within Job Title	25.0%	33.3%	50.0%	88.9%	100.0%	46.2%	33.3%	78.1%
PhD	Count	3	2	12	15	0	0	0	32
	% within Job Title	75.0%	66.7%	50.0%	11.1%	0.0%	0.0%	0.0%	17.1%
Bachelors	Count	0	0	0	0	0	7	2	9
	% within Job Title	0.0%	0.0%	0.0%	0.0%	0.0%	53.8%	66.7%	4.8%
Total	Count	4	3	24	135	5	13	3	187
	% within Job Title	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

RF = Research fellows   TA = Teaching assistants   SDF = Staff development fellows

The results in Table 5.7 indicate that 146 (78.1%) academics have Masters degrees and these cut across all the ranks. It is of interest to note that amongst Masters degree holders is one professor and one associate professor. There are 32 (17.1%) PhD holders within the ranks of professors, associate professors and lecturers.

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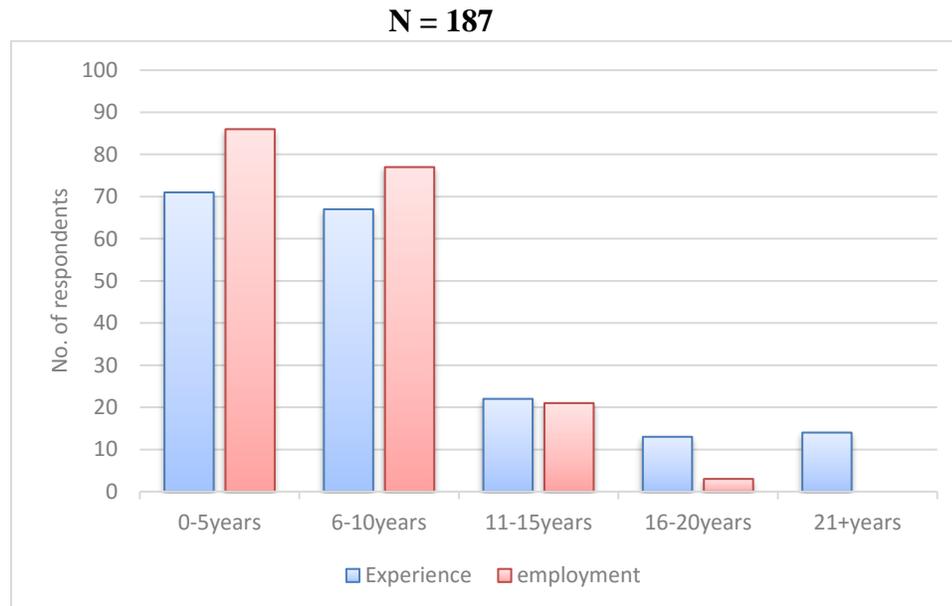
Figure 5.4: Experience and employment in institution

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The results displayed in Figure 5.4 show that most, 73.8% (138) academics had 0 to 10 years post qualification experience in academia while 87.2% (163) had been in the institution for the same period. The most experienced ones (16 to 20 years and 21+) were 14.5% (27) while 1.6% (three) had been in the institution for 16 years and beyond. Twenty-two (11.8%) respondents had 11 to 15 years of experience while 21 (11.2%) had been in the employ of the institution for 11to15years.

N = 187
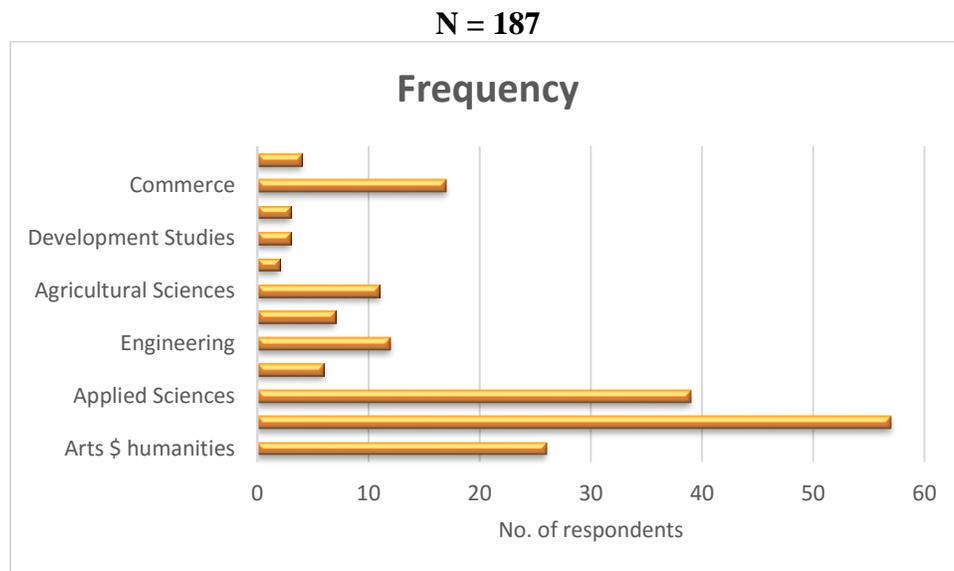
Figure 5.5: Response by discipline

The construct of discipline (Q8) was also included to determine usage and adoption of IRs because the researcher assumed that some disciplines are likely to adopt the technology faster than others. Several disciplines were identified into which the various courses offered in the eight universities were grouped. The results are displayed in Figure 5.5 above. The majority of responses were from social sciences (30.5%) and Applied sciences (20.3%), and the least of the responses were in development studies (1.6%) and natural sciences (1.6%) respectively.

5.3.2.1.2 Awareness of Open Access

Section B of the questionnaire for academics sought to establish the academic community's level of awareness of the concept of open access and, particularly institutional repositories. The researcher's intention was to establish the influence of awareness on attitudes and resultantly the behavioural intentions of the academics to use IRs to deposit their research output. This section is largely informed by the UTAUT constructs of social influence and facilitating conditions. Social influence refers to how an individual is influenced by peers, the significant others (champions) or

prominent researchers within the university. This construct of behavioural intention is moderated by age, experience and gender of the individual. Ten questions were generated for this section.

Question 9 was, Are you aware of the Open Access Initiative? and required to respondent to indicate 'Yes' or 'No' and the results showed that 148 (79.1%) respondents were aware of open access whilst only 39 (20.9%) were not aware. This shows that the majority of academics in the universities were aware of the open access initiative.

The researcher also wanted to compare the respondents' awareness by age and the results in Figure 5.6 indicated that the highest number, 71 (48%), of respondents who were aware of OA was in the 31-40 years age group, followed by the 41-50, 39 (26.4%) years age group and the least was that of 61+years, six (4.1%).

N = 187
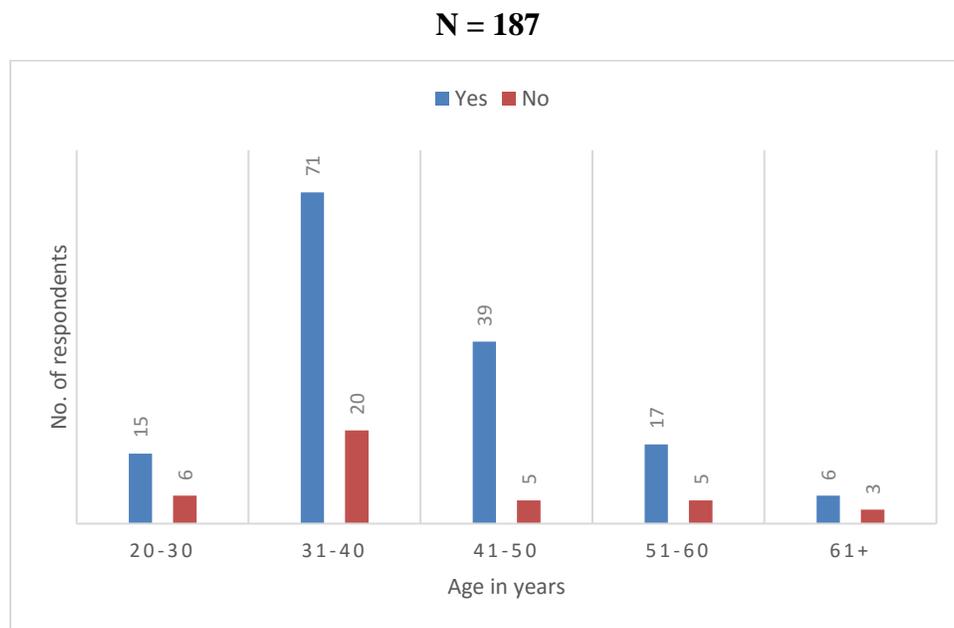
Figure 5.6: Awareness of OA by age

Those respondents who said 'Yes' were asked to respond to Question 10 whilst those who said 'No' were asked to proceed to Question 11. Question 10 required respondents to indicate how they got to know about OA. The following is a list of responses given as sources of awareness:

- *Internet/Online*
- *Library*
- *Workshop*
- *In school/College*
- *Journal website*
- *University website*
- *Through research*
- *Research office*
- *Publications*
- *My lecturers*

- *Publisher adverts*
- *OA week campaign*
- *Colleagues*
- *Seminar*
- *Library orientation*
- *Library Committee*
- *Library marketing*
- *Professional literature*
- *Work experience*
- *The media*

- *University notices*
- *Faculty meeting*
- *Library staff*
- *Email notifications*
- *Library training*
- *Conferences*
- *Journals*
- *Departmental discussions*

The responses above showed that a wide range of avenues existed or had been used to ensure that the academics were informed about open access so as to increase awareness. A close look at the list of terms, for example, where the terms library, workshop, and terms linked to the institution, (67.9%) indicates that both the library and the institution were playing a role in creating awareness amongst academics. Question 11 was a follow-up to question 9 and it required respondents to demonstrate their understanding of OA by explaining the meaning of OA. The question read, explain what you understand by open access? Varied responses were given with 19 participants not responding to the question while five said they had no idea or don't know and one had a vague idea. For those, 167 (89%), who gave an explanation an extract of statements made is shown below:

- *Online free access and sharing of information;*
- *A facility that allows access to research work and books from different scholars. Accessed freely;*
- *Unlimited access to scientific publications;*
- *Researcher pays a journal to allow free access to his articles by readers;*
- *Free exchange of knowledge;*
- *Where readers have access to publications on an institutional repository;*
- *It gives readers access to information by removing legal constraints that may hinder free access to this information;*
- *Free access to electronic resources of an organisation;*

- *It is a movement where there is a call to people for information for free access;* and

- *e-material that is available in the university repository;*

- *A system where research materials are archived and access is made free to the readers.*

The extracted statements above show that the academics do understand that OA is concerned with online free access to scholarly literature. Question 12 required the respondents to express their opinion of the OA initiative. The question read, what is your opinion of the open access initiative? The respondents gave varied views with only 2.6% indicating that they had no idea about the initiative. Fifty-nine (31.6%) respondents said it's a good initiative, 3.2% said it's helpful, 2.7% said it's a positive thing and the following statements are examples of statements made by the rest (59.9%) of the respondents appreciated the initiative and a few statements were extracted:

- *A major development which makes information available to scholars;*

- *A welcome initiative to bridge information gap;*

- *Confidentiality of information needs to be protected;*

- *Expands horizons of knowledge and enhances knowledge dissemination;*

- *Great especially for third world countries where academics and researchers may not be able to afford subscriptions;*

- *It's a great way of making information available to those who need it the most and it also increases the visibility of researchers;*

- *The initiative is commendable as it allows for unrestricted access to information that would have otherwise been difficult to obtain but at the same time producers of these works may cry foul;* and

- *Good and bad. Good in the sense that it gives researchers easy access to knowledge but bad in the sense that some poor works are availed to students who cannot evaluate their quality.*

Question 13 asked, does your institution have an Open Access Policy? This was meant to establish if they were aware of the policy, where the institution had one in place. The respondents were required to tick 'Yes' or 'No'. The results showed that 53% of the respondents said 'Yes', 28% had no idea and 19% said 'No'. The next question (Q14) required respondents to state the degree to which they agreed with the statement that 'scholarship should be freely available on the web'. This question was asked to establish if researchers were in support of the OA initiative. A 5 point

Likert scale was used to measure the level of agreement from strongly disagree, disagree, not sure, agree to strongly agree. A majority, 106 (56.7%) of respondents strongly agreed, 11 (5.9%) were not sure while only three (1.6%) strongly disagreed. A mean of 4.36 scholars supported making scholarship OA.

Questions 15, sought to establish if respondents were aware of IRs as an OA platform for making scholarly information freely available and if they would recommend (Q16) use of this platform by universities. On the heels of these two questions was question 17 whose intention was to find out if the respondents were aware of the IRs in their own institutions. Data for the three questions is presented in Figure 5.7 below.

N = 187
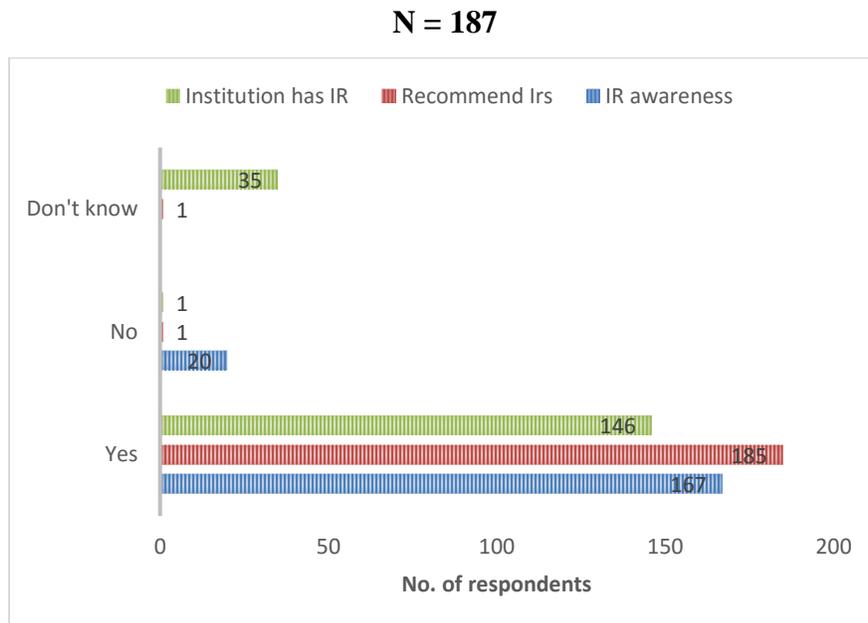
Figure 5.7: Awareness and perception of IRs

Most of the respondents, (89.3%), were aware of the concept of IRs; recommended, (98.9%) that universities use the technology; and were aware of the existence of a repository in their institution (78%). Twenty (10.7%) respondents were not aware of the concept of IRs and 18.7% did not know if their institution had an IR. Respondents who said 'Yes' to question 17 were required to state how they got to know of their institution's IR (Q18). Most, 102 (70%) of respondents got to know of the institutional repository through the librarian, 15 (10%) through the campus newsletter and equally 15 (10%) got to know through the internet. Only five (5%) got informed through other

sources and these were highlighted as being; the library workshop, induction, library director, university website, meetings, workshop and faculty dean.

5.3.2.1.3 Perceptions of IRs

The last section (section C) sought to establish the respondents' perceptions of IRs. The determinants of technology usage of the UTAUT model; facilitating conditions, performance expectancy, social influence and ease of use of the system have an influence on users' attitudes towards IRs and perceptions of the innovation.

Question 19 sought to establish if the scholars had deposited their research output in the repository. Respondents had an option of selecting 2 options, either 'Yes' and deposited elsewhere or 'No' and deposited elsewhere or just say 'Yes' or 'No'. The results in Figure 5.8 showed that 119 (63.6%) respondents had not deposited material in the repository and 68 (36.4%) had deposited. Fifty-three (18.7%) respondents indicated that they deposited elsewhere. Respondents who indicated that they deposited elsewhere proceeded to question 20 while those who selected 'Yes' were to proceed to question 23 and those who said 'No' were instructed to proceed to question 24 and skip questions 27 to 30.

N = 187
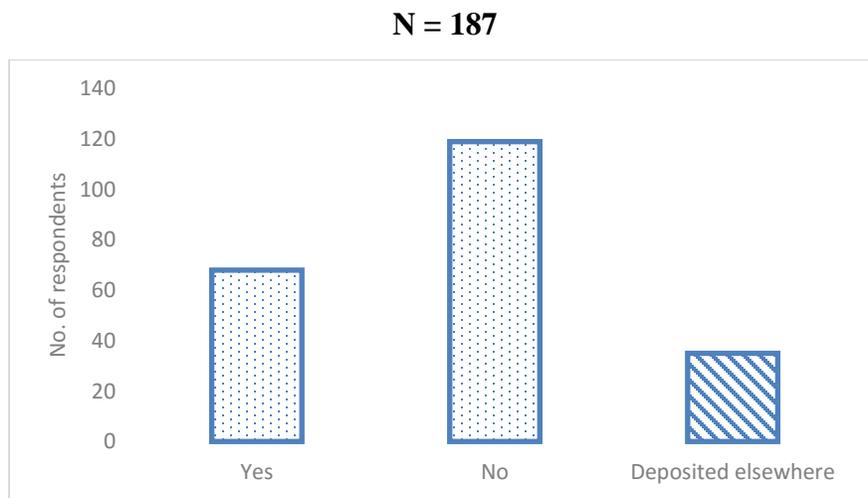
Figure 5.8: Deposited material in the IR

Question 20 required respondents who indicated that they deposited elsewhere to indicate if they had done so in addition to doing so in the university's repository or instead of the local repository. Results in Table 5.8 showed that of the 53 (18.7%) respondents who deposited elsewhere, 20

(10.7%) did so in addition to the university's repository and 15 (8%) did so instead of the institution's repository.

Table 5.8: Deposited elsewhere and in addition to or instead of
N = 35

Depositing	Frequency	Percent	Valid Percent	Cumulative Percent
In addition to	20	10.7	10.7	10.7
Instead of	15	8.0	8.0	18.7
Skip	152	81.3	81.3	100.0
Total	187	100.0	100.0	

Question 21 sought to establish where these respondents deposited their research output. This was a multiple response question where respondents could select 1 or two choices. The results in Figure 5.16 show that most, 10 (5.3%) respondents deposited in a subject repository, nine (4.8%) in a disciplinary repository, six (3.2%) used their personal websites, five (2.7%) deposited in the funding body's repository and another nine (4.8%) in 'other'. Those who selected 'other' specified that they deposited in Research gate, four (44.4%), Academia.edu, four (44.4%) and to their PhD granting institution, one (11.1%).

 The respondents were also required to state the types of materials they had deposited on these platforms in question 22. A collation of the types of materials revealed that 36 (67.9%) respondents had deposited journal articles, research articles, 32 (60.4%), seminal paper, one (1.9%), theses and dissertations (13.2%), conference papers (9.4%) and a book chapter (1.9%).

Respondents who said 'No' to question 19 were asked to state their reasons for not depositing their research output (Q23). There were 91 respondents who gave reasons for not depositing and 30 respondents did not say anything. The researcher categorized the responses and these are displayed in Figure 5.9 below.
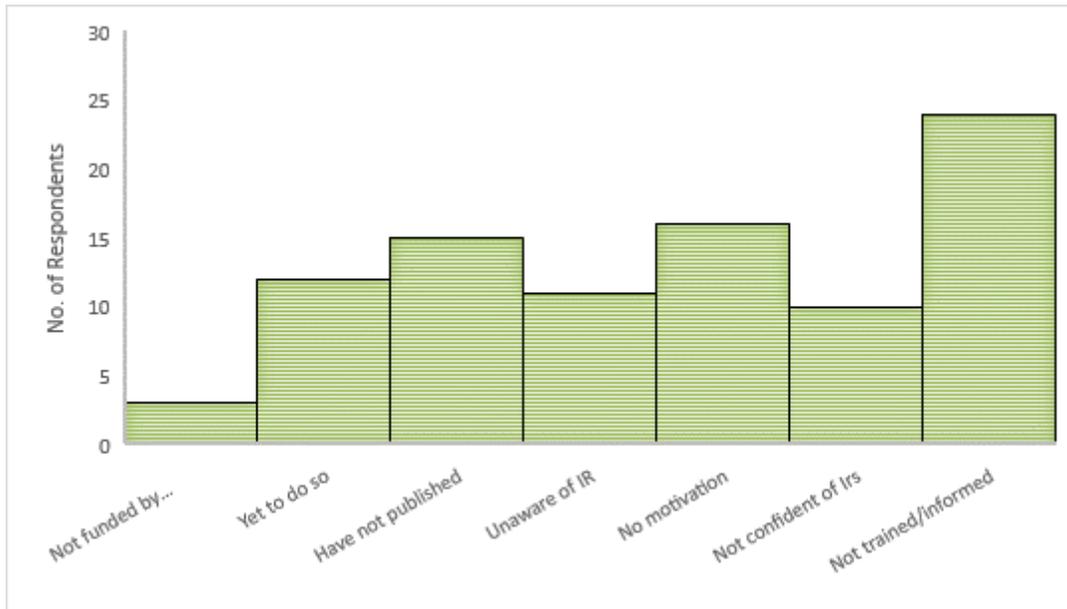
Figure 5.9: Reason for not depositing in IR

It can be observed that a majority, 26% (24) of respondents had not been trained to deposit or informed about the importance of IRs, 18% (16) lacked motivation to deposit, 17% (15) had not published papers, 13% (12) were yet to deposit, 12% (11) were not aware of the IRs existence while 11% (10) did not have confidence in the IR and 3% (3) claimed that they were not funded by the university.

The following question (Q24) required respondents to say if they had valuable research output that has not been published. This question was supposed to be answered by the 119 (63.6%) respondents who said 'No' to question 19 and those who said 'Yes' to question 19 were instructed not to respond to this question. The results showed that 118 (63.1%) participants responded to this question and only one (0.5%) did not give an answer. Eighty-four (71.2%) of the respondents said 'Yes' while 34 (28.8%) said 'No'.

Question 25 was a 5 point Likert scale and was used to establish the factors that motivate users of the IR technology to deposit their works to the repository. There were 10 Likert scale items which were presented as statements offering a scale of options to which they had to respond. Respondents had to rate the level of importance they attached to a given reason for depositing, whether it was very important, important, moderate, of little importance or unimportant.

The results are reflected in Figure 5.10 and Table 5.9. The 1st reason was, *to make my research available to my students and colleagues*. There were 185 (98.9%) responses and a majority (117 (62.6%)) of respondents said it was very important, 50 (26.7%) said it was important, 12 (6.4%) said it was moderate, three (1.6%) attached little importance and another three (1.6%) said it was unimportant. Thus, a mean of 4.49 found this factor to be important. The 2nd reason was, *as a way of increasing exposure to my work*. There were 185 (98.9%) responses and most (110 (58.8%)) respondents said it was very important, 57 (30.5%) said it was important, 10 (5.3%) said it was moderate, 5 (2.7%) said it was unimportant and three (1.6%) said it was of little importance. Thus, a mean 4.43 attached importance to this factor. For the 3rd reason which read, *it is a good way of preserving my materials and listing my research output* there were 184 (98.4%) responses and most (70 (37.4%)) respondents said it was very important, 59 (31.6%) said it was important, 33 (17.6%) said it was moderate, 16 (8.6%) said it was unimportant while six (3.2%) said it was of little importance. Therefore, a mean of 3.88 selected this factor.

N = 187
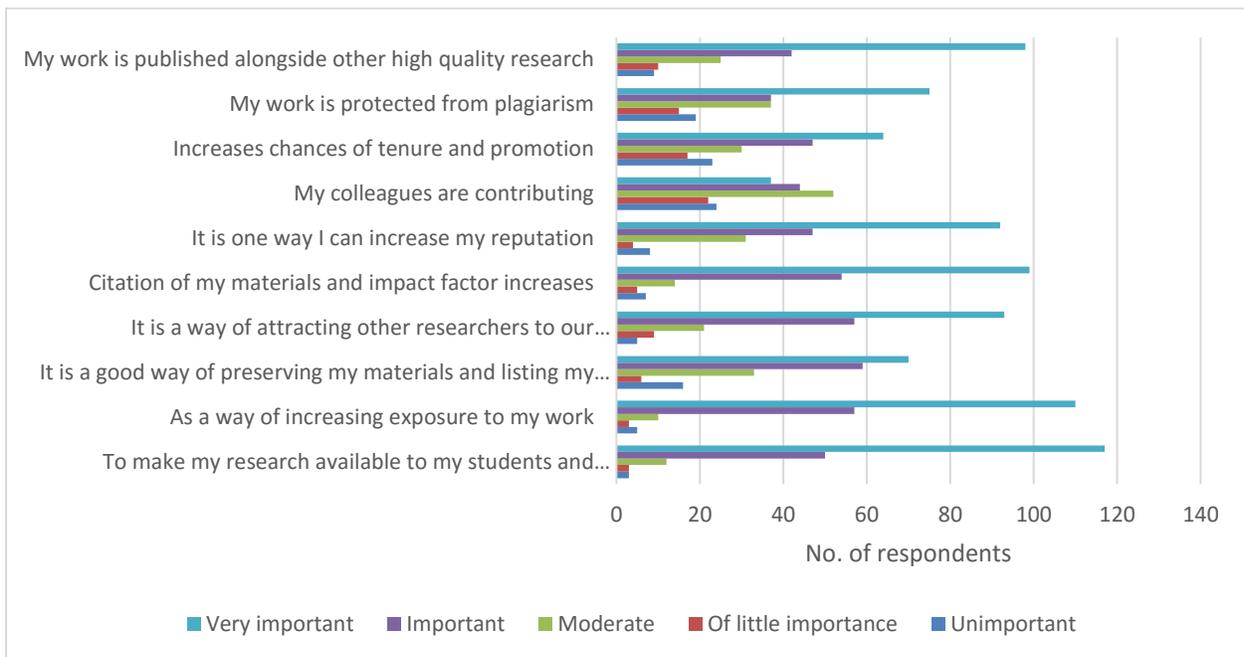
Figure 5.10: Motivation to deposit

The 4th reason was, *it is a way of attracting other researchers to our institution and increases exposure of the institution*. There were 185 (98.9%) respondents and a majority (93 (49.7%)) said it was very important, 57 (30.5%) said it was important, 21 (11.2%) said it was moderate, nine

(4.8%) said it was of little importance and five (2.7%) said it was unimportant. Thus, a mean of 4.21 attached importance to this factor. For the 5th reason which was, *citation of my materials and impact factor increases,* there were 179 (95.7%) responses. Of that number, 99 (52.9%) respondents said it was very important, 54 (28.9%) said it was important, 14 (7.5%) said it was moderate, seven (3.7%) said it was unimportant while five (2.7%) said it was of little importance. Therefore, there was a mean of 4.30. The 6th reason stated, *it is one way I can increase my reputation.* This reason attracted 182 (97.3%) responses from which a majority (92 (49.2%)) said was very important, 47 (25.1%) said it was important, 31 (16.6%) said it was moderate and eight (4.3%) said it was unimportant while four (2.1%) said it was of little importance. Thus, there was a mean of 4.16. For the 7th reason which read, *my colleagues are contributing,* there were 179 (95.7%) respondents where most (52, 27.8%) respondents said it was moderate, 44 (23.5%) said it was important, 37 (19.8%) said it was very important, 24 (12.8%) said it was unimportant and 22 (11.8%) said it was of little importance. There was a mean of 4.3.27. The 8th reason was, *increases chances of tenure and promotion* and out of 181 (96.8%) respondents 64 (34.2%) said it was very important, 47 (25.1%) said it was important, 30 (16%)said it was moderate and 23 (12.3%) said sit was unimportant while 17 (9.1%)aid was of little importance. Therefore, there was a mean of 3.62. For the 9th reason which stated, *my work is protected from plagiarism,* there were 183 (97.9%) responses of which 75 (40.1%) said it was very important, 37 (19.8%) said it was important and another 37 (19.8%) said it was moderate while 19 (10.2%) said it was unimportant and 15 (8%) said it was of little importance. Thus, there was a mean of 3.73. The last and 10th reason read, *my work is published alongside other high quality research.* There were 184 (98.4%) responses of which 98 (52.4%) said it was very important, 42 (22.5%) said it was important, and 10 (5.3%) said it was of little importance while nine (4.8%) said it was unimportant. Thus, there was a mean of 4.14.

Table 5.9: Motivation to deposit

Factor	N	Minimum	Maximum	Mean	Std. Deviation	Variance
To make my research available to my students and colleagues	185	1	5	4.49	.822	.675
As a way of increasing exposure to my work	185	1	5	4.43	.882	.779
It is a good way of preserving my materials and listing my research output	184	1	5	3.88	1.210	1.465
It is a way of attracting other researchers to our institution and increases exposure of the institution	185	1	5	4.21	1.008	1.015
Citation of my materials and impact factor increases	179	1	5	4.30	1.005	1.010
It is one way I can increase my reputation	182	1	5	4.16	1.068	1.140
My colleagues are contributing	179	1	5	3.27	1.292	1.669
Increases chances of tenure and promotion	181	1	5	3.62	1.380	1.904
My work is protected from plagiarism	183	1	5	3.73	1.346	1.813
My work is published alongside other high quality research	184	1	5	4.14	1.146	1.313
Valid N (listwise)	174					

1 = Unimportant   5 = Very important

Respondents were also given the liberty to give other reasons for motivation to deposit. A list of their suggestions is given below.

- *Back up track of saving information;*
- *I'll be ranked among renowned scholars in my discipline;*
- *If mandate exists for annual evaluation;*
- *Institution's reputation enhanced;*
- *Institutional repositories have the pride of showcasing my research output to my friends and colleagues;*
- *The fact that research output is available openly makes it available to policy makers thereby influencing policy direction at government level; and*
- *To get feedback from users, thus to improve my work quality.*

For those respondents who had contributed material to the repository, question 26 required them to state the frequency of deposit. For this question only 74 (39.6%) participants responded out of

187. Figure 5.11 shows that 60% deposited often while 28% rarely did so. Seven percent had not deposited at all and 5% deposited very often.

N = 74
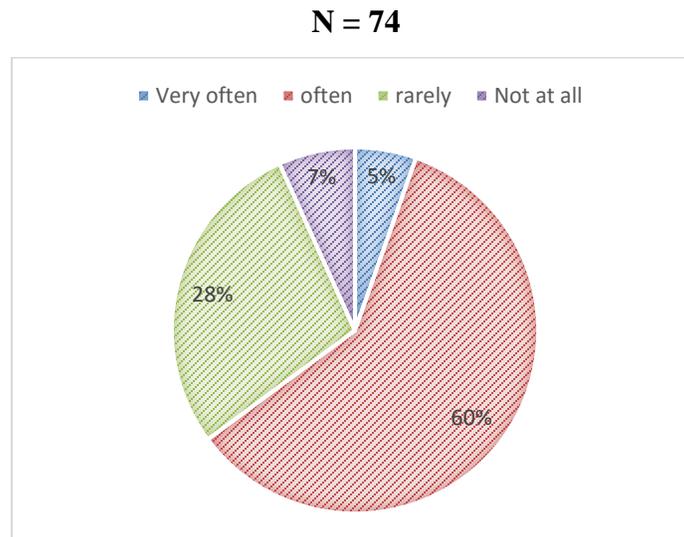
Figure 5.11: Frequency of deposit

Question 27 required respondents who said 'Yes' to question 19 to state if they deposited their materials on their own or someone else did it for them. This question was meant to establish if the libraries encouraged self-archiving. IR/faculty librarians were asked in question 34, who deposits content into the IR and, the Library directors were also asked in question 21, who is responsible for posting content to the repository (results for IR/faculty librarians are presented in 5.3.2.2. According to the results, a majority, 56 (82.4%) of the respondents had someone deposit for them while 17.6% did it on their own. For those respondents whose deposits were done by someone else, they were required to state who did it for them (Q28). There were 55 (98%) responses to this question out of the 56 expected respondents. The respondents gave the following as their intermediaries; librarian/library, 44 (80%), library technician/ICT technician, two (3.6%), research office, four (7.3%), institution, one (1.8%)), faculty representative, one (1.8%), chairperson of department, one (1.8%), and journal, two (3.6%).

Question 29 required the respondents to indicate why they did not self-archive. The results indicated that 55.9% (38) said the librarian prefers to do it, 11.8% (8) said it was time consuming while 32.4% (22) did not know how to do it. As a follow-up to this, question 30 sought to establish if the academics would attend training on self-archiving if it were to be offered. The question read, if training on self-archiving were to be offered would you attend the sessions? There were 182

(97.3%) responses to this question, five (2.7%) did not respond. The results showed that 86.8% (158) of the respondents said 'Yes', they would attend while 13.2% (24) said 'No". Respondents were asked to give an explanation to their responses. There were 150 (80.2%) responses, so the researcher organized the responses into six categories including; To acquire archiving skills 61 (40.6%); to gain knowledge and understanding of the IR concept, 29 (19.3%); it's beneficial to me, 40 (26.7%); I don't know how to do it, seven (4.7%); I know how to do it, seven (4.7%) and; no time to do so, 6 (4%). Three respondents made statements that were irrelevant to the question.

Question 31 sought to find out if the respondents had ever searched for information in an IR. Figure 5.20 shows that 53.5% (100) said 'Yes' while 46.5% (87) said 'No'. A follow-up question (Q32) was asked to establish if the respondents would recommend their peers to use IRs for information. The results showed that six percent (11) of the respondents said 'No' while the 166 (91.2%) said 'Yes'. Respondents were asked to provide an explanation to their answer. There were 124 (66.3%) responses which were organised into five categories; 23.4% (29) said they would recommend peers to use the repository in order to share and disseminate information, 36.3% (45) said to provide access to information, 4.8% (6) said to deposit and store one's works, 20.2% (25) said for visibility and awareness and, 16.9% (21) said it was not important to me.

N = 187
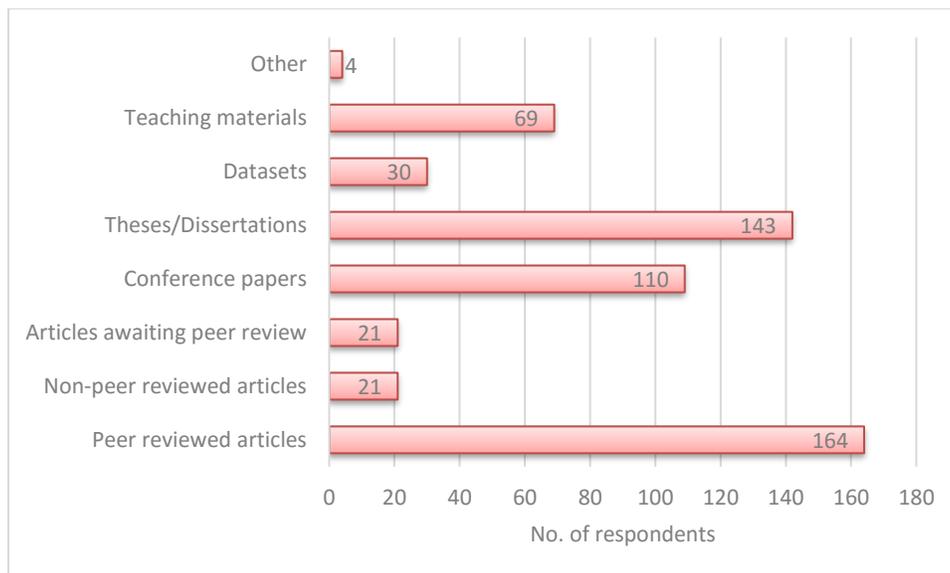
Figure 5.12: Material preferred by academics

Question 33 sought to establish the scholars' preferences for types of materials that should be included in the repository. The question was, which materials do you feel should be accepted for the IR? This was assumed to be a factor contributing to acceptance and use of repositories. This was a multiple response question where respondents ticked on the materials they preferred. From Figure 5.12 it is clear that most respondents, 164 (87.7%) preferred peer reviewed articles followed by theses and dissertations, 142 (76.5%). Another popular type were conference papers, 109 (58.8%) and though not very popular were teaching materials, 69 (36.9%). Datasets, 30 (16%), non-peer reviewed articles and articles awaiting peer review had the lowest responses of 21 (11.2%) each. Other suggested types included past examination papers, textbooks and post-print articles which are the same as peer reviewed articles.

Question 34 required respondents to say if their institution mandates them to deposit research output in the IR. A mandate policy creates awareness amongst stakeholders of the institution of the existence and importance of the IR. Scholars and researchers were amongst the stakeholders in universities. Directors of research, Library directors and IR/faculty librarians were asked a similar question (see results in 5.3.1.3 and 5.3.2.3 respectively). The research policy and OA/IR policies were also analysed for clauses that mandate deposit (see 5.3.2.3). The researcher also went through the websites of the institutions in search of policies or statements related to deposit mandates. According to Figure 5.13 below most (43.8%) respondents didn't know, 32.1% said 'No' and 25.1% said 'Yes". Directors of research and Library directors said that it was mandatory for scholars to deposit research output of university funded research. The research policy did not have a clause mandating deposit. None of the universities' websites had information or statements mandating deposit. Sixty percent of the IR/faculty librarians said 'Yes' while 32% said 'No'. The OA/IR policy documents that were analysed had a clause mandating deposit of university funded research. For those respondents who said 'Yes'(25.1%), question 35 required them to say if the mandate was subject to them getting permission from their publisher or not. Results in Figure 5.12 show that 12.8% respondents said 'Yes' while 9.1% did not know and 3.2% said 'No'. The researcher went through the OA/IR policy documents to check if the mandate was subject to publisher permission or not. Of the five policies two universities' policies did not make reference to publisher's permission. One of the policies said: "In terms of this clause all content below must be submitted to the…IR administrator no later than fourteen (14) days after date of publication." The other three policies recognized the need for publisher permission. One of the policies stated:

"Requires that a record of research output funded by the university be deposited in the …institutional repository…that full-text of submissable outputs be exposed as soon as publisher restrictions allow" (MSU n.d.). And another one says; "In cases where a publisher is not listed in the SHERPA-RoMEO service, the University through its Libraries will seek the publisher's permission to make the particular work Open Access" (BUSE n.d.).

N = 187
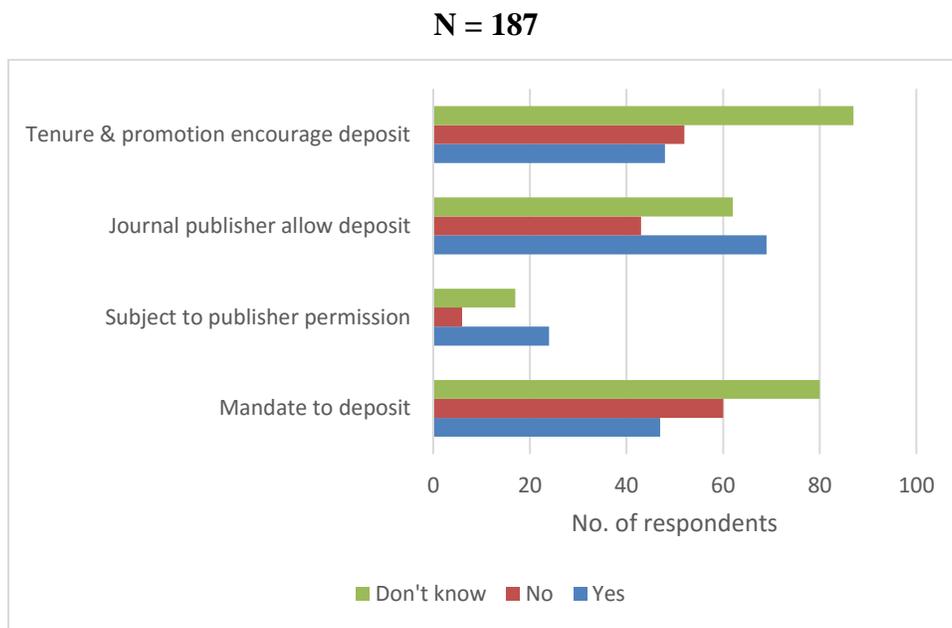
Figure 5.13: Conditions for deposit

Question 36 asked, Do the journal publishers you deal with allow you to deposit your research in the IR? There were 174 (93%) respondents to this question, 13 (7%) did not answer the question. Sixty-nine (36.9%) respondents said 'Yes', 62 (33.2%) said they did not know and 43 (23%) said 'No'. Respondents were then asked to explain and only 104 respondents gave explanations, so the responses were organized into three categories, that is, 11 (10.6%) said on expiry of embargo period, 28 (26.9%) said they were allowed to self -archive while 65 (62.5%) were not sure of the agreement. Question 37 sought to establish from the scholars if their institution's tenure and promotion conditions encouraged deposit of materials into the IR? Directors of research (Q10) were asked a similar question. Responses from academics in Figure 5.22 reflected that 87 (46.5%) respondents did not know, 52 (27.8%) said 'No' and 48 (25.7%) said 'Yes'. Responses from Directors of research (see 5.3.1.3) were unanimous that tenure and promotion conditions did not require one to deposit research work to the IR. The question required respondents to provide an

explanation and only 62 (33.2%) responded, so the researcher categorized the responses. Twelve (19.4%) respondents said their tenure and promotion conditions were concerned with publications and community service, 26 (42%) said they did not require deposit and seven (11.3%) said they were not informed about it and 17 (27.4) other.

Question 38 sought to establish if the scholars had ever discussed the copyright transfer agreements with their publishers. Results showed that 68.9% (126) of the respondents said 'No' while 31.1% (57) said 'Yes". The question required respondents who said 'No' to explain why. There were 83 (65.9%) responses to this question and of this number four (3.2%) gave irrelevant statements. The responses were organized into five categories. Two (1.6%) respondents said they published with OA journals, eight (6.4%) said the publisher retained the copyright, 11 (8.7%) said the issue had not been discussed, 12 (9.5%) had not published while 46 (36.5%) had never bothered about it.

Question 39 asked for the scholars' sentiments on copyright ownership. There were 146 (78.1%) responses to this question. The majority (88 (60.2%) of respondents said it was good and it protects works from plagiarism, 22 (20.5%) said the author should retain copyright, 8 (4.8%) said there should be co-ownership of copyright by the author and publisher. Another 8 (5.5%) respondents said copyright ownership was unfair while 2 (1.4%) said the publisher should own copyright and one (0.7%) said it should be owned by the institution, 8 (5.5%) emphasised respect for copyright and that it should be enforced, 2 (1.4%) respondents said copyright transfer agreements should be negotiated by the author and publisher.
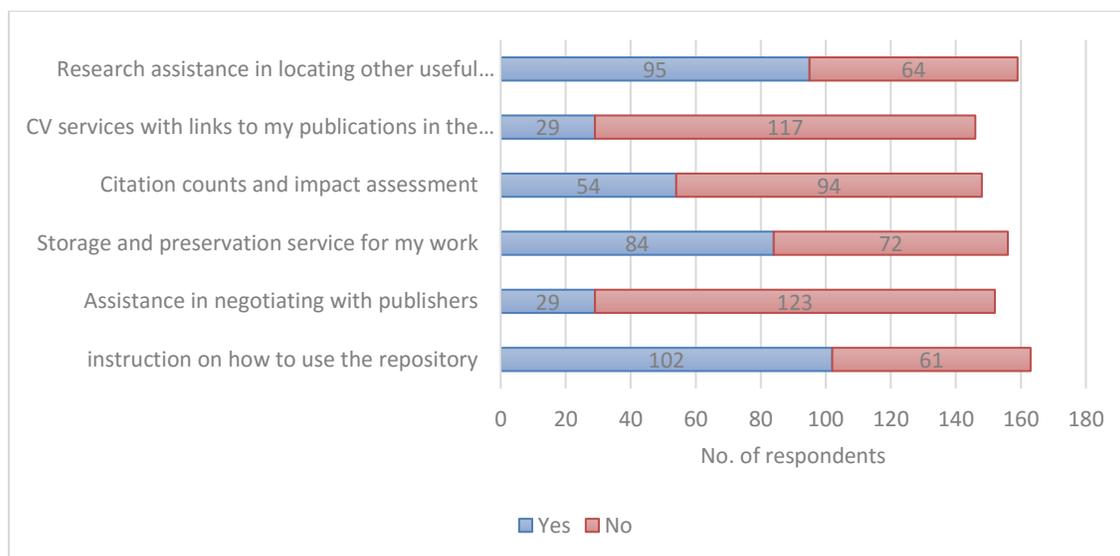
Figure 5.14: IR services offered by the library

Respondents were then asked (Q40) to indicate the services which their institution assisted them to understand the repository. This was a six item binary scale where respondents had to tick 'Yes' or 'No'. The results are shown in Figure 5.14 above. The 1st service was, *instruction on how to use the repository*. There were 163 (87.2%) responses and 62.6% said 'Yes' while 37.4% said 'No'. For the 2nd service, *assistance in negotiating with publishers* 152 (81.3%) participants responded with 80.9% saying 'No' and 19.1% saying 'Yes'. For the 3rd service, *storage and preservation of my work*, there were 156 (83.4%) responses with 53.8% saying 'Yes' and 46.2% saying 'No'. the 4th service, *citation counts and impact assessment* had 148 (79.1%) responses where 63.5% said 'No' while 36.5% said 'Yes'. the 5th service, *CV services with links to my publications in the repository* had 146 (78.1%) responses with 80.1% saying 'No' and 19.9% saying 'Yes'. The 6th service was, *research assistance in locating other useful publications in the repository*, where 159 (85%) responses were made. 59.7% of the respondents said 'Yes' while 40.3% said 'No'.

The next question (Q41) sought to establish the extent to which scholars agreed with statements relating to challenges with depositing research to IRs. This was a 5 point Likert scale from strongly agree, agree, not sure disagree to strongly disagree. The results are displayed in Figure 5.15 and Table 5.10 below.
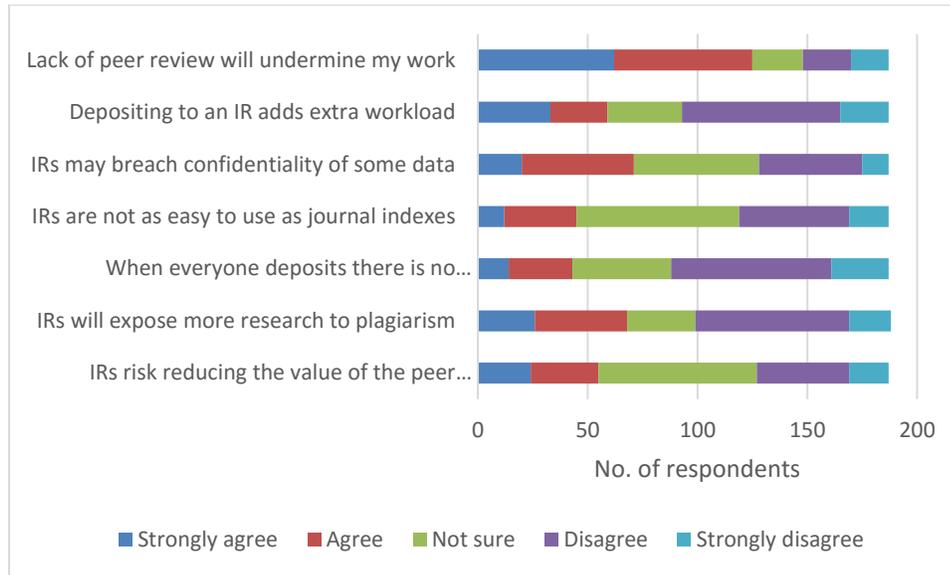
Figure 5.15: Concerns over IRs

The 1ˢᵗ statement, *IRs risk reducing the value of peer review process*, had more than a third (38.5%) of the respondents indicating 'not sure', 22.5% disagreed, 9.6% strongly agreed while 12.8% strongly agreed. For the 2ⁿᵈ statement, *IRs will expose more research to plagiarism*, more than a third of respondents (37.4%) disagreed, 21.6% agreed, 13.9% strongly agreed while 10.2% strongly disagreed. For the 3ʳᵈ statement, *when everyone deposits there is no competitive advantage*, those who strongly agreed were 7.5%, more than a third of respondents (39%) disagreed while 13.9% strongly disagreed. The 4ᵗʰ statement, *IRs are not as easy to use as journal indexes*, had more than a third of respondents (39.6%) not sure, 26.7% disagreed, 9.6% strongly disagree while 6.4% strongly agree. For the 5ᵗʰ statement, *IRs may breach confidentiality of some data*, less than a third of (30.5%) respondents were not sure, followed by 27.3% who agree, 25.1% disagree while 20% strongly agree and 6.4% strongly disagree. The 6ᵗʰ statement, *depositing to an IR adds extra workload*, had more than a third of (38.5%) disagreeing followed by 18.2% not sure while 17.6% strongly agreed and 11.8% strongly disagreed. Lastly, the 7ᵗʰ statement, *lack of peer review will undermine my work* had a third (33.7%) of respondents agreeing, with almost a third of (32.2%) strongly agreeing and 12.3% not sure while 9.1% strongly disagreed. Respondents were asked to give an explanation for their concerns and 40 responses were given. The responses were organized into categories namely; understanding of the concept of IRs, where respondents (8.6%) indicated that the concept had not been communicated well and needed to be appraised *"on the*

values and operations of IRs" while others thought IRs were a positive thing but were also prone to abuse; peer review where respondents (8.6%) expressed fear of compromise of quality and one said *"peer review can be both helpful and distractive to progress sometimes"*; *protection of deposited work* where respondents (1.6%)) expressed fear of plagiarism but one (1.5%) said *"academics view IRs as facilities which open their work to plagiarism when in actual fact IRs help to protect research against plagiarism"*; time consuming where respondents (2.1%)) expressed that depositing is an extra workload particularly when the internet is slow and; 1.5% respondents said *"no concern, let's deposit"*.

Table 5.10: Concerns over depositing research in IR

	N	Minimum	Maximum	Mean	Std. Deviation
IRs risk reducing the value of peer review process	187	1	5	3.01	1.138
IRs will expose more research to plagiarism	187	1	5	2.92	1.248
When everyone deposits there is no competitive advantage	187	1	5	2.64	1.129
IRs are not as easy to use as journal indexes	187	1	5	2.84	1.033
IRs may breach confidentiality of some data	187	1	5	3.11	1.097
Depositing to an IR adds extra workload	187	1	5	2.87	1.301
Lack of peer review will undermine my work	187	1	5	3.70	1.289
Valid N (listwise)	187				

This question was corroborated by a question for directors of research (Q9) where they were asked about measures that have been or are being employed by the institution to address such concerns for academics (see 5.3.1.3) and, Library directors (Q28) were asked if they conducted any training for academics on issues pertaining to plagiarism, creative commons and self-archiving (see 5.3.2.2).

Question 42 sought to establish the conditions under which academics would deposit their works in the IR. Respondents had to select applicable statements from a list of 7 conditions, therefore, it was a multiple response question. The results are shown in Figure 5.16 below. The condition with the highest rating, 130 (69.5%) was, *if the integrity of my work is upheld*, followed by *protection from plagiarism,* 129 (69%), then *if IR is searchable on the web,* 122 (65.2%). One hundred and seventeen (62.6%) respondents would deposit *if they could still publish in journals* while 102 (54.5%) needed *assurance of long term preservation* and 87 (46.5%) would deposit *if the material was indexed*. Only 52 (27.8%) did not require any conditions for them to deposit.

N = 187
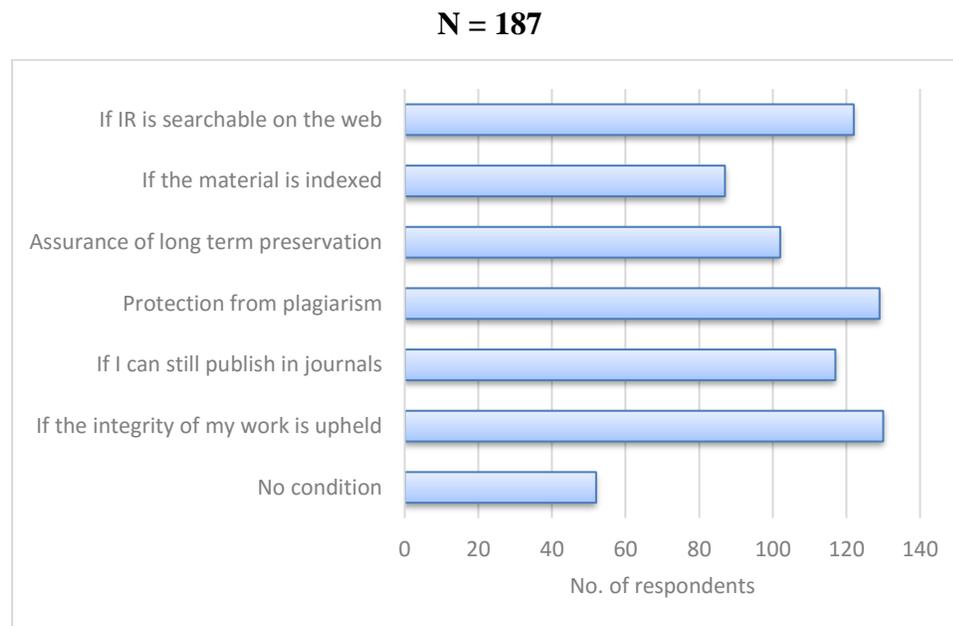
Figure 5.16: Conditions for deposit

Lastly respondents were asked to give any comments (Q43) regarding the issue of scholarly publishing and the IR system. Of the 187 respondents to the study only 46 (24.6%) commented on issues they felt were pertinent. The researcher categorized the responses into seven issues of concern, namely; plagiarism, copyright, marketing and training, a noble initiative and types of materials. Nine (19.6%) respondents said that IRs were a noble initiative with one stating, *"healthy for driving science forward"*. Thirty-two (69.6%) respondents expressed that there was a need for marketing and training of scholars on the IR concept so that they understand it. Respondents also commented on plagiarism stressing the need to protect authors' works but one (2.2%) respondent said IRs are *"an innovative way to manage plagiarism"*. Mixed feelings were expressed on the types of materials to include in the IR by 4 (8.7%) respondents with one saying,

"all research output should be deposited in the IR including undergraduate, MSc, MPhil and PhD theses/Dissertations", while another one felt *"not everything or anything should be deposited since this will lower standards."* Three (6.5%) respondents expressed concern over copyright with one saying *"IRs should uphold copyright and ethical issues on deposited materials".* Two (4.4%) respondents said that IRs should be promoted through policies and one (2.2%) recommended that deposit should be made a condition for tenure and promotion. Lastly one (2.2%) respondent had this to say:

> *"To what extent are institutional repositories the sole responsibility of the library? Perhaps the notion that an IR is for the university library to administer over should be reviewed. Partnership with relevant players in industry, government and science communication should be involved."*

5.3.2.2 Challenges faced by academics and librarians in contributing to and managing the IRs

This research question was largely answered by Section C of the questionnaire for IR/faculty librarians which explored the factors influencing content recruitment in the institution. The variables facilitating conditions and effort expectancy informed this research question. Facilitating conditions as mentioned earlier are concerned with the degree to which someone believes that the institutional and technical infrastructure exists to support use of the system. Effort expectancy on the other hand is concerned with the degree of ease of use of a system. Library directors were also asked questions on this issue (Q9, Q20 and Q22 and Q23). Equally academics were asked questions related to this (Questions 27-31, 40-42) to ascertain the challenges they were facing with the IR system.

Library directors were asked a question related to the establishment of the IR. Question 9 of their interview guide was, what challenges did you encounter in getting support from your institutions management to develop the IR? This question was asked on the backdrop of the fact that introduction of a new system in any organisation faces a challenge of resistance. Four (50%) directors said their management was very supportive from the beginning but the other four (50%) acknowledged that there was resistance from some senior staff who *"would say aah we need to take it slow, you know, this concept and we need to see what are the implications in terms of our innovations and technology."* The directors said the university management were sceptical about the issue and one (12.5%) of the directors expressly said:

> *"Library issues mai* [Mrs] *Tapfuma, you know they are really contentious and it's pretty hard to get just outright support just like that. You just have to keep on toiling and advocating and try to justify yourself. When it came to the IR we had been singing that song…But the previous management were just indifferent, they didn't care less."*

The same director, however, said that management is now creating *an "enabling environment in terms of advocacy within the academic circles and administration which is really helpful."* Another director had this to say:

> *"Our biggest challenge is the Research office, because the person there doesn't support OA, he's not supportive… You can tell him that, he's not supportive, he doesn't believe in it and as a result we have challenges with our academic community. Because when he does his research seminars he trashes OA publishing, he trashes anything OA."*

Two (25%) directors pointed out that they had a challenge in getting technical expertise in the library and this delayed the establishment of the IR. One (12.5%) also pointed out that when they started, they did not have proper equipment to host the IR but later managed to get a server. Two (25%) directors also highlighted challenges with getting the OA/IR policy approved by management as this delayed progress. However, one (12.5%) of them eventually managed to get the policy approved but the other one (12.5%) had this to say:

> *"But to get the policy through, we are having problems, then you know what, research office keeps saying you can't have your policy in place before our Research policy is out because everything to do with OA is to do with research policy of an institution."*

Question 27 for IR/faculty librarians asked if they were responsible for content recruitment. Table 5.11 shows that 52% of the librarians were responsible for content recruitment while 48% said 'No'. Amongst the faculty librarians 54.5% said 'Yes' and 45.5% said 'No'. All IR librarians said 'Yes' and amongst the 'other' respondents 58.3% said 'No' while 41.7 said 'Yes'.

Table 5.11: Responsibility for content recruitment
N = 25

Person responsible		Responsibility for content recruitment		Total
		Yes	No	
Faculty librarian	Count	6	5	11
	% within Designation	54.5%	45.5%	100.0%
IR librarian	Count	2	0	2
	% within Designation	100.0%	0.0%	100.0%
Other	Count	5	7	12
	% within Designation	41.7%	58.3%	100.0%
Total	Count	13	12	25
	% within Designation	52.0%	48.0%	100.0%

As a follow-up to this question, question 28 required those who said 'No' to state who was responsible for the recruitment of content. IR librarians, 20 (42%) and the systems librarian, 16 (34%) were the ones highly responsible for content recruitment in their institutions. The other people responsible included the periodicals librarian, 4 (8%), the faculty librarian, 4 (8%) and the research office, 4 (8%).

The IR/faculty librarians, in question 29, were asked to list the types of materials they accepted in their IR. This question is corroborated by responses from Library directors (Q14) and also OA/IR policy documents (Q4). The 25 (100%) respondents listed the following materials: post prints, 22 (88%), conference presentations, 18 (72%), theses and dissertations, 16 (64%), pre-prints, 8 (32%), books/book chapters, six (24%), unpublished articles, five (20%), Datasets, reports and, innovations/designs, three (12).

Library directors were asked (Q20) if there were any challenges to content recruitment and how they were overcoming them. The second part of the question will be discussed in section 5.3.2.3. All the directors said that getting content from the academic community was a challenge citing that the academics were mostly concerned about issues of copyright and plagiarism. One of the directors said:

> *"Initially as I said, because they did not trust, if you want to use the word, that their ideas, their innovation is going to be hijacked, it's going to be abused, it's going to be stolen. You know all these fears."*

Another director also highlighted the issue of the environment being unsupportive and this is what he had to say:

> *"but for us we have to go back to the people and try to ask, drum up, beg for the content…So for us to be able to lay our hands on those papers is pretty hard given the environment like what you are saying that they may say looking at the IR policy and say no we accept but then other policies and the enabling environment in terms of supporting the IR policy."*

Another director pointed out that they also sometimes face challenges with journal articles which were not OA and have copyright restrictions which did not allow archiving content in the IR. He said getting copyright clearance was difficult sometimes.

Question 30 for IR/faculty librarians was a follow-up to the above question and it sought to establish if academics were forthcoming with materials for deposit. Those who said 'Yes' were 48% (12) and equally the same number said 'No'. Four percent (one) did not answer the question. In relation to this question, the librarians were asked in question 26 to indicate which level of academics had a higher acceptance and response rate to IRs. The result presented in section 5.3.2.3 revealed that most, 11 (44%) respondents selected lecturers, followed by senior lecturers, 10 (40%) followed by professors, nine (36%), research fellows five (20%), teaching assistants four (16%) and staff development fellows two (8%). Library directors were also asked (Q22) to say which level of academics they thought were forthcoming. Two (25%) directors indicated that the support cuts across all levels and could not pin point which group was more active than the other. One (12.5%) director said the seasoned academics while another (12.5%) said the young junior lecturers.

Table 5.12: Mandatory or voluntary deposit
N= 25

Type of deposit	Frequency	Percent	Valid Percent	Cumulative Percent
Mandatory	9	36.0	36.0	36.0
Voluntary	14	56.0	56.0	92.0
Both	1	4.0	4.0	96.0
No answer	1	4.0	4.0	100.0
Total	25	100.0	100.0	

Question 31 sought to find out from the IR/faculty librarians if deposit of content by academics was mandatory or voluntary. This was meant to establish if they were aware of policies in the institution mandating deposit of content to the library. Responses to this question were corroborated with responses from Library directors (Q25) and Directors of research (Q11) and the OA/IR policy documents (see 5.3.1.3). The results in Table 5.12 show that nine (36%) respondents said it was mandatory and 14 (56%) said it's voluntary and another said Both (4%) while one (4%) did not answer the question. All the Directors of research and Library directors' said that deposit was mandatory for research that is funded by the university but voluntary for research output funded from by external funders. The OA/IR policies also concurred with these responses.

Question 32 sought to establish the extent to which the librarians agreed with the statement; academic libraries should encourage faculty to deposit scholarly work that they do not intend to publish via traditional means (such as working papers, datasets, or multimedia presentations) into open access digital repositories. The results showed that nine (36%) agreed, seven (28%) strongly agreed and four (16%) strongly disagreed.

Question 33 also sought to establish the degree to which the librarians agree with the notion that academic libraries should encourage campus administration to adopt tenure and promotion policies that support a faculty member's decision to publish in open access sources. The results showed that 12 (48%) respondents strongly agree, seven (28%) agree and four (16%) strongly disagree.

The IR/faculty librarians were asked (Q34), who does the deposit of content into the IR? Library directors were also asked the same question (Q21 and part of Q28 on self-archiving). Academics were also asked (Q27-28) to state if they self-archived their materials and if not, who does it (see 5.3.2.1.3). Responses from IR librarians (Table 5.13) reflected that of the 25 (100%) respondents, 56% (14) said deposit was done by the IR librarian, 28% (seven) said it was the faculty librarian while 16% (four) said both the academics and the librarian did the archiving.

Table 5.13: Who deposits content?
N = 25

Who deposits	Frequency	Percent
Faculty librarian	7	28.0
IR librarian	14	56.0
Both (academics & Librarian)	4	16.0
Total	25	100.0

In interviews with library directors two (25%) directors said the systems librarian uploaded content, four (50%) had IR librarians doing it and one (12.5%) director said faculty librarians did it while another (12.5%) said Senior library assistants uploaded the content. One (12.5%) library director indicated that they had a champion amongst the academics who self-archived articles.

The researcher also asked the directors if the academics were depositing content on their own. The response to this question by all the directors was that currently there was no self-archiving but one (12.5%) director mentioned that they had identified a champion amongst academics and they had trained him to self-archive. When the researcher asked them why they did not encourage self-archiving one of the reasons given was that the academics had not yet reached that stage "*for now, because most of them still have to be fully skilled in it, you know, we've only started with this technology, people are a bit hesitant, you know, to do it.*" Another (12.5%) director proffered a sentiment that was also shared by all directors by saying:

> *"We would love to do that going forward but now that we are still struggling with the idea of convincing them to give us papers for us to deposit. We're still trying to instill that culture to say let's share. But as soon as that culture is visible and as soon as we can see that it's there, it's easy for us to just tell them no you can use this handle to just deposit for yourself."*

The IR/faculty librarians were asked in question 35 if they harvest content from journals and other databases. The results showed that 64% (16) respondents said 'Yes' while 20% (5) said 'No'.

In interviews with library directors two (25%) indicated that they harvested content online. One (12.5%) said it was the faculty librarians who do it and another (12.5%) said the IR librarian does the harvesting.

> *"We have faculty librarians who do that through a number of things. One is to just go on google scholar or even google page search by maybe author's name,*

they know faculty staff in their respective areas then they search and harvest. And then we also use alerts, google scholar has alerts sites, so every time a researcher publishes…, an alert comes, so we also use SCOPUS alerts and other means to capture recent publications."

Question 36 sought to establish if the institutions engaged in copyright clearance activities with publishers in order to make published faculty research available in the IR. Results showed that 68% (17) of the respondents said 'Yes' while 24% (6) said 'No'. The next questions (Q37) was, how do you deal with copyright permissions? Library directors were also asked the same question in the interview (Q23) but their question also required them to say who does the copyright clearance. Of the 25 (100%) IR/faculty librarians, nine (36%) did not answer the question, only 16 (64%) did. Extracts of the responses are shown below.

- *Verify with SHERPA-RoMEO, 2. Verify with Copyright Ac, 3. Verify with publisher;*

- *A consent form is completed before a document is uploaded to the IR;*

- *Copyright permission is sought from the authors as well as from the publishers;*

- *Copyrighted material is not uploaded;*

- *Plagiarism tests;*

- *We request for author's version from the writer of the work to avoid infringing copyright;* and

- *When uploading the content, the IR has a software embedded in it and it will show the policies of other publishers.*

In response to the same question three (37.5%) directors said they used web tools to check for publishers' copyright requirements, that is, the SHERPA-RoMEO and SPARC platforms. One (12.5%) director said that the library worked closely with two members of staff, one who was an IP expert and another who was in charge of making sure that all research done in the institution was patented whenever they had to check for copyright permissions. Another (12.5%) director said that for research funded by the institution, their policy stated that scholars were to deposit the output in the IR regardless of embargoes but for research not funded by the institution, the library considered the journal's requirements. The researcher cross-checked this statement with the institution's OA/IR policy and found that the policy actually stated that if an embargo is placed on an item only the abstract would be made available to the public until the embargo period expired. The same director in concurrence with another two (37.4%) directors said academics had to ask

for permission from their publishers. Two (25%) of the directors exclaimed that maybe that was the reason they were having challenges getting content from the academics. The directors also mentioned that where copyright clearance was required, they write directly to the publisher for permission. On the issue of who was responsible for copyright clearance, four (50%) directors said it was the library's prerogative to do seek clearance.

IR/faculty librarians were also asked (Q38) to indicate who was responsible for copyright clearance and permissions processing between them and the author. The results showed that 56% (14) of the respondents said the librarian did the copyright clearance, while 16% (four) said the author and 8% (two) said both.

Related to the same issue of copyright clearance and permissions processing, IR/faculty librarians were asked in question 39, What resources or services does your institution use to determine publisher IR deposit policies? This was a multiple response question where respondents had to select the choices that applied to them. The results showed that SHERPA-RoMEO was the most popular, 56% (14) resource followed by copyright policies from publisher websites, 24% (six), Copyright clearance centre, 12% (three) and OAKlist was the least used resource, four percent (one). Twenty percent (five) of the respondents indicated that they used other sources. The researcher also went through the OA/IR policies and found that five of the policies made reference to the SHERPA-RoMEO service for verifying publisher copyright permissions. Two of the policies stated that the IR administrator/committee would check the copyright permissions for papers submitted for deposit.
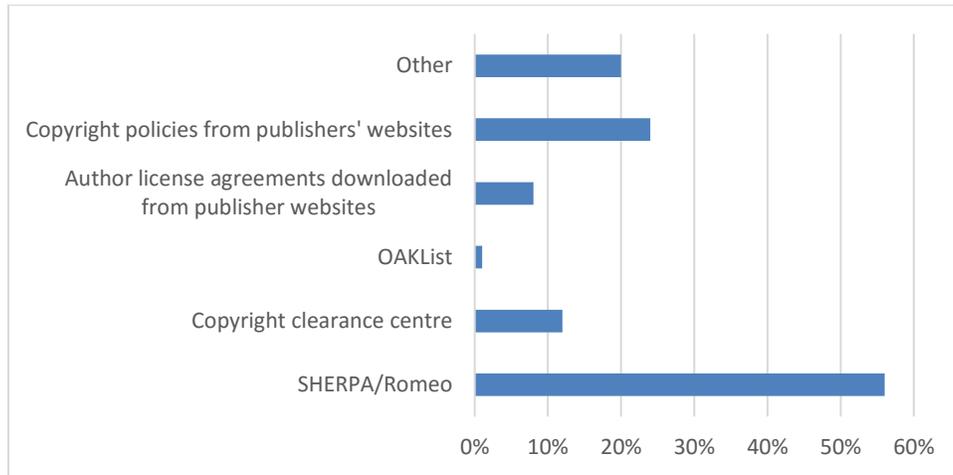
Figure 5.17: Resources or services used to determine publisher IR deposit policies

The next question (Q40) was a multiple response question requiring the IR/faculty librarians to indicate the challenges they faced in copyright clearance by ticking the options that applied to them. From Figure 5.18 'obtaining publisher copyright policies' had the highest number of respondents, 12 (48%), followed by 'limited copyright expertise' with 11 (44%) respondents. Nine (36%) respondents selected 'interpreting publisher policies', eight (32%) selected 'determining the identity of the publisher', seven (28%) selected 'limited staffing for copyright clearance activities', while 'creating a scalable model for copyright clearance' and 'limited time for copyright clearance activities' had five (20%) respondents each respectively. Only three (12%) selected 'other' challenges.

N = 25

Figure 5.18: Copyright clearance challenges

Question 41 was a five point Likert scale question which asked respondents to state the degree to which they agreed with the statement, academic libraries should educate faculty about intellectual property issues.

Table 5.14: Educating scholars about OA

	N	Minimum	Maximum	Mean	Std. Deviation
Academic libraries should educate faculty about OA IRs	25	1	5	4.08	1.441
Valid N (listwise)	25				

The results showed that 48% (12) of the respondents agreed with the statement, 32% (8) disagreed, 12% (three) strongly agreed and 8% (two) were not sure. There was a mean of 4.08 (Table 5.14). Question 42 sought to establish if the IR/faculty librarians trained academics on issues of plagiarism, creative commons, self-archiving and so on. Library directors were also asked the same questions (Q28) in the interviews. Results of IR/faculty librarians' responses showed that 68% (17) of the respondents said 'Yes' while 32% (8) said 'No'. In response to the same question, three library directors said the issues were mentioned in training workshops conducted by the library, such as, e-resources training and the communication skills courses but training particularly on these issues had not been done. Two (25%) of the directors said their institutions had the Turnitin anti-plagiarism software. Two (25%) directors said they held anti-plagiarism workshops and one (12.5%) of them added that reception from the academics was really good.

Question 43 and 44 were asked as follow-ups to question 42. Question 43 was, if 'Yes', are they now able to demonstrate an understanding of their rights as authors? Of the 17 (68%) respondents who said 'Yes' two (11.8%) did not answer the question. Eleven (64.7%) respondents said 'Yes' some understood copyright issues and one (5.9%) added that they could self-archive their papers, while another (5.9%) said that training was on-going. One respondent said *"some are able to clear with their publishers before sending their papers for uploading. But generally there is a lack of understanding of their rights."* Two (11.8%) respondents said they partly understood and one (5.9%) went on to say *"It's not easy to convince an academic, rather to teach a teacher or train a trainer but it's taking need to fully strategise how to make them understand."* One (5.9%) respondent said that understanding was still shaky. Question 43 was, If 'No', why not? Of the eight

(32%) respondents who said 'No', four (50%) did not respond to this question. One (12.5%) respondent said in their institution research issues were not library business so it was the purview of the research and post-graduate studies unit. A second (12.5%) respondent cited limited time and resources, while another (12.5%) said "*Communication between academics and librarians is mostly complicated*" and the last one (12.5%) said they needed training on IP and they were engaging Africa University for training.

5.3.2.3 Strategies to overcome the challenges

This question sought to establish the strategies that could be employed to overcome the challenges to the acceptance and use of OA/IRs by scholars and researcher in Zimbabwe's public universities. This research question is largely informed by the UTAUT variable 'facilitating conditions'. Facilitating conditions is concerned with the "degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al. 2003:453). Section B of the questionnaire for IR/faculty librarians and Section C of the Library directors' interview guide sought to establish the marketing and promotion strategies being employed by the librarians to increase acceptance and use of the IRs.

Library directors were asked in question 24 if they had an IR policy. An IR policy should inform and guide all stakeholders in the institution on what was expected of them in contributing to the success of the IR. Three institutions had IR policies, two had OA & IR policies, two have draft OA/IR policies and one was still working on it. Library directors were asked (Q25) if it was mandatory for academics to deposit their papers to the repository. Deposit mandates can be regarded as one strategy of promoting an institution's repository. The research and OA/IR policy documents were also examined for any clauses that mandate content deposit by the university community. IR/faculty librarians were also asked the same question (Q21) in an endeavour to establish if they were aware of the existence of a mandate in the institution, particularly in universities that have a mandate. Knowledge of this was assumed to empower them to seriously pursue academics for articles. Directors of research were also asked if it was mandatory for academics to deposit their research output in the library (see 5.3.1.3). All the library directors mentioned that it was mandatory for researchers who received funding from the research board to deposit their research output in the library, thereby echoing the same sentiments as the Directors of research (see 5.3.1.3). One (12.5%) of the library directors was quoted here saying:

"We made a presentation to the effect that we wanted it to be made a requirement that all publicly funded research generated within... [the university] should be deposited in the IR. So that was taken aboard by Senate. So there is a Senate directive that all faculties should deposit material in the IR."

The Library directors also added that their OA/IR policies had a clause that mandates the university community to deposit all university funded research to the IR. The researcher also analysed the OA/IR policy documents she had access to and observed that all the OA/IR policies of the institutions concerned had a clause mandating deposit of the research output to the IR, particularly research funded by the university.

IR/faculty librarians were required to indicate 'Yes' or 'No'. From the results showed that 60% (15) of the respondents are aware of the existence of a mandate while 32% (eight) said 'No' and eight percent (two) did not give an answer; it can be assumed that they were not sure. A presentation of the same responses by institution (Figure 5.19 below) shows four (50%) institutions (1, 3, 5 & 7) had some respondents saying 'Yes' and others saying 'No'.
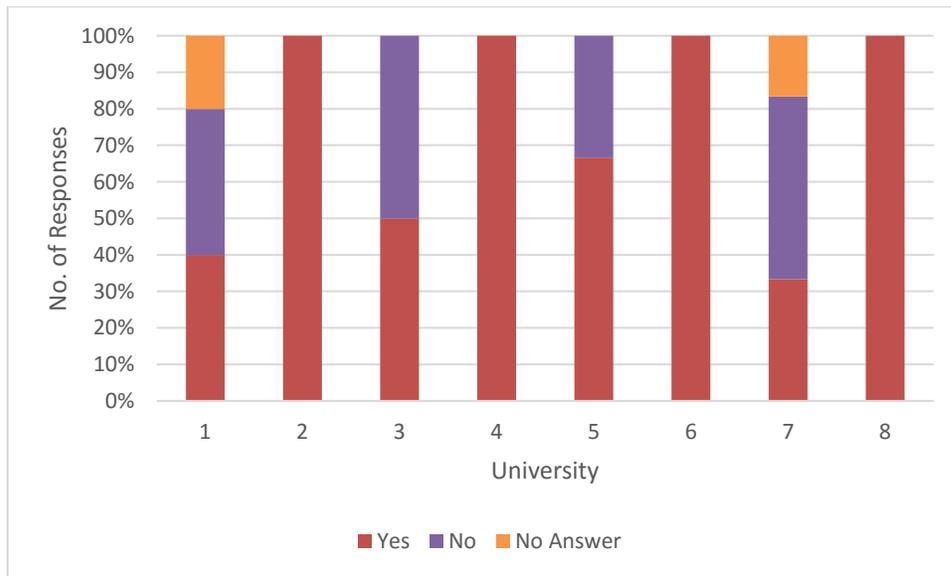
Figure 5.19: Mandate for depositing in IR by institution

Library directors were also asked in question 26, Have you made any efforts to encourage university administration to adopt tenure and promotion policies that support a faculty member's decision to publish in open access sources? The researcher regarded this to be a strategy that could be used to promote the IR as an OA source. IR/faculty librarians were also asked (Q33) to state

the extent to which they agreed with the notion that academic libraries should encourage campus administration to adopt tenure and promotion policies that support a faculty member's decision to publish in open access sources. This was asked on the backdrop of challenges they faced in content recruitment (see 5.3.2.2). The responses to this question were used to see if they corroborate the responses of the directors of research presented in 5.3.1.3. Seven (87.5%) Library directors confirmed that they had mentioned the issue at various fora in the university and only one (12.5%) had not taken a step in doing that. Three (37.5%) of the library directors (university 1, 7 and 8) said the institutions did not have written policies in place yet although the issue had been put forward. Another two (25%) Library directors (university 3 and 6) mentioned that the issue had been discussed in their library committees and management of both universities had indicated that they would consider tying tenure and promotion to library deposit. One (12.5%) Library director (University 5) said that their institution's policy stated that tenure would not be given of things that were outside their IR and he underscored this by saying "the *Pro-VC, in our strategic planning, categorically said we don't really need to over emphasise. You have stuff and you want to be tenured, we have to look at our IR."* The Library director of university 4 said that they still had a challenge in that area but the library was trying to educate the university community on predatory journals and they worked together with the promotions committee to identify such journals. Also related to this, one (12.5%) Director of research also expressed that they had recommended that if anyone wanted to be tenured or promoted, they should have their articles in the IR but management had not taken up the recommendation.

IR faculty librarians were asked in question 22, What strategies are you using or intend to use in creating awareness of the IR for the academic community? Nine (36%) respondents said OA awareness campaigns, nine (36%) said advocacy at meetings such as faculty board, two (8%) said door to door office visits, 13 (52%) said training workshops, four (16%) said posters and pamphlets, four (16%) said social media, three (12%) said the website, three (12%) said use of champions, two (8%) said email alerts and three (12%) said mandating deposit. Library directors were also asked similar questions in question Q19 which required them to state the strategies they used to encourage academic staff to deposit their materials and, in question 27 which required them to state the IR marketing strategies they employed to increase deposits by the academic community. One director said that the institution holds induction seminars for new staff where the library was given a slot and they took that opportunity to talk about the IR. Five (62.5%) library

directors said they had an annual OA week celebration where library staff spent the week talking to students, researchers and lecturers about OA. They also hold workshops during the OA celebrations where they invited lecturers and students to raise awareness of OA and the IR. Three (37.3%) directors said that they had used the OA workshops to invite a renowned academic and OA champion, Professor Mashingaidze from Chinhoyi University of Technology, to talk to academics about archiving research output in the IRs.

> *"But somebody who is also a contributor and the owner of the intellectual property. It's pretty hard to convince them to let it go. That's when we call those champions to talk even internally."*

One director also mentioned that they have identified a champion within the institution who was a keen researcher and he was actually training others to self-archive. One (12.5%) of the directors mentioned that ZULC had even invited the popular professor to talk to librarians about the concerns of academics. Another (12.5%) director said that they printed t-shirts and posters for the OA week celebrations while another said that in 2012/2013 they recognised those scholars who contributed the highest number of articles to the repository by publicizing them on the library's social media platform alert pages. This got the attention of other scholars and aroused interest in them and they started submitting their work to the library. One (12.5%) director said that they make use of usage statistics for the Vice Chancellor's briefings and the library committee which is chaired by the Pro-Vice Chancellor so that they enticed the academics to cooperate. He also said they used article citation statistics as a way of motivating others to deposit. Two (25%) Library directors said they used the door-to-door office visits and one-on-one strategies to persuade academics to deposit papers. Seven (87.5%) Library directors said they also marketed the IR at the university the various university committee meetings such as faculty board, Senate, Council and the library committee. Two (8%) of the librarians said they had managed to convince the university Senate to mandate deposit of publicly funded research to the IR. One (12%) of them was quoted saying:

> *"I am very happy to say that at one of our Senate meetings we made a presentation to the effect that we wanted it to be made requirement that all publicly funded research generated within…* [the institution] *should be deposited in the IR. So that was taken aboard by Senate."*

Another Library director said:

"We embarked on formulation of a policy support to force the academic staff and researchers to deposit their research papers with the library…Even when it came to policy formulation we held various seminars and workshops on the policy issue and eventually it was finally accepted in 2014."

The same director said that they used examples of current trends such as:

"The National Repository Trust being undertaken by the Research Council of Zimbabwe (RCZ), a repository of all research that is generated within the country particularly that research that they sponsor and they gather articles in that repository. Now what they want to do is to go a step further and provide access to research articles that are contained in our IRs by providing metadata links to our repositories. So in essence the RCZ platform will provide the linkages to our own IRs so that you can actually search. If we give the metadata of what is contained in our repository and they provide that link on their repository it becomes visible to researchers from outside and when they see which institution holds that article, all they need is to click that link and they are taken to the actual content in the individual institution's repository. So when academics see the benefits of this, see that they are actually having a national visibility, because we have to explain to them that this is where we are going and they are so attracted and interested in the whole initiative."

Question 23 sought to establish if the IR/faculty librarians had been trained/appraised on the pertinent issues to discuss with faculty in marketing of the IRs. The results showed 52% said 'No' and 48% said 'Yes'. Library directors were asked (Q13) if the IR/faculty librarians had been trained on open source and IR issues and to explain the nature of training they received. All the directors said their IR/faculty librarians staff had been trained and two (25%) of the directors said they trained almost all the staff members in the library so that they were "*aware of what is going on in case anyone from out comes inquiring they should be in a position to at least say something*". One (12.5%) of the directors said they had ILS training where they asked senior library staff to take along with them two Chief library assistants. Another (12.5%) Library director said

"It took a lot of coaching for people to understand what is involved… we first of all took everybody on board on OA and once they understood OA we then sort of identified all those areas that had to do with the OA."

On the kind of training received by the IR/faculty librarians all directors said they had in-house and off-the-job training workshops held by ZULC. One (12.5%) director mentioned that *ZULC members share skills informally and formally.* Four (50%) directors said they had sent their staff for training at the University of Zimbabwe.

Question 24 for IR/faculty librarians was a five point Likert scale requiring them to state the extent to which they agreed with the statement that academic libraries should educate faculty about open access and institutional repositories. Figure 5.20 shows that 56% (14) of the respondents strongly agreed, 28% (seven) agreed and 16% (4) strongly disagree. Respondents were asked to give an explanation for their responses. Of the 25 (100%) respondents five (20%) did not explain. Ten (40%) respondents expressed the need to get buy-in from the scholars and one (4%) expressly said; "*Without their buy-in IRs are doomed to fail. These are the major stakeholders in terms of depositing content and utilising the deposited content for the researches and information needs.*" Five (20%) respondents underscored the need to create awareness of the benefits of IRs and one (4%) said:

> "*Most faculties they only know about publishing their materials not knowing who benefits; therefore, this should be made clear that they do not only add to the knowledge base, but this also increases the individual/institutional visibility.*"
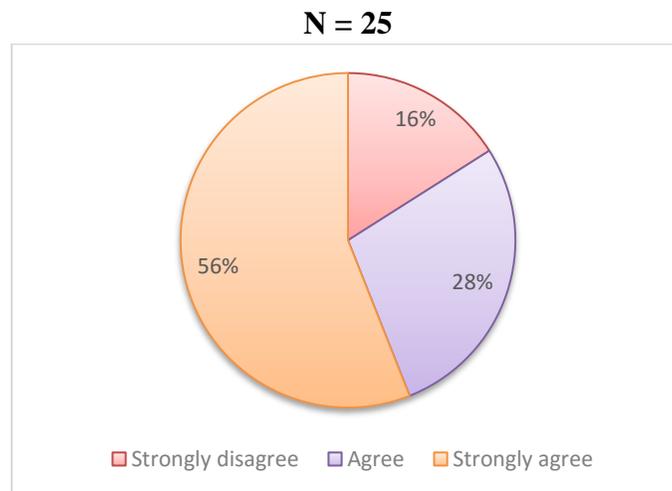
Figure 5.20: Educate faculty about OA

Two (8%) respondents expressed that it was the responsibility of librarians to educate faculty since "*they are better placed to understand the concept of OA as disseminators of information; therefore, they can explain the full potential of OA to researchers convincingly.*" Another two (8%) respondents said content recruitment would be made easier while one (4%) felt a committee comprising academic staff and librarians should be formed to deal with OA, IR and IP issues. Another (4%) respondent expressed that OA IRs are the way to go "*because the economic environment prevailing in most 3rd world countries does not allow universities or academic libraries to purchase books*".

IR/faculty librarians were asked (Q25), what challenges they faced in marketing and promotion of the IR. One (4%) respondent said they had not faced any challenges as yet while 14 (56%) said they faced resistance from the scholars and researchers, five (20%) indicated time constraints and one (4%) of them said; "*mobilising particularly teaching is difficult due to ever pressing commitments.*" Seven (28%) respondents cited limited or lack of resources such as equipment, venues and funding as constraints to their marketing activities. Eight (32%) respondents highlighted scholars' concerns over IP and copyright issues. One (4%) cited the absence of an IR policy, another (4%) said technical jargon used was an obstacle, while one (4%) alluded to the challenge of the multi-campus system. One (4%) respondent highlighted the issue of poor computer literacy skills and another (4%) said submission excluded tenure.

Question 27 required the IR/faculty librarians to say which level of academics had a higher level of acceptance and response to IRs. From Figure 5.21 it can be observed that 11 (44%) respondents selected lecturers followed by senior lecturers, 10 (40%) followed by professors, nine (36%), research fellows, five (20%), teaching assistants, four (16%) and staff development fellows, two (8%).

N = 25
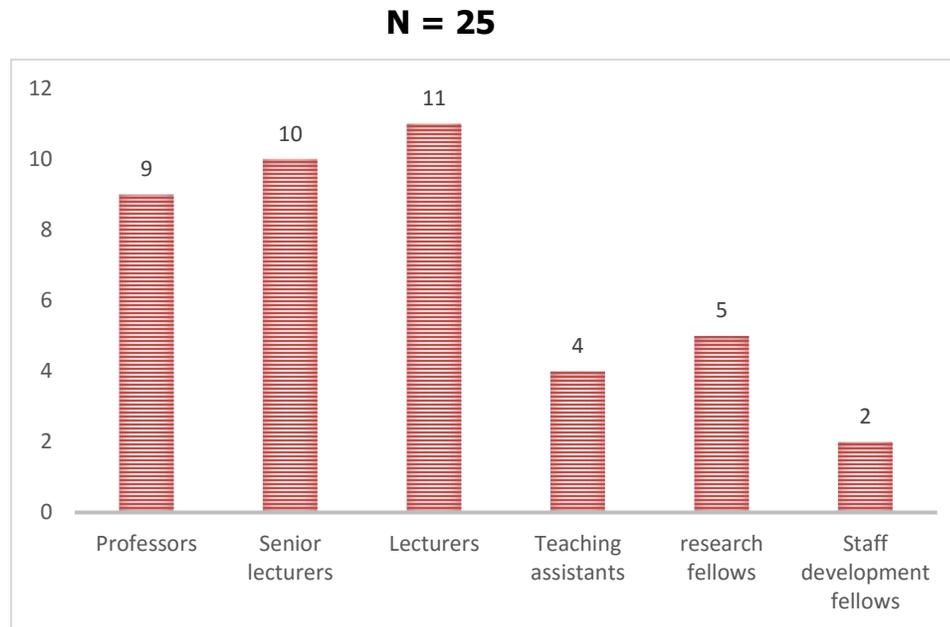
Figure 5.21: Academics receptive to IR

Library directors were also asked (Q22) to say which level of academics they thought were forthcoming. Two (25%) directors indicated that the support cuts across all levels and could not pin point which group was more active than the other but one (12.5%) of them indicated that there were some professors who were still reluctant to submit their works. One (12.5%) director was quoted here saying:

> *"I think the seasoned academics at Doctoral level. The early researcher who is possibly a Teaching Assistant who've just completed their first degree, these are not very keen, they are not yet sure of their publication. Those that have recently attained their Masters elsewhere are also very keen, particularly where they have obtained their qualifications, because we are now emphasising on Mtechs and those that have acquired their Mtechs from countries such as India where they have actually come across the advantages of OA, these have been quite forthcoming in terms of placing their materials in the IR. So it's the Mtech academics that are very keen to do this and those that have been exposed to it either from training from outside the country have seen the benefits of it."*

Another two (25%) directors in concurrence with this one also said that they got support from the *"junior young lecturers"*, that included, lecturers and teaching assistants and one (12.5%) of them said particularly from the faculty of education.

5.3.2.4 Comments made by librarians

This section presents the comments made by all librarians who participated in this study. At the end of both the interview and questionnaire, Library directors and IR/faculty librarians were asked to comment on OA and IRs. These are discussed below.

5.3.2.4.1 IR/faculty librarians' comments

IR/faculty librarians were requested in question 44 to pass comments on the issues discussed. Only six (24) respondents commented and of this number, four (66.7%) supported the use of IRs as they increase visibility and according to one (16.7%) of them a "*high profile IR may be used to support marketing activities to attract high quality staff, students and funding.*" Two (33.4%) respondents underscored the need for serious marketing of the concept for the academic community to appreciate OA IRs and one (16.7%) said that support for the initiative was required. Another (16.7%) respondent said:

> "*Financial constraints hinder progress of OA initiatives to ensure appreciation of IRs and cooperation. At ZULC level, spirited efforts should continue to encourage institutions to have IRs up and running and registered on the DOAR.*"

5.3.2.4.2 Library directors' comments

The first (12.5%) director said more education on IRs was required but this should not be the concern of librarians only but rather both librarians and researchers should work together and advocate for the initiative. Another director (12.5%) suggested that OA should be embraced at the national level and ensure that publicly funded research output was easily accessed and this would contribute to improved pass rate even in rural areas since people now have smartphones. Related to this, another (12.5%) director said there was need for a strong partnership between the Research Council of Zimbabwe and institutions of higher learning in developing standards and guidelines for IRs at a national level and suggested that the RCZ should lead in developing a national policy pertaining to research output from Zimbabwe. The same director highlighted the need to lobby for use of IR content by local researchers and scholars. He said that the current statistics show that most of the downloads are by American, Chinese, British and Russian researchers. He suggested that lectures should refer students to content in the IR.

One (12.5%) of the directors said that they would like to enhance content recruitment and increase the rate of submission of papers. He alluded to the Minister of Higher Education's emphasis on

the need for increased visibility of universities. Two (25%) directors said they wanted to influence management to adopt tenure and promotion conditions that support deposit in the IR. Another (12.5%) director said that the research office should speak the same language as the library in promoting OA in the institution while two (25%) directors who pledged their support for OA said that IRs significantly increased visibility of the research generated in the university and contributes to the ranking of the university. One (12.5%) of them said:

> *"I think this becomes a huge blessing to Africa in terms of accessing a lot of scientific, engineering and technology information that is generated elsewhere and beneficiated in our local environment and vice versa… if our researchers publish in these OA journals then we can access their articles and the researches they are doing become known, then Africa comes out to be a powerhouse because of the innovations that they are developing... I'm happy that SA is doing so well in that you know, coming up with a number of internationally renowned journals that are OA."*

Lastly, one director commended the ZULC members for their support in developing their repository.

5.4 Workshop on advocacy for a national mandate on OA and management of open research data

The researcher attended a workshop which was hosted by the ZULC on 30 November 2015 at the Holiday Inn hotel in Bulawayo, to advocate for a national mandate on OA and management of open data. ZULC had invited the Minister of Higher and Tertiary Education, Science and Technology Development, the Zimbabwe University Vice-Chancellors Association (ZUVCA) and the Zimbabwe Council for Higher Education (ZIMCHE) to the workshop. The purpose of the workshop was to formulate a draft OA initiative for Zimbabwe. The facilitators of the workshop included Dr Daisy Selematsela, the Executive Director Knowledge Management Corporation, National Research Foundation of South Africa and, Dr Elisha Chiware, the Director of the Cape Peninsula University of Technology, Cape Town, South Africa. The Ministry was represented by the Principal Director, Air-Commodore Dumba. The ZUVCA representatives failed to attend.

In an interview with the ZULC chairperson, the researcher sought to establish the rationale for choice of participants that were invited to attend the workshop. According to the Chairperson the

ZIMCHE and ZUVCA were stakeholders that would support the cause; so it was paramount that they had to know the goals of ZULC, that is, developing a national mandate to OA. The expectation was that they would drive the advocacy for OA in higher offices such as the Ministry of Higher Education which is responsible for any development in higher education and in parliament. The chairperson said:

> *"OA mandate and OA issues are quite a major development that has taken place in universities and they must know. And if they are going to drive the national mandate they must be clear of what is involved. So if we don't bring them on board at these early stages we would find it difficult to move even further."*

The Air-Commodore, in his speech said the Ministry supports the initiative by ZULC to push for the country to formulate a policy *"that will enforce recognition and adoption of OA throughout all research and tertiary education institution"* (Dumba 2015). In His speech, the Air-commodore expressed skepticism of OA by saying:

> "Inventors, authors and designers should all be rewarded handsomely for their work hence Open Access should be discussed whilst giving regard to this reality. Further to this ladies and gentlemen consideration should also be given to the fact that many valuable research outcomes have been lost to the developed world under the guise of free trade" (Dumba 2015).

In response to this, the chairperson of ZULC said having been wary of the scepticism of OA held by the stakeholders the consortium wanted to allay those fears by explaining to them the actual implications of OA so that when they begin to drive the national OA policy agenda they will be able to convince the other arms of government.

Dr Selematsela gave a global perspective of OA and also spoke about how to draft an OA policy. Dr Chiware's presentation entitled "A roadmap for research data management services in Zimbabwe university and research libraries" focused on how Zimbabwe could start the initiative. He pointed out that the first step would be advocacy at institutional level up to the national level, followed by development of a policy and he identified the stakeholders to be involved. The third stage would be development for librarians including the current library and information science programmes on offer and areas of training, followed by infrastructure development, then piloting the project and finally resource mobilisation.

5.6 Summary of the chapter

The chapter presented the results of the study using the thematic approach. The results showed that on IR establishment most universities in Zimbabwe established their repositories between 2009 and 2012, and three institutions' IRs had at least 400 items while the other five had very few items. A national repository had been established by the Research Council of Zimbabwe to link repositories of all repositories in the country. All the institutions use the DSpace open source software for their repositories. However, lack of management support and lack of proper infrastructure and ICT human resources stalled progress. Five universities' repositories searcable on the internet and the most common types of materials found in all the institutions' repositories included; pre-print articles, post-print articles, theses and dissertations, conference proceedings, books and book chapters, unpublished articles, dataset, reports and innovations. Most of the universities now have OA OR policies either as draft policies or adopted policies and the ZULC was advocating for the development of a national OA policy. The establishment of IRs in the university libraries added responsibilities to the existing staff because new staff could not be recruited due to a government job freeze. Some institutions had to reassign their staff to the new role of IR/systems librarian, thus, the responsibility for running and maintaining the repositories was shouldered by different ranks and titles across the universities. However, in selecting these IR champions considerations were made of their skills but some institutions managed to recruit ICT staff as an essential technical human resource for the maintenance of the IR. Even though the staff were trained either in-house or off-the-job by the ZULC, IR/faculty librarians strongly felt that professional positions should be created for this job but however, they felt that the academic library should be actively involved in driving the IR agenda.

Directors of research, as policy makers, showed that they knew and understood the concept of open access and appreciate the role of the IR in scholarly communication but some were concerned about predatory journals and the rigour of the peer review process particularly in the author pays model. So, they compiled lists of accredited journals in which they recommend their scholars and researchers to publish in. Ethics and IP policies to address issues of ownership and plagiarism were also established. However, most directors acknowledged that the benefits of OA IRs would prop up career prospects and advancement of scholars and researchers, therefore, the institutions supported publication in OA platforms by their scholars and researchers. Research policies of the

institutions mandate deposit of research funded by the institution but the tenure and promotion conditions did not require deposit for consideration for tenure and promotion. A few institutions offered monetary incentives to entice academics to submit their works for deposit in the IR.

On the attitudes and perceptions of academics, the results revealed that most academics were aware of and understand the concept of OA and IRs and acknowledged that they got to know of these concepts through the library workshops. However, they felt that the concept of IRs was not communicated well since they harboured fears of plagiarism and the compromise of quality. So most of the scholars were aware of the existence of a repository in their institution but most of them had not deposited any work in the IR yet some had deposited in other platforms. However, the results also revealed that the librarians did not promote self-archiving of research by the scholars but preferred to do it for them because they were more concerned about populating the IRs for now and felt that the scholars were not skilled enough to do it on their own. The academics revealed that they could submit their research for deposit in the IR if their integrity was upheld and if they were protected from plagiarism.

The results also showed that librarians had challenges with content recruitment, lack of resources for effective marketing of the IR and getting publisher copyright policies and clearances. However, most institutions assisted authors to get copyright clearance while a few expected the authors to process the copyright permissions on their own. Most of the institutions use the SHERPA-RoMEO resource for checking publisher copyright policies. The next chapter will analyse and discuss the results of the study.

CHAPTER VI: DISCUSSION OF THE FINDINGS

6.1 Introduction

This chapter will interpret the study findings in light of the research problem presented in Chapter 1 and in terms of the theory, practice and the existing body of knowledge. The discussion of the findings is guided by the objectives and research questions of the study. The main objectives of the study were to explore the utilisation of institutional repositories in Zimbabwe's public universities, and ascertain the reasons as to why scholars are not depositing their works to their IRs. Therefore, it sought to answer the following questions:

1. What categories of documents are included in the IRs?
2. What is the role of the academic librarian in promoting the institutional repository?
3. How has the institution contributed to the promotion of OA?
4. What are the attitudes and concerns of academics towards IRs?
5. What challenges do the academics and librarians face in contributing to and managing the IRs?
6. What strategies can be employed to overcome the challenges?

The analysis and discussion follows the order of the research questions.

6.2 The utilization of institutional repositories in Zimbabwe's public universities

The first objective of the study, as mentioned earlier, was to assess the utilisation of IRs in Zimbabwe's eight public universities. Therefore, this section will discuss the findings on the categories of documents included in the repositories, the role being played by academic librarians in promoting the IRs and, how the institutions have contributed to the promotion of OA.

6.2.1 Categories of documents are included in the IRs

This section will cover issues around the establishment of institutional repositories in Zimbabwe's public universities including, the history, size and composition of the repositories. The success of the repositories will also be measured.

6.2.1.1 IR establishment in the universities

This research question was informed by the UTAUT constructs of performance expectancy and social influence. Performance expectancy is concerned with the extent to which users of a system believe that it will benefit them in job performance.

The findings of the study revealed that all the universities had an OA repository even though some were yet to be searchable on the internet for wider readership. However, seven universities maintained a second repository which was available to the local university community and hosted past examination papers and dissertations and theses. The findings of the study suggest that the universities were wary of what the scholarly community (the significant others) would say about the quality of their output and institution, therefore, they made public content which met an acceptable standard as evidenced by seven universities running two repositories, one for internal use by the local university community and the other for the public domain. Institutional repositories are one strategy through which self-archived refereed scholarly research literature can be made freely available and accessible to the public, searchable, harvestable, useable by a wider readership (on the internet); and visibility of both the scholar and the institution are increased by the IR (Onyancha 2011:58). Therefore, the social influence construct of the UTAUT model is influencing their decision making. The quality of the repository will also have a bearing on participation by academics and scholars in the development of the repositories as they also worry about their reputation and trustworthiness of the platforms on which they deposit their works. The university libraries also demonstrated their concern for the research values of their scholars, which are largely determined by both intrinsic and extrinsic motivations. Intrinsic motivation relates to the desire by the scholar to avail their research findings to colleagues and stakeholders - they originate from within the individual (Trotter et al. 2014:96). Extrinsic motivation relates to recognition for the scholar and the institution, publicity, trustworthiness and academic reward (Cullen and Chawner 2011:462) - the motivations originate from the university management. So, academics and scholars in Zimbabwe's universities would be driven to use the IRs if they conform to acceptable standards and values of scholarship. Therefore, the university libraries have to be

commended for considering the scholarly communication values in determining which repository goes on the public domain and which one stays internal to their university communities.

The fact that university administrators and management in half of the institutions took long to respond positively to proposals and pleas by the university librarians to establish institutional repositories signifies a two thronged resistance to change, which took courage and determination by the change agent (librarians) for the change to happen. They were skeptical of the OA concept despite having been appraised of the concept by the Southern African Regional Universities Association (SARUA) – to which Zimbabwe's universities are members- during the SARUA OA leadership summit which was held in Botswana in November 2007. The summit came on the backdrop of the regional body's observation that Southern African countries had challenges of increasing the accessibility of available knowledge and the volumes of research knowledge generated in the region (Abrahams et al. 2008:10) and, therefore, saw an opportunity to do so through OA. So the concept of OA IRs was not really new to the universities' administrators and management, which explains why the other half of the universities' administrators and managers were quick to respond and support the initiative. On the other hand, we cannot ignore the economic environment under which the universities were operating when the initiative was introduced; an environment characterized by inflation and currently a crunch in the economy; an environment which is economically constrained. "Setting up a repository is a major undertaking for an institution" (Cullen and Chawner 2011:462) requiring financial and human resources for establishing and maintaining the repository. Therefore, universities had to think through this issue before plunging themselves into a project they would not be able to sustain in the long run. Lynch (2003:334) exclaimed that "stewardship is easy and inexpensive to claim; it is expensive and difficult to honor, and perhaps it will prove to be all too easy to later abdicate". This explains why the libraries had the challenge of lack of IT skilled staff and could not recruit additional staff specifically for the repository. Without management support there was no way the libraries could recruit IT personnel. As a result, the establishment of IRs in the country's institutions of higher learning lagged behind. The findings of the study revealed that in Zimbabwe the IR concept was still in its infancy, given that most (87.5%) IRs had been operational for three to six years since they were established between 2010 to 2012 and only two institutions had had IRs for almost 10 years.

6.2.1.2 Platform choice

The findings of the study showed that all the universities use the DSpace open source software to host their IRs as shown in Table 5.4. This confirms studies by Masrek and Hakimjavadi (2012) and Xia and Opperman (2010) which found that the DSpace platform is preferred by most universities due to its flexibility for customization. DSpace was designed to operate in an institutional setting, allows faculty members to self-archive and the model utilises communities (departments, schools, faculties and so forth) to build digital collections. "The software is ideal for planning, building and managing digital repositories for large institutions" (Ravikumar and Ramanan 2014:80). One factor determining the choice of platform for the repository is the size of the institution. So the universities, by settling for the DSpace platform, could have considered their size, though some (five universities) of them were small; probably they envision growth in the near future but they could work together as a consortium and share an IR. However, two universities still used the Greenstone platform for their second repositories despite the fact that other universities that attempted to use it faced challenges with the software which led to them abandoning it. The universities used the Greenstone repositories for hosting theses and dissertations and, past examination papers. It can be assumed that the institutions were attracted to the software by the fact that it is highly suitable for preserving "digitised collections like dissertations/ theses, manuscripts, rare materials, past examination papers, and other in-house documents" (Ravikumar and Ramanan 2014:80). All the universities' repositories were multi-disciplinary and make use of the facility of communities within DSpace to categorise their items.

6.2.1.3 Content type

The findings for the content that should be held by an institutional repository revealed diverse preferences by librarians, research directors (policy makers) and the scholars respectively. Most librarians concurred on post-prints, pre-prints, conference and workshop papers and, theses and dissertations. However, differences were found on the level of theses and dissertations with some including undergraduate first class dissertations in addition to postgraduate theses and dissertations. Others considered postgraduate theses and dissertations only. Other materials which were included by other universities and not by all included; books and book chapters, the university journal, annual reports, datasets, technical reports, lecture notes, grey literature, working papers and industrial design reports. The varied content compositions for the universities showed that there was no consensus amongst librarians in Zimbabwe's public universities, as drivers of this

OA technology, on the content to be held in the repositories, thus confirming Ruiz-Condo and Calderon-Martinez's (2014:1285) assertion that there is lack of consensus on the functions of repositories and a debate is raging on the type of materials that should be stored in the repositories. Connell (2011) and Kocken and Wical (2013) believe that academic libraries are overly selective about the kind of content to be included in the repository thereby, weakening their efforts of getting campus participation in the IR. Policy makers (research directors) proposed that the repository should contain theses and dissertations, post-print journal articles, pre-print journal articles, occasional papers, patents and unpatented research, books, conference proceedings and abstracts, slides or powerpoint presentations, lecture notes, modules, extension services reports and documentaries. Some of the research directors emphasized content that is published within academic circles; a view shared by Foster and Gibbons (2005:1) who opined that for a university repository to succeed, it should "be filled with scholarly work of enduring value that is searched and cited." Contrary to this view, research directors who suggested additional materials to the scholarly works, are supported by Lynch (2003:328), who proffered that:

> a mature and fully realized institutional repository will contain the intellectual works of faculty and students – both research and teaching materials – and also documentation of the activities of the institution itself in the form of records of events and performance and of the ongoing intellectual life of the institution. It will also house experimental and observational data captured by members of the institution that support their scholarly activities.

The issue of repository content could have an influence on acceptance and usage of the repositories by scholars and researchers. Scholars and academics expressed preference for peer reviewed articles, conference papers and theses and dissertations were most preferred. Teaching materials had a significant number of respondents preferring them as well. This expose showed that scholars and policy makers preferred peer reviewed content for the IRs. Peer review is regarded as a measuring rod for quality, reliability and credibility of the scholarly output. It is built on the premise that research output is more credible, acceptable; would contribute more towards a society or discipline, command more respect and be more reliable if experts in the discipline (peers) vet its quality by scrutinising, screening and evaluating its content and format (Ocholla 2011:3). Therefore, the findings on content type for the repository suggest that there could have been very little or no consultation of stakeholders in determining the content composition of the repositories. Therefore, there is a need for wider consultation and collaboration amongst the stakeholder so that

they agree on what to incorporate in their repositories if they are determined to see the repositories succeeding in their endeavour.

Thus, the UTAUT construct of social influence plays a significant role in this in that scholars can be influenced by the behavior and opinions of their colleagues in deciding to participate in populating the IR. So peers' preferences of types of content that should be included in an IR can determine whether they would support or reject the IR technology. This expose confirms Ruiz-Condo and Calderon-Martinez's (2014:1285) assertion that there is indeed lack of consensus on the composition of IR content and that there is a raging debate on the type of materials that should be stored in the repositories. The fact that scholars in this study showed that they largely preferred scholarly materials is an indicator that the inclusion of varied materials outside the confines of those they preferred could be a contributory factor to low participation by faculty in building the institutional repositories in the universities. As mentioned earlier, quality is at the heart of scholarly discourse which is underscored by the peer review process.

6.2.1.4 Size of the repositories
A significant finding of the study was the size of the repositories in terms of the number of items deposited since establishment to date, showing that the biggest repository had 450 (six years old) items, followed by two with 401 and 394 (seven years old) items respectively. This finding signifies that content deposit levels in the universities were very low if one were to compare the number of items held in the repository to the period in which the IR has been operational, the number of academics (Table 4.1), including students since they contribute theses and dissertations and, expected research output per year for each institution. One library director aptly stated that statistics of research publications by scholars did not match the amount of content held in the repository.

The success of an academic IR is measured by the proportion of items held in the repository to the number of scholars, and by the number of searches and downloads of archived items by others (Kocken and Wical 2013:41; Mercer, Rosenblum and Emmett 2007:191; Shearer 2003). The picture reflected here is that of institutions struggling to populate their IRs. It appears as though the institutions used the 'Build it and they will come' approach when they established the repositories but the intended depositors are not forthcoming. More needs to be done in order to increase content deposit so that they get a return on their investment. The result confirms Kocken

and Wicals' (2013) assertion that most universities struggle to acquire content for their IRs. Harnard (2011:35) also observed that most universities' IRs are 85% empty and deposit levels languish at 15% or below. So the status of Zimbabwe's university repositories is not a new phenomenon but a strategy has to be devised to increase content deposits in order for universities to get a return on investment in the IR technologies.

6.2.1.5 Interoperability of the repositories

The findings revealed that most (five) IRs were discoverable on the internet (Table 5.4) while a few (three) universities' IRs were not searchable. This is a positive development in that the country's research output is now highly visible and discoverable on the international arena and its impact will increase, thereby, potentially attracting collaborative research and more funding from research funders. The research knowledge can be used by a broader readership of scholars working within and outside academia, undergraduate students and instructors and potentially interested publics (Fitzpatrick 2012:353). Six repositories were registered with the OpenDoar and of these, four were also registered with the ROAR. Registration of an IR with the OpenDoar and ROAR increases visibility and discoverability of the repository content since these databases provide comprehensive lists of academic repositories and they enable users to find them by location or particular groupings such as content type. The OpenDoar even enables users to search for full-text articles from repositories through the '*search repository content*' link. In addition, the interfaces of the IRs are user friendly as they enable easy navigation through various access/entry points such as the author, title, discipline/community and so forth. The lack of interoperability of the three universities' IRs is actually detrimental to research impact (Gustafson and Pitman 2004 cited in Yiotis 2005:159) and visibility of the institutions and the scholars and ultimately, return on investment is not realised. Therefore, efforts at speeding up searchability of the repositories should be accelerated. It is, therefore, recommended that at the ZULC level, spirited efforts should continue to encourage institutions to have IRs up and running, ensure searchability through various internet search engines and have them registered in the DOAR for increased visibility of Zimbabwe's research output and attraction of a wider readership.

6.2.1.6 Success of the repositories

Zimbabwe's public universities invested in the establishment of institutional repositories in an effort to increase access to and visibility of research output generated in their institutions on the public domain. At this stage it would be prudent to establish if the repositories have been successful

so far. The findings revealed that only 25% (two) of library directors were satisfied with their achievements and felt that their IRs were successful while the rest (75%) felt they had not yet reached a desirable level of success in terms of content submission by academics and discoverability of the repositories. The success of an academic IR can be measured by the level of content submission by its academic community which is attributed to the issue of awareness (Kocken and Wical 2013:141). In concurrence Mercer, Rosenblum and Emmett (2007:191) and Shearer (2003) posit that an IR's success is determined by the proportion of items held in the repository to the number of scholars in an institution, and by the number of searches and downloads of archived items by others (Mercer, Rosenblum and Emmett 2007:191; Shearer 2003). However, this study only established the number of items held in the repositories and their level of awareness which can be compared to the number of scholars in Zimbabwe's public universities whose figures are shown in Table 4.1 and did not look at the searches and downloads of archived items. The population size of academics in Zimbabwe's public universities was 2, 226 and a break down by institution showed that BUSE had 219, CUT (274), GZU (330), HIT (247), LSU (74), MSU (464), NUST (413) and ZOU (205) academics respectively (see Table 4.1). Therefore, seven out of eight universities had more than 200 academics. The findings of the study showed that the first and oldest repository was nine years old and had 121 items, the seven-year-old repository had 401 items, the six-year-old repository had 450 items and one two-year-old repository had 394 items. A majority (79.1%) of academics were aware of open access, 89.3% were aware of the concept of IRs, 98.9% recommended that universities use the technology and 78% were aware of the existence of a repository in their institution.

Assuming that every one of these scholars were to publish at least one article per year, after seven years a repository would have at least 1,400 items. Given that the contents of the repositories included theses and dissertations by students (whose population size obviously exceeds that of academics but is not mentioned here) and works generated by academics and scholars, the size of the repositories compared to the number of academics, their level of awareness of OA/IRs and years of existence of the repositories following their establishment is testimony that the IRs have not been successful. The picture reflected here is that of institutions struggling to populate their IRs. So the status of Zimbabwe's university repositories is not a new phenomenon but a strategy has to be devised to increase content deposits in order for the universities to get a return on investment in the IR technologies.

However, we cannot ignore Westell's (2006:212) framework of indicators of IR success which include; mandate, integration into institutional planning, funding model, relationship to digitization centres, interoperability, measurement, promotion and, preservation strategy. This study did not look at integration into institutional planning, funding models, relationship to digitization centres and preservation strategies; so these will be excluded in this discussion.

Westell (2006:214) emphasises the need for a specific mandate of the repository as key to its success instead of having a broad mandate which is deemed as lacking focus and priorities and would be difficult to populate on a sustained basis. The author, therefore, suggests that institutions should have clearly defined mandates for the repositories stating whether the repository would be mandated, multi-purpose, faculty centric and so forth. The findings of the study showed that all the universities' repositories were multi-discipline oriented and the contents were organised by discipline in the DSpace communities which have further sub-divisions for specific subjects. The repositories were established to capture the institutions' intellectual capital for purposes of sharing and dissemination on the public domain; the contributors of content were bona fide academics, researchers, non-teaching staff and students of the institutions. All the institutions except one, had two repositories, one dedicated for past examination papers and undergraduate theses and dissertations for usage within the institution and another one with scholarly content including; pre-print and post-print articles, conference and workshop papers and, first class undergraduate and postgraduate theses and dissertations, books and book chapters, the university journal, annual reports, datasets, technical reports, lecture notes, grey literature, working papers and industrial design reports, for the public domain. The findings revealed that 62.5% had developed OA/IR policies mandating deposit of research and conferences that had been funded by the university through the research board, the conference abstract and published papers should be submitted to the research office and a copy deposited to the library.

According to Westell (2006) the mandate should be accompanied by a plan for the promotion of the IR and a strategy for growth, that is, inclusion of a champion in management and an advisory committee to oversee the repository management and contribute towards its sustained success. The findings showed that all the institutions had established IR teams/committees and three (37.5%) universities had the Pro-Vice Chancellor academic and faculty representatives sitting on these

committees. Even though the institutions did not have a written strategy for promotion of the repositories, they had employed a number of strategies (discussed in sections 6.4, 6.5 and 6.7) including; mandating deposits, training workshops, offering financial rewards in two universities, use of champions to entice colleagues to deposit research material, OA week campaigns, recognition of depositors of the highest number of articles, providing usage statistics and so forth. So for this measure, the institutions were successful.

It was also established that three quarters (75%) of the universities' repositories were interoperable and that a National Repository Trust, a repository of all research that is generated within the country, was established by the Research Council of Zimbabwe. The national repository would provide access to research articles that are contained in the universities' IRs by providing metadata links to the repositories. "Cross repository searching requires that IRs comply with the Open Archives Initiative-Protocol for Metadata Harvesting (OAI-PMH)" facilitated by IR software programs such as DSpace (Westell 2006:220). All the public universities in this study used the DSpace software for their repositories and they were searchable on the internet. This expose confirms the satisfaction of three (37.5%) library directors that indeed their repositories had been successful considering Westell's framework of indicators of IR success but if we consider the level of content submission by scholars in the universities given their number and level of awareness of OA/IRs (Kocken and Wical 2013; Mercer, Rosenblum and Emmett 2007 and Shearer 2003), the institutions have not been successful in populating the repositories. "Even with a considerable investment of resources and strong initial advocacy from libraries, institutional repositories have not been as successful as expected" (Cullen and Chawner 2011:462).

6.2.2 The role of the academic librarian in promoting the institutional repository

As mentioned earlier in Chapter 5, this research question sought to establish the changing role of librarians due to the establishment of IRs and ascertain how they are coping with the system. The variables effort expectancy and facilitating conditions as determinants of usage of technology inform the question.

6.2.2.1 Responsibility for the IR

The responsibility for managing and maintaining IRs in the university libraries was shouldered by a mixed bag of designations and levels across the universities which included; faculty librarians, IR librarians, deputy librarians, manager, reader services librarians, assistant librarians, senior

library assistants (SLAs), the systems librarians, and IT experts who maintain the system and train library staff. This shows lack of uniformity and agreement amongst Zimbabwe's universities and ZULC on which rank/level of library staff should shoulder the responsibility. So IR management and maintenance in Zimbabwe's universities involved both junior and senior staff while others had created a post for an individual whose sole responsibility was to run and manage the IR. However, the finding concurs with Potvin's (2013:69) position that OA responsibilities in academic libraries can be assigned to subject specialists, reference librarians, and liaisons, library units or positions involved in scholarly communication and those participating in digital projects, collection development, or electronic resources. This therefore, indicates that it is necessary for the university libraries to establish an IR position which would enable them to find a suitable placement/unit within the library for the IR. Institutions that have created an IR position have demonstrated dedication to ensuring success of their repository.

The establishment of the IR affected library staff (72%) in all the universities (Table 5.7) with most staff (44%) having new responsibilities added to the existing ones while some (32%) were reassigned to take up new responsibilities. This could be the major reason for the existence of a mixed bag of library staff running the IRs. The current freeze on employee recruitment in state institutions, due to the economic crunch facing Zimbabwe, hindered the university libraries from recruiting additional staff to shoulder IR responsibilities. This has a negative effect on the morale of employees particularly when the job enlargement does not come with an incentive. However, in a few instances, additional staff were recruited particularly, IT personnel and in some of the universities, consideration of staff interests and skills was made in assigning the responsibility. The success of the IRs may be hindered or stalled due to the fact that the library staff may find the IR development process to be too taxing and time consuming, thus, they may end up resenting the IR (Jain 2010; Mckay 2007). The findings revealed that the duties of the librarians around the IR included; content recruitment, collect and request for metadata to be put on the IR from faculty, marketing and promotion of the IR amongst the academic community, quality control, IR maintenance, managing and uploading articles, instructing scholars on how to self-archive their works and search the IR, IR administration, coordination and supervision of IR activities. The job enlargement strategy taken by the universities has implications on the performance of the librarians in service delivery, and efficiency and effectiveness in the execution of their duties. Jain (2010) propounds that the library may also take time establishing a mediated deposit service especially

where maintenance of the IR is done by existing staff who have this responsibility thrust upon them in addition to their usual duties.

The criterion employed by two university libraries to identify champions of the IR took into account the talent or skills of individuals, that is, those who were IT competent. Potvin (2013) opines that subject specialists, reference librarians, and liaisons in academic libraries, library units or positions involved in scholarly communication and those participating in digital projects, collection development, or electronic resources may shoulder OA responsibilities. Given that there was no recruitment of new staff and responsibilities were distributed to existing staff, it is important to consider the capabilities, skills and interests of the IR maintainers and managers so that they are not bored or demotivated by the job. So the institutions that considered the talent and skills of individuals in reassigning staff, enriched the jobs of the individuals concerned; this would contribute towards increased acceptance and use of the repository by librarians. The effort expectancy construct in the UTAUT model plays a significant role in this instance since it is concerned with the ease of use of a system. So if the selected individuals have an interest in information technology and have the skills to run the system they are likely to perform well in their job since they do not have difficulties understanding the system. People perform better when they are motivated to work.

6.2.2.2 Need for a professional position

The study results (Table 5.5) showed that most (mean of 3.64) librarians felt that professional positions should be created for the management of OA initiatives, projects and repositories. In explaining their perception, the librarians indicated that the IR comes with a lot of responsibilities, therefore, it requires that an IR unit be opened and; that a specialist in OA issues is required to shoulder this responsibility. Mckay (2007: Data creators/maintainers citing Pinfield, Gardner and MacColl 2002) opines that the role of the IR maintainer requires a combination of "technical expertise, an understanding of metadata and metadata standards, copyright knowledge [and licensing agreements] and the inclination to collate research publications". Therefore, there is a need for capacity building in numerous skills and activities (Czerniewicz 2013:11) for the library staff to be relevant, efficient and effective in the OA environment. In addition, technical expertise is required in aggregation, harvesting, analytics and impact assessment.

The university libraries were indeed making efforts to equip their staff with the requisite skills for running and maintaining the IR. The IR/faculty librarians and library directors confirmed that they had received training on IR maintenance and content recruitment either in-house or off-the-job through workshops. They trained on the Greenstone and DSpace software; attended workshops facilitated by INASP and the university libraries consortium, ZULC; in-house or on-the-job training by systems librarians and Senior library staff; self-training and, contact visits to universities such as UZ and MSU. This underscores Potvin's (2013:69) view that librarians graduating from university "without significant pre-professional work touching on the legal, publishing, subject-specific, and policy issues around OA" have to sharpen their skills and knowledge on the job through continuous training and research. The construct 'facilitating conditions' in the UTAUT model plays a significant role in this instance of influencing acceptance and use of IRs. The universities, by organizing and sending their staff for skills training created an enabling environment for the library staff to execute their duties and responsibilities effectively and efficiently. When the drivers of a system are empowered, they are motivated to adopt and use the system and advocate for its use by the academic community.

From the findings, it is evident that the institutions were involving all stakeholders on issues of the IR by creating a sense of ownership in an effort to ensure success of the IR. All the universities established IR teams or IR management committees whose compositions in some institutions comprise academics/scholars, the Pro-Vice Chancellor academic (management), librarians and ICT personnel. In one institution, a quality assurance team was included in the IR committee while another had a lawyer. Therefore, the IR innovation becomes an 'ours' issue and not 'theirs' by virtue of stakeholder involvement in the planning and implementation of the system. The responsibilities of the IR committee extracted from one university IR policy are evidence of a good strategy of managing change in an organisation and ensuring its success. Lynch (2003) advocated for collaboration among librarians, information technologists, archives and records managers, faculty and university administrators and policy makers to ensure IR effectiveness. The involvement of all stakeholders will assist in establishing the repository's authority and value in the institution; management will see the need to provide both financial and staff resources for the management and maintenance of the repository; the involvement of academics would facilitate awareness creation in the scholarly community and persuasion of scholars to deposit their works (Cullen and Chawner 2011). Consequently, the institutions would obtain a maximum return on

their investment in the IR technology once their institutions' intellectual output is visible and accessible in the international arena, not forgetting the benefits accruing to the scholars and researchers locally.

6.2.2.3 Attitudes of librarians towards IRs

The librarians exhibited positive attitudes towards IRs, since they are driving advocacy for acceptance and use of the technology by the university community and they appreciate the role of the repositories in facilitating scholarly communication. They opined that IRs would motivate scholars to publish once their works start to be visible to a wide readership. Knowledge and understanding of the role of IRs by academic librarians has both professional and institutional benefits including; closure of the gap between librarians' attitudes and behaviours towards OA; motivation and empowerment for OA outreach beyond the library; provide insight into repository resources that may inform information literacy; and provoke dialogue and discussions amongst librarians on the functionality of publishing platforms and OA (Potvin 2013:70). This relates well with the performance expectancy variable for acceptance and use of technologies in the UTAUT model. Librarians would readily accept and be motivated to advocate for acceptance and use of IRs by the academic community by virtue of their perceptions of the role of the IR in scholarly communication. Therefore, the finding is a reflection that the librarians were motivated to promote the IR agenda.

Related to this issue of skills, was the finding that a majority (80%) of the librarians did not have a qualification in publishing. Possession of knowledge and skills of publishing is an added advantage to the IR maintainer and developer in that they would understand the nature of materials being handled as scholarly publications. It was observed by Czerniewicz (2013) that quite a number of libraries have taken over the function of scholarly publishing driven by the OA initiatives. They can work together with the university journal editors, who happen to be the scholars and researchers in the university, on publishing projects and in the event that the IR is regarded as a publishing venture (Geisecke 2011) it is essential that the person responsible for the IR has a background of publishing so that they understand the publishing process from solicitation of manuscripts, through the production process to the finished product, copyright and permissions issues and online dissemination (Geisecke 2011:537). With such a skill and knowledge, the IR librarian is empowered to devise powerful services that will attract the academic community to

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participate in the development of the IR. The current state, where the library staff lacks publishing knowledge and experience, is a disadvantage to them in that it would take time for them to understand the publishing behaviours of authors which would enable librarians to entice authors and get their buy-in. So there is a need for the librarians to self-train through research and also training on the basics of scholarly publishing.

6.2.2.4 Content recruitment

Content recruitment from faculty in the universities was shouldered by IR librarians and this activity, as they professed, was made difficult by lack of cooperation by the academic community. The academic community generates research output under the watchful eye of the research office and faculty office and it is the responsibility of the research office to collate the research output of the institution. Therefore, the office can play a significant role in facilitating or creating an enabling environment for the library to recruit content from scholars and researchers. Recruiting and harvesting content requires liaison amongst the three units, that is, the library, faculties and research office. The findings revealed that all the libraries liaised with faculty and only five of them also liaised with the research office. As mentioned earlier, Lynch (2003) proposes that collaboration among stakeholders including; librarians, IT personnel, faculty, university management and policy makers is essential for the IR to be effective. In all the institutions faculty/IR librarians were assigned the responsibility of maintaining constant communication with faculty and the research office. Outreach by librarians is an important activity aimed at drawing the attention of content depositors in an effort to build the IR and operationalize its work (Little 2012:66). In universities where the research office was active, it supplied the library with research output which would have been collected from academics for onward transmission to the library. The lack of collaboration between the library and the research office in three universities is a reflection of the attitudes of management towards OA and IR initiatives, which is not supportive at all. In one instance it was indicated that the librarians informally engage some influential academics to encourage them to convince their colleagues to submit their research materials to the library for self-archiving. In this case, they were using the UTAUT model construct of social influence where the significant others are being used to influence colleagues to participate in populating the IR and increase its acceptance and use. The model theorises that individuals will adopt and use a system if their peers (particularly those to whom the academic community looks up to) are using it since they are concerned about what they will say if they do not use the system.

Therefore, librarians have to think subversively whether to publicise the scholarly communication crisis by preaching the OA and digital archiving gospel or be diplomatic by working towards reaching consensus on the function of IRs and also transform the attitudes of faculty and researchers (Little 2012). They are achieving the later through engaging champions or influential academics to encourage their colleagues to participate in building the institutions' repositories.

One other finding of the study was that 68% of IR/faculty librarians indicated that their institutions engage in copyright clearance and permissions processing activities with publishers in order to make published faculty research available in the IR. Fifty-six percent of academics said it was the library's prerogative to seek clearance while 16% said it was the authors' responsibility. They verified publishers' copyright requirements through web tools such as SHERPA-Romeo, SPARC and the Copyright Act and also sought clearance from the author and publisher and run plagiarism tests. In three universities academics had to seek permission from their publishers and this could be assumed to be one of the reasons librarians had challenges getting content from the academics. "Faculty have more important work to do, and not all of them have support staff to assist with the clerical work of self-archiving" (Troll Covey 2009:249), so they tend to resent any activity that seems to eat into their time. The scholars whose universities required them to seek copyright clearance from their publishers on their own could be resentful of the idea and end up abandoning deposit after all. The process of seeking copyright clearance can be tedious and too long of which the scholar may lack patience to go through the process. A system of copyright clearance, which does not push content depositors away but encourages them to participate, should be established. In one of the universities, the library worked closely with two members of staff, one who was an IP expert and another was in charge of making sure that all research done in the institution was patented whenever they checked for copyright permissions. This approach could also be adopted by other institutions but the research office and the library need to collude together and map the way forward so that the content deposit ethos and momentum is maintained and increased.

The study also established that the libraries did not upload copyrighted material and where an embargo was placed on an item, only the abstract would be made available to the public until the embargo period expires. One feature of an IR is that it has a 'Fair Use' button, also known as the 'Request a copy' button which makes it possible for any authors who have copyright worries to deposit their papers as 'Closed Access' (CA) instead of OA" (Sale et al. 2010 and Harnad 2011).

The button gives authors an opportunity to provide 'Almost OA' to the papers on request by individuals. If a user shows interest in a CA article, they send an automated e-mail request for the final draft (for research purposes only), which can be authorized by the author through an automated e-mail response, with the article attached, to the user at the click of a button (Carr and Harnad 2005; Harnad 2011:35). So, the universities can require their scholars to deposit all their refereed articles in the repository and make use of the 'fair use' button to control access.

A significant finding of the study was that the most popular resource/service used by the universities to determine publisher IR deposit policies was the SHERPA-RoMEO (56% IR/faculty librarians), copyright policies from publisher websites (24%), the Copyright clearance centre (12%) and OAKlist is the least (4%) used resource. The SHERPA-RoMEO database provides a clear cut method for determining whether some kind of self-archiving is permitted in the author agreement (Wirth and Chadwell 2010). The database uses colour coding to label each publisher. White is for publishers that prohibit self-archiving; green is for publishers who allow self-archiving of both pre-prints and post-prints; blue is for those that allow self-archiving of post-prints only; yellow is used for allowing archiving of pre-prints (Wirth and Chadwell 2010:343; Troll Covey 2009:240). Where an embargo period is instituted before self-archiving a post-print, SHERPA-RoMEO assigns a yellow code to publishers allowing self-archiving of both pre-prints and post-prints. "Often publishers that allow self-archiving set conditions or restrictions that must be followed to comply with the policy" (Troll Covey 2009:240).

On a five-point likert scale most (mean of 4.20) of the librarians were in agreement that 'the principles of OA are in tandem with the role of academic libraries' with one respondent saying; "*Open access promotes the five laws of Ranganathan without which information could not reach its intended recipients.*" The five laws of library science by Ranganathan state that: i) books are for use; ii) every reader his [or her] book; iii) every book its reader; iv) save the time of the user; and v) the library is a growing organism. Ranganathan's five laws concisely demonstrate the ideal library practice and attitudes of librarians (Finks 2010:142). "The first law…refers to the accessibility of books. The second…is a call to avoid discrimination against readers" (Dannenbring 2014:2), the third emphasizes ease of finding books in the library by avoiding complicated organisation or arrangement systems. The fourth law complements the third by emphasizing efficiency of service and the fifth law envisages growth of the library. Ranganathan's

laws remain relevant in today's technologically driven or digital library service. However, a modern version was devised by Gorman (1995) for modern digital library practice which in principle underscores the same values and morals put forward by Ranganathan. Gorman's five new laws of librarianship can be easily related to the role of IRs as he states that; i) libraries serve humanity; ii) respect all forms by which knowledge is communicated; iii) use technology intelligently to enhance service; iv) protect free access to knowledge; and v) honor the past and create the future. Gorman's first law emphasizes attention to quality of service that meets or surpasses users' expectations and; that the mission of the library "is both to the individual seeker of truth and to the wider goals and aspirations of the culture" (Gorman 1995:784). The second law emphasizes respect for all forms of communication since each new form (IRs) enhances and complements the strengths of the superseded forms. The third law refers to using technology to seek answers to problems instead of:

> seeking applications of new interesting technology; weighing the cost-effectiveness, cost-benefit, and, above all, impact on service of any proposes innovation; and rethinking the program, service or workflow that is being automated rather than automating what one has (Gorman 1995:785).

This law, generally implies employing library practices and services that enable access to resources and in this case institutional repositories enable increased access to and use of research by a wider readership by virtue of them being searchable on the internet through search engines like Google. The fourth law underscores the need for libraries to preserve all records of all societies and communities and make them available to anyone who desires to use them. IRs strive to preserve the intellectual capital of an institution for continued and future use. The fifth law proffers that the library of the future should retain both the best of the past and a sense of library development over time and of human communication. In essence Gorman's new laws of librarianship are in no way a digression from Ranganathan's laws of library science. It is just that Gorman rephrased Ranganathan's laws to suit the digital environment of the modern library. Ranganathan's laws are in line with OA principles which promote equal distribution and sharing of research across the globe by enabling free availability of and access to research output on the internet. This signifies that well trained librarians with an understanding of the "ethics, values, and foundational principles" of librarianship (Potvin (2013:71) which are enshrined in Ranganthan's laws will not lose direction in the OA environment.

On a five-point likert scale a mean of 3.92 (84%) of librarians indicated that they agreed with the statement that 'OA IRs will fail without the active involvement of academic libraries' because libraries play a critical role in information dissemination; they enable access to information through indexing and abstracting of materials; disseminate, store and preserve information for the readership. Academic libraries are, therefore, significant stakeholders in scholarly communication whose mission is to collect and provide access to scholarly publications which will be used by academics to inform and validate their research (Phillips 2010:4). This view is supported by Parks (2002:323) who proffers that academic libraries play a key role in the `market of distribution' for learned inquiry. So, the positioning of librarians in scholarly communication enables them to link published literature to academics and also facilitate access to the works. This finding signifies that academic libraries have a strength in which the success of IRs lies. Therefore, they are best placed to house the repositories even though the research and publications units, by virtue of them shouldering the responsibility of handling the institution's research activities, can also house the repository but will often find themselves seeking the assistance of librarians.

6.2.3 How the institution contributed to the promotion of OA
This section will discuss the contribution of the universities to the promotion of the IR initiative and subsequently to its acceptance and usage. It will explore the policy makers' awareness level, understanding and appreciation of OA. The section will also deliberate on the measures that were put in place by the institutions in support of the OA initiative, particularly policies that were adopted to this effect, their participation in content recruitment and their preferences for content types to be included in the repositories.

6.2.3.1 Policy makers' understanding of OA
The findings revealed that there was high awareness, understanding and appreciation of the concept of OA by the directors of research, as administrators of and policy makers in research issues, in a majority (87.5%) of the universities. However, some of the policy makers were skeptical about the riguor and credibility of the peer review process in the OA domain. This skepticism has been shared by many scholars who also argued that OA would result in bad scholarship; could be vanity or self-publishing, which damages the peer review process (Pandita and Ramesha 2013:50; Boissy and Schartz 2011:480), yet OA "publishing is perfectly compatible with peer review" (Fitzpatrick 2012:348). Peer review is used as a measuring instrument for quality, reliability and credibility of the scholarly output; it is built on the premise that research

output would earn more credibility, be more accepted, contribute more towards a society or discipline, command more respect and be more reliable if experts in the discipline (peers) vet its quality by scrutinising, screening and evaluating its content and format (Ocholla 2011:3). Critics of OA opine that the conventional system of closed access guards against substandard publications (Pandita and Ramesha 2013:50). Articles published in open access journals go through the peer review process as much as the subscription based journal articles do. OA journals employ quite a number of traditional and "supplementary or alternative quality-assurance models—peer review, collaborative peer review, moderation, automatic assessment, and assessment by readers—and often a combination of models is used" (European Commission, 2008 cited in Caruso, Nicol and Archambault 2013:32). The peer review process in the conventional system is fraught with flaws, it is poor at detecting gross defects and almost useless for detecting fraud (Smith 2006:179). Some fraudulent articles have on occasion passed unnoticed and have been published in reputable journals; others are published with errors. This is evidenced by the publication of a hoax paper in 2009 which was computer-generated and published by a reputed publisher (Gilbert 2009 cited in Pandita and Ramesha 2013:50). This argument serves to show that peer review for both subscription-based and OA journals is susceptible to bad scholarship. The peer review system relies on trust, so university policy makers, managers and scholars have to put the same trust in OA. This fear in the policy maker could be a contributing factor to the low rate of deposits in the universities' repositories. Therefore, it is critical that policy makers and the academic communities in Zimbabwe's universities be informed that:

> OA, is not self-publishing, nor a way to bypassing peer-review and publication, nor is it a kind of second-class, cut-print publishing route, but simply a means to make research results freely available on-line to the whole research community (Katebere and Kate, 2008 cited in Wasike 2013:17).

There were mixed feelings amongst the directors over the author pays model (article processing charge). Some opined that the fees were exorbitant and that payment of publication fees contributed to fast tracked publication of articles which caused them to question the rigour of the peer review process. However, others opined that the peer review process is not affected in any way by OA and were in support of the author paying for publication since they believed its purpose is to enable the work to be made OA. This finding shows that there is a need to raise awareness amongst policy makers and the academic community on the author pays model in order for them

to fully understand the OA publishing process which also ensures rigorous peer review of research articles. Trustworthiness of a work in scholarly publishing is paramount and it hinges on the knowledge that the work has been peer reviewed. Scholarship requires that quality control be done on all works of a scholarly nature and peer review fulfills that requirement and ensures that published works meet set standards (Ruiz, Candler and Teasdale 2007:503). The sentiment behind the article processing charge (APC) is that it is the institution and the author who stand to benefit from the article's publication, therefore, the OA journal's publication costs are distributed, by the article processing charge, across individuals and institutions benefiting from the article's publication (Open Society Institute 2004:17 cited in Fullard 2007: 44-45). However, the policy makers who supported the APC or the author pays model appreciated the fact that the journal publisher has to recover publication costs, so instead of charging subscription fees, the author pays an article processing fee (Boissy and Schatz 2011:480). The Wellcome Trust (2004:22) carried out a study of the author pays model and found that the model is less costly and can successfully serve the research community, therefore, they mandated OA publication and deposit of all the research they fund. These divergent views in Zimbabwe's policy makers on the effect of OA on the peer review process add to the existing debate between proponents of gold OA and their critics. However, the findings of the study revealed that most (five) of the policy makers are positive that OA contributes to the advancement of career prospects of scholars and researchers as they indicated that it increases visibility and citation of one's works. A scholar's publication record is one criterion that is used to assess whether they should receive future funding, eligibility for tenure, promotion and the researcher's university department (Mabe 2006). Citations to one's articles are used as the basis for evaluation of publications.

The research directors in the universities were wary of the influx of predatory journals to which some of their scholars were falling prey. Caruso, Nicol and Archambault (2013) acknowledge the proliferation of predatory journals where unscrupulous publishers, under false pretenses, are taking advantage of the author pays model of OA publishing to lure scholars to publish with them yet they provide little or no peer-review service. The findings revealed that in an effort to guard against scholars falling prey to predatory journals, in all the universities, the research offices in collaboration with the libraries, had compiled lists of both accredited journals and predatory journals which they use for verification purposes before payment of publication fees and for evaluation of individual scholars' articles for promotion purposes. Unfortunately, the compiled

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lists of accredited journals were not accessible on the university websites for the academics to see. It is important that the universities create awareness amongst the academics of these predatory journals rather than wait for them to submit their papers for promotion, only for them to discover that their submission is being rejected because they published in a predatory journal. Caruso, Nicol and Archambault (2013) proffered that currently there are few safeguards against predatory publishers besides awareness of individual authors. They advocate fostering internet literacy to authors as it may equip them with tools to recognise telltale signs of foul play. So Zimbabwe's universities, through the information literacy skills training programmes, enlighten scholars and students of the predatory publishers and publicise the lists of predatory journals even through the university website, on the library and research office portals. Publicity of such information including policies impacting on research practice in the institution will assist even the librarians whose responsibility is to recruit content for the repository in executing their duties. Such information empowers and builds confidence in librarians to pursue academics and persuade them to submit content for the repository.

6.2.3.2 Support for scholars publishing in OA platforms

A study by SARUA in 2008 entitled *Opening access to knowledge in Southern African universities* proposed the adoption of an OA research dissemination platform for Southern African universities and recommended conduct of advocacy campaign strategies that focus on OA publishing and licensing, from 2009 to 2014, with universities and academic journals originating from Southern Africa (Abrahams et al. 2008:15). Therefore, it follows that universities in Zimbabwe, as members of SARUA, had to adopt OA strategies that reflected their acceptance of the OA ethos in order to:

> increase the volume of published research, profiles the work of publishing researchers and scientists in both the Southern African and international research communities, promotes quality in scholarly publishing, makes research and scholarly publication available to the broad academic and student population, particularly the postgraduate student population at low cost and promotes the utilisation of research output by a broader community of researchers and members of society (Abrahams et al. 2008:15).

The findings revealed that five universities in Zimbabwe accepted publications by their scholars in accredited journals irrespective of the platform (OA or closed), as long as these had an impact factor. Abrahams et al. (2008:37) expressed that researchers' publishing behaviour is influenced by conditions of the promotion and reward policies of the universities, that include: the emphasis

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on publishing in international peer reviewed journals listed in the ISI indexes, the glamour that comes with publishing in the journals and funding to institutions for staff who publish in such journals. The attitude displayed by the tenure and promotions committees in Zimbabwe's universities is a positive step towards promotion of OA in the institution, therefore, they have to be commended for such behaviour. Reality is that scholars are publishing, not only in traditional print sources but also in electronic, non-subscription, and open access journals (Casey 2012:3). Therefore, if the tenure and promotions policies and committees were to emphasise publications in traditional formats that would reflect a conservative culture which would stand in the way of scholars who are striving to meet the requirements for them to be tenured. However, as long as the policies in Zimbabwe's public universities do not stipulate recognition of OA publications, they are prone to the discretion of the tenure and promotions committees who can decide to accept or reject OA publications. It is, therefore, paramount that the universities incorporate clauses that refer to treatment of OA publications in making decisions for faculty tenure and promotion as a way of showing their commitment to the OA initiative.

On the issue of mandating deposit for promotion and tenure, the results of the study revealed that all the universities' tenure and promotion conditions did not require academics to deposit research to the IR. Amongst its five policy statements, the Berlin Declaration on open access to knowledge in the sciences and humanities, advocates for recognition of open access publication in promotion and tenure evaluation in universities. The findings revealed that only three universities in Zimbabwe had signed the Berlin Declaration, signaling that Zimbabwe's universities were lagging behind in supporting the OA initiative by virtue of not committing themselves to the ethos through signing the Declaration.

6.2.3.3 Participation in content recruitment
Since the research office works closely with scholars and researchers, they are best positioned to persuade them to deposit their research to the repository. As mentioned earlier (see 6.3.2) findings of the study showed that in most (62.5%) universities there was collaboration between the library and the research office in content recruitment and that the research policies mandated deposit of all research output (abstracts of research or conference presentations and published papers) funded by the institution either to the research office or the library but they could not force scholars to deposit research that has not been funded by the institution. Given that some (37.5%) universities

lacked collaboration between the research office and the library in content recruitment, much of the research output was not captured in the IR and remains in the records of the Research office only. So there is a need for such universities to push for close cooperation between the library and the research office to ensure that all research carried out in the institution is captured and made publicly accessible through the library. However, there is a ray of hope of IR success, for those universities that have close collaboration between the two offices even though deposits remain low.

It is interesting to note that one university's new research policy mandated deposit of research published using institutional affiliation even though no funding had been extended towards the research. It is not a secret that scholars were using institutional affiliation to their benefit but were not willing to give the research to the university, whose name would have enabled them to publish. It is important for the universities to close such gaps or loopholes since they should also benefit from use of the institution's name, time and resources, which the researcher would have used, as a way of acknowledging the institution. However, one director of research indicated that they had tried pinning the scholars on this pretext but failed to get them to deposit. This reaction from scholars can be attributed, in part, to the fact that the research policy did not have such a condition, so it was difficult to enforce an unwritten policy. Resistance by scholars to cooperate in the development of the institutional repository is primarily motivational characterized by indifference rather than active resistance (Quinn 2010:67). So if the universities want to achieve a 100% content deposit in their IRs, they have to institute written mandatory policies (Sale 2006). It is through a mandate policy that scholars' awareness of broad information sharing can be raised and improve self-archiving of intellectual outcomes" (Xia et al. 2012:86). So, Zimbabwe's universities should consider including a clause, in their tenure and promotion conditions, that mandates academics to deposit research in the IR, if they want to be considered for promotion, so that the institutions develop their repositories and also rid themselves of a retrogressive culture. The universities have invested in the establishment of repositories, therefore, participation of content contributors is one of the very important indicators of success of an IR (Thomas and MacDonald 2007).

Another finding was that in some (25%) institutions, financial incentives (US$20.00) were offered to authors who deposited their research, resultantly increased deposits were realized and admittedly, for the institution that withdrew the incentive, deposit rates decreased. Increased

deposits were also realized in institutions (25%) that incentivized their scholars by publicizing names of those who would have deposited the highest number of papers within a particular period and provided usage statistics. Most (five) institutions did not offer any incentive and relied on the existing deposit mandate and in some (two) universities, the research office was involved in promotion of the repositories through workshops and the research newsletter where they encouraged scholars to deposit their works. This finding shows that financial rewards are an important catalyst for increased deposits by scholars in Zimbabwe's universities. Even though Harnad (2011:35) says cash rewards from funders or scholars' institutions and incentives are not sufficient motivators for authors to deposit, for Zimbabwe, the strategy seems to be working as the universities that employed these strategies reported increased deposits. But for those institutions that do not offer any incentives except for encouraging the scholars to deposit surely confirms Harnad's (2011:35) claim that encouragement is not a sufficient motivator for deposit of content in the repository. Zimbabwean scholars demonstrated that financial rewards are a facilitating condition for acceptance and usage of the IR technology. However, Sale's (2006) study found that inducements only accelerate the deposit rate to about 30% (Sale 2006). So Zimbabwe's universities have to devise innovative ways of arousing depositors' interest for them to participate in populating the repositories.

However, on a positive note, the research offices in most of the universities were working together with the library to promote acceptance and usage of the repositories. Lynch (2003) advocated for collaboration among librarians, information technologists, archives and records managers, faculty and university administrators and policy makers to ensure IR effectiveness. The involvement of all stakeholders will assist in establishing the repository's authority and value in the institution; management will see the need to provide both financial and staff resources for the management and maintenance of the repository. The findings also showed that most (75%) of the policy makers were aware of the benefits accruing to the institution from use of IRs and they cited benefits of repositories to include; increased visibility and improved ranking of the institution, and benefits to students and scholars with increased citation of their works. Awareness by management and policy makers of the benefits of open access repositories will influence their decision to adopt and promote usage of the IR technology by the academic community and this can only be reflected in the policies they institute to ensure success of the repositories.

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6.2.3.4 Content type for the repository

A mature and fully realized institutional repository will contain the intellectual works of faculty and students—both research and teaching materials—and also documentation of the activities of the institution itself in the form of records of events and performance and of the ongoing intellectual life of the institution (Lynch 2003:328). The research findings revealed that the policy makers were of the opinion that, as mentioned earlier in 6.2.3, content for the repository should include; theses and dissertations, post-print journal articles, pre-print journal articles, conference proceedings and abstracts, occasional papers, patents and unpatented research, books, and extension service reports and documentaries, slides or powerpoint presentations, lecture notes and modules. A significant observation from the finding is that policy makers in Zimbabwe's universities seem to have a high preference for materials that are acceptable in academic circles, that is research output they regard to be more credible, acceptable; would contribute more towards a society or discipline, command more respect and be more reliable if experts in the discipline (peers) vet its quality by scrutinising, screening and evaluating its content and format (Ocholla 2011:3). The preferred content types for the repositories could have a bearing on the decision by both policy makers to adopt and promote use of the repositories by scholars and academics in the universities. The policy makers' repository content preferences were found to be in tandem with those of the academics and scholars (discussed in 6.2.3 and 6.5.3).

In efforts aimed at addressing concerns pertaining to issues of intellectual property rights (IPR), authenticity, data integrity, peer review and so on, with reference to IRs as platforms for disseminating intellectual output, Zimbabwe's universities instituted several measures including; establishment of an ethics committee, a quality assurance committee within the institution to ensure that all research done in the institution is cleared by this body, IP policies, use of anti-plagiarism software, such as, Turnitin through which all Masters and DPhil theses pass before they are accepted and, use of accredited journals for publication. It is evident that the universities have put stop-gap measures to address IP and ethical issues that may arise in the conduct of and dissemination of research by their scholars but it remains to be established in the ensuing discussion if these policies and measures were communicated to the academic community and if they address publication in OA.

6.3 Impediments to deposit of research in IRs by scholars

The second objective of the study as mentioned earlier, was to ascertain the reasons as to why scholars were not depositing their works to IRs in their universities. The universities invested in establishment of the IR technologies and therefore, it is befitting that they get a return on their investment. This section discusses the attitudes and perceptions of academics towards IR, the challenges faced by both academics and librarians in the development and maintenance of the repositories and, the strategies that have been employed by the institutions to overcome the challenges.

6.3.1 What are the attitudes and concerns of academics towards IRs?

Even though all the universities in Zimbabwe have established IRs, the rate of acceptance and use of the technology is assumed to be different as determined by effort expectancy, facilitating conditions, social influence, performance expectancy and voluntariness of use. These constructs of behavioural intention are moderated by age, experience and gender of the individual.

6.3.1.1 Profile of respondents

In order to understand the OAIR acceptance and usage behaviours of academics in Zimbabwe's public universities it was deemed necessary to profile the age, gender, rank, qualification, experience and discipline of the respondents. These age, gender, experience and discipline have a moderating effect on the constructs of social influence, facilitating conditions, effort expectancy and performance expectancy which in turn influence acceptance and use of OAIRs by the academics. Post qualification experience and rank were assumed to impact on participant's level of research activity and experience in scholarly communication which would have a bearing on the level of research output.

A significant finding of the study on the caliber of academic staff in Zimbabwe's universities showed more male (75.9%) respondents than were females (24.1%) which is characteristic of the gender imbalances in the universities which employ more males than females. Of these respondents 48.7% were in the age group of 31 to 40 years for both females (18.7%) and males (81.3%) respectively followed by the 41 to 50 years (23.5%) age group. In the 61+ years age group there is only 11.1% (1) females against 88.9% (8) males. Most of the respondents (72.2%) were lecturers who are still building their publication portfolio, 12.8% senior lectures, 2.7% research fellows while professors and associate professor constituted 3.7%. Of these respondents 78.1%

were Masters degree holders and 17.1% were PhD holders. Of the 31 to 40years age group 76.9% were in the lecturer rank, 7.7% senior lecturers and 2.2% associate professors. Most of the academics (73.8%) have 0 to 10years post qualification experience in academia. In contrast, Dulle's (2010) study of OA scholarly communication in Tanzanian public universities, found that 70.4% researchers were aged beyond 40 years, 75.1% were PhD holders and 53.8% were in the ranks above lecturer position. This result shows the level of depletion of experienced academic staff in Zimbabwe's public universities and this has an effect on their knowledge and level of research activity.

The economic meltdown experienced in Zimbabwe between 2005 to 2009 and 2013 to present have seen a massive exodus of senior academics and researchers with extensive teaching and research skills and experience (Kotecha and Perold 2010:38) fleeing the country in search for greener pastures in neighbouring countries like South Africa, thereby, resulting in the loss of institutional memory (Kotecha and Perold 2010:42; Machawira 2009 cited in Garwe 2013:5). The needs analysis of Zimbabwe's higher education by SARUA in 2010 established that the senior academics complement in four universities had been severely depleted and the few professors and associate professors (Table 4.1) indicate incapacity for research supervision and mentorship in Zimbabwe's universities (Kotecha and Perold 2010). The massive brain drain left the universities with inexperienced researchers who still needed to be mentored in research methodology and scholarly communication; the departure of seasoned academic staff heralded long-term weaknesses for the research capacity of the institutions (Kotecha and Perold 2010:41). However, a study by Garwe (2013:5) to examine "the effect of institutional leadership on the quality of educational provision in higher education institutions in Zimbabwe" found that recruitment of highly qualified and experienced staff in Zimbabwe's public universities had significantly improved in that public universities had more PhD holders amongst their academic staff than private universities.

6.3.1.2 Awareness of OA
The major finding of the study was that there was high (79.1%) awareness and understanding of OA amongst Zimbabwe's scholars with 59.9% opinionating that the OA initiative is a positive move in scholarly communication. Most (89.3%) of the respondents were aware of the concept of IRs, recommended (98.9%) that universities should use the technology and were aware of the existence of a repository in their institution (78%). The results also showed that the scholars

understand that OA is concerned with online free access to scholarly literature. This awareness can be attributed to the awareness campaigns carried out by the institutions, particularly by the library and this is also strengthened by the fact that 52% of the respondents professed awareness of the existence of an OA policy within their institution. Therefore, the institutions and the libraries are proactive in creating awareness of OA in their communities. A SARUA study by Abrahams et al. (2008), in eight universities in Southern Africa on opening access to knowledge in Southern African universities, found that 71% of respondents, who included DVC's, librarians, Deans and researchers, were aware of OA approaches. Eighty percent of the researchers and more than 60% of Deans were aware of OA. The DVC's and librarians indicated that progress was being made in creating awareness of OA in the universities. The introduction of the OA IR concept in Zimbabwe dates back to 2005 where eIFL.net established the first institutional repository at the University of Zimbabwe and spread to other institutions through the Zimbabwe university libraries consortium. The study findings revealed that 97% of scholars and directors of research understood and appreciated the OA initiative and a mean of 4.36 of scholars indicated support for scholarship to be made OA, while 98.9% of them recommended that universities use the IR technology. This result concurs with Abrahams et al.'s (2008) finding where 77% of respondents professed support for OA approaches and their introduction, while two thirds of the DVC's were in favour of OA. This finding signifies that scholars in Zimbabwe are ready to accept and use OA platforms to publish and disseminate their research, this readiness will be unraveled in the course of the discussion.

6.3.1.3 Perceptions of IRs

The findings revealed that a most (63.6%) of scholars and academics had not deposited their research in the institutional repositories; only a few (36.4%) had done so while very few (8%) respondents preferred to deposit their research output in disciplinary or subject repositories and other popular web repositories such as Academia.edu and Researchgate. A study by Kim explored the factors that affect faculty self-archiving behavior and found that a few of the professors deposited their research in their universities' IRs with 70.2% of them self-archiving on personal web pages, departmental websites, research/group/centre/lab websites and IRs. Onyancha (2011) in his study of self-archiving by LIS schools in South Africa also found that departments self-archived their documents on their websites instead of IRs, which posed preservation challenges. This shows that this problem of academics' preference to self-archive elsewhere other than their

universities' repositories is not unique to Zimbabwe, so the causes of such behavior needed to be explored in order to find lasting solutions. The reasons given by Zimbabwean academics for not depositing their research included; lack of training on self-archiving, lack of information on the importance of IRs, lack of motivation to deposit, lack of published papers, lack of awareness of the IR, lack of confidence in the IR and that their research would not have been funded by the university. Scholars and academics who contributed to the repository, 65% deposited quite often. At this point it can be said that lack of published papers to deposit in the IR by some of the respondents is a reflection of the state of academic staffing in Zimbabwe's universities where most of the academics and scholars are inexperienced researchers who still need to be mentored in research methodology and are grappling to make a name for themselves on the scholarly landscape.

However, 71.2% of respondents who did not deposit but had valuable unpublished works can utilize their universities' repositories to publicise and disseminate the works. This finding is in tandem with Lercher's (2008) study of faculty at Louisiana State University which found that scholars and scientists who indicated that they had valuable unpublished work, or thought others had it, had not yet used digital repositories, whether disciplinary or institutional. The works are valuable in the sense that other researchers can make good use of them, but for reasons known to the researchers they are not published and these works could include; technical reports, conference papers, working papers or grey literature (Lercher 2008:410).

> The current frame of new knowledge and peer production, with requirements to publish in a hierarchy of academic journals, placing ISI journals at the top of the hierarchy, local journals at the bottom of the hierarchy, and excluding 'grey literature' from acknowledgement in institutional promotion and reward systems, may have contributed to the extremely low rates of production (Abrahams et al. 2008) [in Southern Africa particularly Zimbabwe].

So Zimbabwe's public universities can encourage their academics and scholars to embrace IRs to publicise and share their research with scholars within the institution, the country and across the globe since the contents of repositories also include grey literature and reflect the intellectual life of the university and its scholars, instead of keeping the information hidden in their office drawers.

Therefore, the universities can leverage on this weakness to mandate their academics to deposit in the IR whatever output they generate and also make it a condition for tenure and promotion. The other reason for not depositing research was that the research was not funded by the university is

indeed a bone of contention between academics and management. All the four Zimbabwean public universities in Garwe's (2010) study experienced grave financial challenges and allocations they got from Treasury were way below the requirements of the institutions. Universities in Zimbabwe are finding it difficult to fund research for their academics or even send them to attend conferences largely due to the economic crunch which has seen public institutions being underfunded. The needs analysis study of Zimbabwe's public universities by SARUA in 2010 found that "in the case of research, the most common priority listed was the need for the Zimbabwe universities to secure research funding" and respondents highlighted that very little research was going on in their institutions due to absence of funding (Kotecha and Perold 2010:40). This confirms Abrahams, Burke and Mouton's (2010:29) assertion that investment in research funding in universities in Southern Africa is scanty resulting in researchers' unwillingness to engage in other, potentially valuable, forms of scholarly communication, that is, OAIRs to self-archive research that has not been funded by the university. This could explain why some scholars were depositing their research elsewhere other than their university repository since they were not motivated to give to an institution which did not invest in their research efforts.

However, as noted in the findings, these academics seem not to realise that when they write grant winning proposals, they use institutional affiliation, that is, the name of the university, in order to be considered for award of the funding. They also use the university's time and resources in conducting the research. So there is a need for both parties (university and academics) to engage each other and resolve this difference amicably with the goal of increasing visibility of research being churned out by scholars in these universities and ultimately influence the ranking of the institutions. Getting a cue from the words of directors of research of institutions that were offering a cash incentive for submitting research material to the research office which saw them realise increased deposits, it would be advisable for those universities that have not done so to offer an incentive to their scholars for depositing research they have not funded.

> In the absence of any specific or financial incentive, academics can feel little motivation to provide even bibliographic details of their academic work especially when they see incentives are available at other institutions (Jain 2011:131).

In the study, it was also found that for those respondents who had deposited their works to the repository, most (82.4%) did not deposit themselves but had someone do it for them while only

17.6% did it on their own. The deposits were mediated by librarians, the research office, Library ICT technician, faculty representatives and chairpersons of departments respectively. In the library, as confirmed by library directors and faculty/IR librarians, deposit of materials was the responsibility of IR librarians, faculty librarians, systems librarian, senior library assistants and in isolated cases academics (champions) self-archived. So in essence academics in all the public universities in Zimbabwe do not self-archive, as per the actual sense of the word (that is, do it yourself), but experience mediated archiving of their materials by the library. They are not actively involved in uploading their works to the repositories. In 2008/9 the Carnegie Mellon University implemented an OA repository named Research Showcase and deposits are mediated by a Research Showcase Outreach Coordinator (Troll Covey 2011).

The library directors justified their stance of non-involvement of academics in uploading content by opining that the academics were not yet fully skilled and were hesitant to do so. They also indicated that they are still struggling to convince them to submit papers, so they would rather focus on getting their support first and once indications of readiness are visible, they would show them how to deposit on their own. This assertion is supported by the finding that 55.9% of academics indicated the librarian prefers to do the archiving, 11.8% said it is time consuming while 32.4% do not know how to do it. The librarians demonstrated lack of confidence in the ICT skills of the academics whom they assumed to be technophobic yet they have self-archiving experience in other venues other than the IR (Kim 2007: 4.3 self-archiving experience paragraph 1). On one hand, it is important that the librarians proceed with caution in the development of the repositories to avoid inaccuracies in capturing the metadata of the works. Allowing academics to deposit on their own at this early stage could present challenges for the IR managers in terms of ensuring accuracy in deposit of self-archived records since faculty have been found, in most studies, to be inaccurate in completing metadata fields (Geisecke 2011). The terminology used in IR software, such as, DSpace and ePrints, for the deposit and management interfaces can be confusing and inappropriate for the scholars and librarians while the deposit process can also be tedious and frustrating, particularly where the user is expected to click through a number of screens (Mckay 2007). Therefore, attention has to be paid to the needs and experiences of depositors.

On the other hand, the fact that the same academics are self-archiving their research on personal websites and other online repositories such as Researchgate is an indicator that they have the skill to self-archive. The cautionary approach adopted by the university librarians not to allow academics to self-archive can be an impediment to acceptance, use and growth of the repositories. Therefore, they have to quickly change their mindsets, get rid of their fears and encourage academics to actively participate in the population of the repositories by self-archiving from their offices as soon as a publication is ready for upload. Participation by the scholars will instill a sense of ownership of the repository in them and could, in addition to other incentives, motivate them to submit and deposit their works and ultimately see the repositories succeeding. Therefore, there is need for training.

Regarding lack of knowledge of how to self-archive 86.8% of academics were willing to attend training sessions so that they could gain knowledge and understanding of the IR concept and be skilled in self-archiving. This result is in concurrence with the findings of a study by Kyriaki-Manessi et al. (2013:783) which explored faculty attitudes towards the IR and self-archiving where 82% of respondents were willing to participate in an informative seminar and follow the self-archiving procedures but showed a low rate (17%) of trust for the library to archive for them.

For this study, a few respondents indicated that they did not have time to attend training sessions. The issue of time was also raised as a reason for not self-archiving by 11.8% of the respondents. This finding corresponds with Cullen and Chawner's (2011) finding in their study of attitudes and behaviours of scholars and researchers drawn from all research active faculty in New Zealand's tertiary education institutions, that lack of time, lack of awareness and lack of encouragement were major constraints for non-depositors. Academics have busy schedules which do not allow them to waste time, therefore, they tend to resist activities that are costly to them in terms of time. This view is shared by Foster and Gibbons (2005:3) who found in their study, that academics felt overworked, resented clerical work and "any additional activity that cuts into their research and writing time." They may not feel like depositing their research to a 'self-service' site as they may view the activity as time-consuming and at times may be reluctant to learn to use a technology they will not use that often (Geisecke 2011). "They may be happy to contribute content but are reluctant to do it themselves" (Jain 2011:131). The UTAUT construct of effort expectancy significantly influences the attitude of the scholars towards their content deposit behavior. This

scenario requires the library to be proactive and mediate deposit of content generated by scholars who feel that self-archiving is an unnecessary inconvenience so that all the intellectual output of the institution is captured in the repository. However, the institution has to tirelessly encourage the scholars to participate and self-archive their works.

Ten likert scale items were used to determine factors that motivate (or would motivate) scholars to deposit their works in the repository. From the likert scale a mean value in excess of three was taken to mean that the item was considered to be a significant motivator for deposit. All the listed factors (Table 5.9) were found to significantly motivate the scholars to deposit.

Scholars engage in scholarly publishing for purposes of publicising, enabling access to and enhancing trustworthiness of research (Drott 2006; Kennan and Cecez-Kecmanovic 2007) and in addition, for academic reward and professional recognition; so the above motivating factors can be categorized into these purposes. Accessibility in this regard is the extent to which scholars "perceive self-archived materials to be available in a stable manner, over time" (Kim 2010:1911) and in this study these factors include; *to make my research available to my students and colleagues* and, *a good way of preserving my materials and listing my research output*. Publicity, refers to the "extent of perceived readership and citation rate of self-archived materials" (Kim 2010:1911) and for this study the factors include; *as a way of increasing exposure to their work* and, *citation of my materials and impact factor increases*. Trustworthiness is to the level to which scholars "perceive self-archived materials to have credibility" (Kim 2010:1911) and in this study the factor is *My work is protected from plagiarism*. Academic reward is the level to which the scholars perceive self-archiving to influence tenure and promotion, therefore, the factor *increases chances of tenure and promotion* falls into this category. Professional recognition refers to the degree to which scholars perceive self-archiving research work to increase visibility in their field and in this study factors related to this include; *it is one way I can increase my reputation* and *My work is published alongside other high quality research.*

Kim (2007) carried out a survey on 67 professors whose materials were deposited in the DSpace IR of ABC university, in the USA, and found that the professors were motivated to deposit their research in the IR by the fact that accessibility of their works would increase, through long term preservation and an increased opportunity to make them available to peers. Publicity factors were also found to significantly motivate them to deposit as well including; wider readership, increase

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in potential impact of their work and knowing the usage statistics. The other factor was professional recognition through increased visibility and increased citations. In this study, the factor, *to make my research available to my students and colleagues* was the most important motivating factor, while Kim's (2007) study found the most important motivating factor to be the capability of the IR to provide citation statistics, which in this study was, *citation of my materials and impact factor increases* which ranked 3rd but was equally very important. This finding suggests that Zimbabwean scholars will be motivated to deposit their research in their universities' repositories by intrinsic motivating factors including; increased visibility, recognition and impact in their disciplines (Swan et al. 2005; Foster and Gibbons 2005; Kennan and Wilson 2006). Several recent studies have shown that OA literature, in a variety of disciplines, is cited more than literature published in traditional closed-access forums (Fitzpatrick 2012:353; Panitch and Michalak 2005:5). Pandita and Ramesha (2013:56) in support of this fact proffer that a manifold increase in OA journals citation and impact factors is being experienced. The UTAUT variable 'performance expectancy' will significantly motivate Zimbabwean academics to deposit their research in their universities' IRs. Therefore, the OA movement provides an opportunity for institutions of higher learning to reconsider the practice of valuing and measuring knowledge. The construct of social influence represented by the statement; *My colleagues are contributing*, will moderately influence the deposit behavior of Zimbabwean scholars. Contrary to this finding, Cullen and Chawner (2011:469) found that academics and scholars in New Zealand had not embraced the idea that depositing their research in OA platforms would result in increased awareness by one's peers and potentially high citation rates.

It was also interesting to find that 53.5% of respondents had searched for information in an IR while 46.5% had not. The majority (91.2%) said they would recommend their peers to use IRs in order to provide access to information, to share and disseminate information, to deposit and store one's works and for visibility and awareness. This finding shows increased awareness and appreciation, by academics and scholars in Zimbabwe's universities, of the role of institutional repositories in scholarly communication. The scholars appreciate that they can find valuable information in these repositories and their preferences for materials to be incorporated in the repository showed that peer reviewed articles had high priority (87.7%) followed by theses and dissertations (76.5%) then conference papers (58.8% and, though not very popular, teaching materials (36.9%) and datasets (16% 30). Non-peer reviewed articles and articles awaiting peer

review were least preferred (11.2% for each). Other suggested material types included past examination papers and textbooks. This finding reflects the importance attached to reputation, credibility and reliability of research by academics and scholars in scholarly communication. Scholars are concerned and influenced by what the significant others (peers) in academia will say about their works. The construct 'social influence' in UTAUT will, therefore, influence their behavior towards preferred contents of an institutional repository and ultimately determine their acceptance or rejection of repositories. So quality is at the heart of scholarly communication and this is ensured through peer review, that is, rigorous scrutiny of results by colleagues in the discipline. The content in the repository will also reflect the quality of research being produced by scholars in an institution, hence the suggested list of repository contents by scholars. The librarians expressed that in considering the content types to include in the institutions' repositories, they were wary of quality issues, an element which shows that their decisions were influenced by the values held by the scholarly communication community. The fact that 53,5% of scholars had searched for information in the repositories and 91% said they would recommend their peers to use the repository shows that the scholars and academics in Zimbabwe's universities have confidence in the repositories for having materials of acceptable quality. This raises hopes that chances of the academic community accepting and actively participating in populating the repositories are high.

6.3.1.4 Research deposit policies

Participation by contributors of content in populating the repository is one of the very important indicators of success of an IR (Thomas and MacDonald 2007). Universities in Zimbabwe, as indicated in the findings mentioned earlier, face a daunting task of populating their repositories in order to get a return on their investment in IR establishment. The study found that five universities had OA/IR policies, two had draft OA/IR policies and one was still working on it. An IR policy should inform and guide all stakeholders in the institution on what is expected of them in contributing to the success of the IR. Like most research funders, the universities have instituted deposit mandates for their scholars and academics. A mandate policy creates awareness amongst the institution's stakeholders of the existence of the IR and the value of opening access to scholarly works to a wider readership (Little 2012:65). A significant finding was that while policy makers (directors of research and library directors) indicated that it was mandatory for scholars to deposit research output of university funded research, most academics and scholars (43.8%) did not know if their institution mandated them to deposit their research, while 32.1% thought there was no

mandate. Only a few (25.1%) knew of the mandate. Sixty percent of the IR/faculty librarians knew about the mandate while 32% did not know. The mandate is enshrined in both the research policies and OA/IR policies but the policy documents were not readily available on the universities' websites for the academic and research community to access them. These mixed responses indicate that the universities' administrations have not taken it upon themselves to publicise the policies yet they require compliance from a community that is not informed. A policy support system is required in order to educate academics and scholars on the requirements of the policies. According to Cryer and Collins (2011:104) several health sciences libraries in the USA established NIH Public Access Policy support programmes whose services included "one-on-one researcher consultations, online guides or Web sites, printed or printable handouts, group training sessions and third-party submission services." The authors give an example of the Duke university policy support programme whose website provides a detailed frequently asked questions column on the mandate "including an outline of when compliance is required, a discussion of who is responsible for compliance, and a listing of various methods for compliance" (Cryer and Collins 2011:104). Since such documents, if handed out to individuals as hard copies, can easily be forgotten, it is recommended that they make the documents available on the universities' websites for all to see and access whenever they are needed.

The deposit mandates of the universities were subject to publisher permission as evidenced by an extracted statement from an OA/IR policy document of one of the universities, which says; *"Requires that a record of research output funded by the university be deposited in the ...institutional repository...that full-text of submissable outputs be exposed as soon as publisher restrictions allow"* (MSU n.d.). It is interesting to observe that, of those who knew about the existence of a deposit mandate, very few academics and scholars 12.8% knew that the mandate was subject to publisher permission and only 37% were aware that their publishers allowed them to deposit their research in the IR on expiry of the embargo period and those who did not know said they were not sure of the agreement. The scholars demonstrated that they do not take time to read both their institutions' and publishers' OA policies to know what is permissible and what is not. On the other hand, the universities in Zimbabwe are not educating their academics and scholars on the policies of the institution regarding research and also sensitizing them about publisher policies. "The publisher's open access policy determines whether or not faculty have the opportunity to self-archive an article and, if so, the parameters of that opportunity" (Troll Covey

2009:234). A study by Troll Covey (2009) to understand self-archiving practice by scholars at Carnegie Mellon found that in the disciplines of chemistry, mechanical engineering, chemical engineering and biomedical engineering, self-archiving is prohibited. So it is important that scholars understand the self-archiving policies of their publishers to ensure that materials they self-archived, in the event that the libraries allow them to do so, align with publishers' policies. Troll Covey's study (2009) found that a majority of articles that scholars at Carnegie Mellon self-archived on personal and departmental websites could not be harvested for the repository because of lack of compliance with publisher policy.

Another significant finding related to mandating deposit of research was that the tenure and promotion conditions of all the Zimbabwe's public universities do not require deposit of research materials in the IR as confirmed by the directors of research. However, of interest was the discovery that only 27.8% of academics knew that there was no requirement while 46.5% did not know if the conditions required them to do so or not and 25.7% thought there was a requirement. Some of the academics explained that the conditions were concerned with publication and community service. This result shows that the academics, after signing their contracts of employment, hardly revisit or read the staff handbooks which stipulate the conditions of service. Therefore, it would be prudent if the university administration could make the handbook available on the university website for ready access and consultation by the university community.

However, if the universities are serious about increasing visibility of their institutions and intellectual output, on the international arena, they should consider tying deposit of works in the repository to tenure and promotion. With such a mandate, deposits are likely to increase since the universities have a high number of researchers and academics who are still in their prime years of research and publication and at the same time would like to be tenured and promoted. Given that the institutions are struggling to populate their repositories as evidenced by the statistics of the number of items held in the repositories where the oldest repository is nine years old but has 121 items, another is seven years old with 401 items, two are six years old with 394 and 450 items respectively, two are five years old with 37 and 101 items respectively and, three are four years old with 50, 85 and 175 items respectively. The content deposit levels are quite low, so it is recommended that the university administrators think in other terms (a motto of NUST) and consider tying deposit to tenure and promotion conditions so that they get a return on investment

in IRs and research which they fund. This also calls for IR/faculty librarians to make themselves visible by promoting, following-up and assisting authors in uploading their works for a period of two to three years until the behaviour is imbibed (Sale 2006:11) to ensure 100% success of the IR.

Another finding was that 68.9% of scholars and academics had not discussed copyright transfer agreements with their publishers and only a few (31.1%) had done so. In their explanations for not discussing the copyright agreements some said they had not bothered about it, they publish with OA journals while other indicated that the publisher retained copyright. A study by Carter, Snyder and Imre (2007) on attitudes and awareness of intellectual property issues by library faculty found that seven percent respondents had negotiated with their publisher(s) for reasonable intellectual property rights, and only one person failed when they attempted to negotiate. The scholars in this study echoed mixed sentiments on copyright ownership with some saying that the author should retain copyright, others said it should be retained by the publisher while others advocated for co-ownership by the author and publisher. This finding is a reflection of lack of knowledge and understanding by Zimbabwean scholars of their intellectual property rights. Troll Covey (2009:249) proffered that many scholars and academics simply lack knowledge of publisher policies and scantily understand copyright, that is, they are not adequately versed with their intellectual property rights. They do not know what rights they are being asked to transfer to the publisher, at what point in the publishing process the transfer occurs, what rights they retain as authors and what the publisher expects of them with reference to depositing, sharing, redistributing or republishing the work (Wirth and Chadwell 2010:347). Copyright transfer agreements also usually give some rights back to the author, so it is important for authors to pay attention to what rights they have retained in that they would know what they can continue to do with their own work (Smith and Hansen 2010: transfer of rights). The study found that some of the universities developed IP policies which guide researchers on the issues of ownership, therefore, it follows that they need to educate the academic communities about their IP rights.

The self-archiving conditions of publishers are varied even for works published by the same publisher, therefore, it is recommended that scholars should familiarise themselves with publisher policies. Since university libraries are in the forefront of promoting scholarly communication it is paramount that Zimbabwe's public university libraries take a leading role in sensitising academics and scholars of their rights as authors and encourage them to retain copyright of their works. Most

(80% and mean 3.08) of the IR/faculty librarians were in agreement that academic libraries should educate faculty about intellectual property issues. The universities could draft contract "addenda" that their scholars and academics can use and rest assured that they retain specified use rights regardless of the language of the publisher's standard contract. These addenda spell out the rights retained by the author and they are attached to the agreement which is returned to the publisher (Smith and Hansen 2010: negotiating). The libraries should increase scholars and academics' understanding of copyright law and ensure that scholars' self-archiving practice is aligned to publisher policies (Troll Covey 2009:247). Therefore, librarians have to be proactive by disseminating policy information through workshops, availing policy documents on both the university and library websites. They should also provide information on resources, such as SPARC, SHERPA-RoMEO, for locating publisher policy information.

For the services which the universities assisted the academics and scholars with in order for them to understand the repository, the study found that the most popular services offered were 'instruction on how to use the IR' (62.6%) and 'storage and preservation of my work' (53.8%). Services that the institutions did not assist with included; '*assistance in negotiating with publishers*' (80.9%), '*CV services with links to my publications*' (80.1%), '*citation counts and impact assessment*' (63.5%), and '*research assistance in locating other useful publications in the IR*' (59.7%). This finding shows that the institutions seem to be neglecting the most pertinent services in research and scholarly publishing/communication from which they benefit in terms of visibility, access and wider dissemination of research to as wide an audience as possible and resultantly their ranking. The popularity of '*Instruction on how to use the IR*' could be attributed to the fact that, as mentioned by the library directors, Zimbabwe's universities are currently focusing on promoting the IRs in an endeavor to get buy-in from the academics and scholars in order to populate the repository, hence, the emphasis on training them on IR use. The second rated service was 'storage and preservation of my work'. This service is related to instruction on how to use the IR because part of the training involves self-archiving which is a component of storage and preservation of materials. So it can be said that the universities are making strides in capturing the intellectual capital of the institution for posterity lest they lose the research due to brain-drain and other reasons of course, which could be attributed to the persistent economic crunch facing the country. So the universities should be commended for succeeding in fulfilling the functions of

scholarly communication which include; registration, certification, awareness or dissemination and archiving (Roosendaal and Geurts 1997; Ware and Mabe 2012:14) through the repositories.

Similarly, a study by Kim (2011) on factors that motivate scholars to participate in the development of repositories, found that potential contributors to the repository "considered digital preservation to be a primary reason for contributing to IRs in the future". On the other hand, non-contributors did not trust the commitment of the IR to long-term preservation against the backdrop of inadequate financial and staff resources of the university libraries. Similarly, Zimbabwe's university libraries are short staffed as evidenced by their failure to recruit additional staff to manage the repositories due to a freeze on recruitment imposed by government. The economic crunch being experienced by the country currently has also impacted on funding of universities and library budgets which continue to dwindle yearly. Therefore, it becomes questionable if the universities' IRs will uphold the ethos of long-term preservation of the intellectual output. "Stewardship is easy and inexpensive to claim; it is expensive and difficult to honor, and perhaps it will prove to be all too easy to later abdicate" (Lynch 2003:334).

A significant finding was that 80.9% respondents indicated that they are not assisted in negotiating with publishers. As mentioned earlier, many scholars are not adequately versed about their intellectual property rights and have a scanty understanding of copyright. Consequently, when they sign copyright agreements with publishers, they tend to cede all their rights to the publisher instead of retaining some of the rights so that they have control over what to do with their works. When scholars give publishers exclusive rights to their publications, institutions may find it difficult to archive the research output from their institutions' employees. To exacerbate the situation some of the universities, as reported earlier, require their scholars to seek copyright clearance from their publishers on their own, a scenario which is deterrent to article deposits by the scholars since they could resent the idea of following up on publishers for the benefit of the university.

> Several institutions and higher education organisation have drafted contract "addenda" that authors can use to be certain that they retain specified use rights regardless of the language of the publisher's standard contract. These addenda are simply attached to the agreement when it is returned to the publisher and they enumerate rights that the author retains (Smith and Hansen 2010: negotiating).

So universities in Zimbabwe can go the same route of drafting contract addenda for their authors to use for negotiating with publishers for retention of some of their intellectual property rights and in turn facilitate archiving of articles in the institutional repository with limited or no restrictions.

> In many cases, publisher policies that purportedly allow open access seem designed to actually discourage self-archiving practice. The work required to meet the various picayune [petty] conditions and restrictions increases the time it takes to self-archive an article. Complying with embargo periods, which differ not only from publisher to publisher but also from journal to journal published by the same publisher, means keeping a schedule of what can be self-archived when (Troll Covey 2009:248).

This complicates copyright management for the repository managers. So the institutions have to be proactive by drafting contract addenda for their scholars and nip publisher bossiness in the bud.

'Citation counts and impact assessment' are key to career progression of scholars and academics in the academic sphere. Scholars and researchers need feedback on how their work is being used and the impact it is making on the scholarly communication landscape since they believe that measurement of the value of their research is done through the frequency it is used and cited. The universities can use a researcher's publication record as one criterion by which to assess whether they should receive future funding, eligibility for tenure, promotion and evaluation of the researcher's university department - whose reviews can affect the future existence and funding of the departments (Mabe 2006:59). Evaluation of publications is often based on citations to the articles, the number of articles published and the journals' reputation. This pressure on scholars with regards to funding and career progression is what is known as 'publish or perish' and this syndrome amplifies the many pre-existing motives for authors to publish. By not offering the citation counts and impact assessment of scholars and academics' articles in the repository, the universities are actually demotivating them. Scholars are intrinsically motivated by the idea of sharing their research and knowledge of the impact they are making in their discipline and academia at large. If such a service were to be offered in all the universities, there could be increase in article deposit rates to the IR. This is evidenced by statements made by library directors of some universities (presumably where 36.5% respondents who said citation counts services are offered, are from) who indicated that they announce citation statistics as a way of attracting the inactive academics to participate in populating the repository and this has yielded positive results.

The study found 80.1% respondents indicating that their institutions do not offer them CV services with links to their publications. "For the individuals, the institutional repository acts as a central archive for their work, representing a CV that provides a complete list of their research over the years" (Prosser 2003:167). Zimbabwe's universities do not seem to realise that the IR presents an opportunity for them not to go through the tedious administrative exercise of compiling research output of individual scholars and researchers for purposes of assessment and review for promotion and tenure, and also for attracting funders to their institutions. Offering such a service would most likely facilitate increased deposits of articles in the IR as it also takes away, from the researchers, the burden of keeping a track on their publication record. Whenever, they need to compile their CVs, they would just by the click of a button retrieve the list of publications and add them to their CVs. The UTAUT construct facilitating conditions significantly influences acceptance and use of IRs by scholars in terms of services offered by the institution in publishing, career advancement and scholarly life of the scholars.

The academics (59.7%) also indicated that they did not get research assistance in locating other useful publications in the IR. However, a significant number (40.3%) confirmed receiving assistance from their institutions. This finding shows that the university libraries are making strides in promoting the IRs and are bringing to the attention of scholars the existence of useful research resources in the repository as evidenced by the 40.3% responses. However, more still need to be done to reach the university wide academics and research community since some (59.7%) of them had not yet received research assistance using the repositories, so there is need for faculty librarians, who liaise closely with faculty to upscale their activities and reach out to academics in the respective faculties they represent and assist them to search for literature in the repositories. It can be assumed that after the academics see the richness of the repository and works of their colleagues deposited therein, they will be motivated to deposit their own research so that they share it with students and fellow researchers within the institution and globally and consequently content deposits will increase. Therefore, the social influence construct of the UTAUT model would influence the behavioural intentions of the academics and researchers to adopt and use IRs. Since most of the academic and research staff in Zimbabwe's universities are in their prime years of research and desire to be published and be known in scholarly circles, they are most likely to be influenced by the fact that colleagues, particularly the significant ones whom they have high regard

for, to participate in depositing works to the repository for increased visibility and accessibility and also to be cited.

In terms of challenges with depositing research to IRs, that is, the perceived disadvantages of IRs, seven likert scale items were used to determine scholars' perceived challenges or disadvantages of depositing content in an IR. A descriptive analysis of the findings is shown in Table 5.10 where from a 5 point Likert scale a mean value in excess of 3 was taken to mean that the item was considered to be a significant challenge to deposit of one's works. A significant finding is that three factors were found to be inhibitors of participation by Zimbabwean scholars and academics in populating the IR and these included, in order of significance, *lack of peer review will undermine my work* (3.70), *IRs may breach confidentiality of some data* (3.11) and *IRs risk reducing the value of peer review process* (3.01). The rest of the factors were not significant challenges to deposit and they included, in order of insignificance: *IRs will expose more research to plagiarism, depositing to an IR adds extra workload, IRs are not as easy to use as journal indexes, when everyone deposits there is no competitive advantage*. The finding shows that the scholars attach a lot of value to the peer review process in scholarly communication. Peer review fulfills the quality-control requirement of scholarship and ensures that published materials meet set standards (Ruiz, Candler and Teasdale 2007:503). It is built on the premise that research output would earn more credibility, be more accepted, contribute more towards a society or discipline, command more respect and be more reliable if experts in the discipline (peers) vet its quality by scrutinising, screening and evaluating its content and format (Ocholla 2011:3).

Kim's (2011:251) study which sought to establish factors affecting faculty contribution to the IR found the prevalence of concerns over improper use of scholars' self-archived works coming from scholars who had never shared their works publicly on the internet. However, two respondents in Kim's study highlighted that plagiarism was also prevalent in the print environment so there was no reason to worry about it happening in the web environment. The finding of this study indicates that Zimbabwean scholars do not regard IRs as trusted places for storing their research. So there is a need for the institutions to sensitise the scholars about the IR concept so that the academic community understands their functions since this was one of the explanations given by the respondents that information on IRs had been poorly communicated to them.

The second significant challenge, *IRs may breach confidentiality of some data*. The scholars worried about the security of research data which may contain sensitive information or instances where research participants were assured of confidentiality of information they give to the researcher. This finding shows that university librarians have to conduct seminars and workshops where they can engage academics and scholars and take the opportunity to convince them that the repository will not expose confidential data but only the metadata of such resources will be captured and access can be restricted if the individual researcher so wishes.

The study also sought to established conditions that could facilitate acceptance and use of repositories by scholars in Zimbabwe's public universities (UTAUT construct of facilitating conditions). It was found that the most prompting conditions under which academics would deposit their works in the IR, is *if the integrity of my work is upheld* (69.5% respondents). This element is crucial and the scholars need assurance that their works will not be compromised. However, the DSpace software that has been adopted by all the universities in Zimbabwe for establishing the repositories was designed to operate in an institutional setting and is ideal for planning, building and managing digital repositories for large institutions. The scholars' fears can be forgiven given that, for them IRs are untested waters, therefore, they are justified to be weary of having the integrity of their works compromised by this unfamiliar system of scholarly communication. However, it can be noted that increased citation of OA literature has been reported (Pandita and Ramesha 2013:56; Fitzpatrick 2012:353; Boissy and Schartz 2011:480), so Zimbabwean academics and scholars can rest assured that OA institutional repositories, by increasing discoverability, simultaneously increases impact (Ravikumar and Ramanan 2014:80). Pelizzari's (2004) study found that almost 80% of the respondents requested protection for integrity of their works. This shows that integrity of scholarly works is of critical concern in academia. The condition with the second highest number of respondents (69.5%) was *if they can still publish in journals*. In Pelizzari's (2011:119) study, this aspect had the highest respondents (80%) agreeing to the possibility of them continuing "publishing their works in the journals of their choice, respecting the traditional model of publication."

The third condition with 69% for depositing works was *protection from plagiarism*. As mentioned earlier, the scholars express fear of their works being plagiarized in the web based technology but

in the words of one respondent cited earlier, there is no reason to worry about it happening on the web environment because it is also prevalent in the print environment. Again in Pelizzari's (2011) study 70% of the respondents requested protection against plagiarism. Zimbabwe's university librarians acknowledged that they make mention of plagiarism, creative commons, self-archiving and so on in workshops they conducted on e-resources training and the communication skills courses but training particularly on these issues had not been done (discussed in 6.6). It is, therefore, clear that the communication of this critical issue through the training sessions conducted by the libraries is not effective. Therefore, the universities have to run workshops that are specifically devoted to issues of plagiarism, creative commons and self-archiving in order to increase acceptance of the repositories. Thus, creating a facilitating condition for adoption of the IR technologies.

The issue of interoperability of the repositories is also prominently of concern to the scholars where 65.2% respondents selected *if IR is searchable on the web* as their condition for participation in the IR development. The scholars demonstrated greater concern for visibility and accessibility of their works on the public domain where they can increase their reputation and potentially attract invitations for collaborative research. The issue of citation counts and impact of their research come to fore in this instance. This has been discussed above in this section.

Another finding was that 62.6% respondents would deposit works to the repository *if they can still publish in journals*. A response to this concern can be traced back to Steven Harnad's subversive proposal in 1994 where he advocated for scholars not to agree to withdraw universally accessible pre-print versions of their works from the public eye after acceptance of the refereed version for paper publication. Scholars have assurance that by virtue of depositing a pre-print of an article in a repository which makes it public before submitting it to a journal, the author has leeway to negotiate to retain copyright instead of handing it over to the publisher (Yiotis 2005:158). So the university libraries have to clarify and assure scholars that by depositing pre-prints they will not be prejudiced of the opportunity to publish in journals of their own choice, instead, they are empowered to negotiate with publishers for retention of some of their intellectual property rights. This is so that they participate in populating the repository without fear of rejection of their papers by publishers. A significant number of respondents (54.5%) also indicated they *need assurance of long term preservation*. This has been discussed above in this section under challenges to

depositing research in repositories. Lastly, was the condition *if the material is indexed* (46.5%) with slightly less than half of the respondents setting it as a condition for deposit. Indexing of materials is crucial in that it facilitates discoverability of and ease of access to a work housed in a repository.

6.3.2 Challenges faced by the academics and librarians in contributing to and managing the IRs

Universities in Zimbabwe have made strides in opening access to research generated by their academics and scholars but challenges inhibiting progress in development of institutional repositories have been experienced. This section will discuss the findings of this study in relation to challenges faced by the libraries in populating the repositories. The variables facilitating conditions and effort expectancy inform this discussion. Facilitating conditions as mentioned earlier is concerned with the degree to which someone believes that the institutional and technical infrastructure exists to support use of the system. Effort expectancy on the other hand is concerned with the degree of ease of use of a system.

The study found that four universities had challenges getting support from university management in establishing their IRs because they were skeptical about the issue and one of the librarians expressly said:

> *"Library issues mai* [Mrs] *Tapfuma, you know they are really contentious and it's pretty hard to get just outright support just like that. You just have to keep on toiling and advocating and try to justify yourself. When it came to the IR we had been singing that song…But the previous management were just indifferent, they didn't care less."*

In one institution, they had a challenge with the director of research who was not supportive of OA and took every opportunity he had with the academic community to take a swipe at OA. However, the management in the other four universities were quite supportive, hence they were quick to establish their IRs. These challenges came despite the fact that Zimbabwe's university vice-chancellors, as members of SARUA, had attended the SARUA OA leadership summit which was held in Botswana in November 2007, where OA issues had been addressed for the first time (Abrahams et al. 2008:10), which means that the leadership of the universities were versed with OA issues at the time their own libraries were proposing the adoption of IRs. This finding shows that the universities' management were still not convinced about OA at the time, but in the end, they conceded to the librarians' proposals. Lack of management support can be attributed to the

slow acceptance and growth of institutional repositories in Zimbabwe's universities. Chan and Costa (2005:154) proffered that:

> The most likely reason why authors have been slow in self-archiving their publications is that their institutions do not have a clear policy on why and how their faculty members should participate. This is because senior administrators and policy makers themselves are often unaware of the benefits of OA for their institutions and for their faculty's research impact. Again, this is true for institutions in developing and developed countries.

The study found that the university libraries also faced challenges in getting technical expertise and proper equipment for hosting the repositories, as a result there were delays in establishing the repositories. It was also found that two universities had challenges getting their OA/IR policies approved by management and this stalled progress. However, one of them eventually managed to get the policy approved but the other one was yet to be approved. These findings demonstrate that decision-makers in some of Zimbabwe's public universities lacked commitment to the development of the repositories and remained unconvinced that the IRs were crucial drivers of scholarly communication and would benefit the institution and its scholars tremendously. This "becomes a critical issue in the current period of economic crisis which has seen universities putting in place some cost cutting measures and therefore, threatens [the] IRs' long-term sustainability" (Cassela 2010:211). Therefore, the librarians have to tirelessly continue lobbying for management support and devise innovative ways of getting increased participation from the scholars, such as, tracking citation statistics and other activities which will convince management of the worth of the repository to the institution. It is often difficult to maintain continued support and commitment from these stakeholders (Jain 2011; Pickton and Barwick 2006). "stewardship is easy and inexpensive to claim; it is expensive and difficult to honor, and perhaps it will prove to be all too easy to later abdicate" (Lynch 2003:334).

The findings revealed that in all the universities, content recruitment was a challenge due to fears and misconceptions of OA and IRs held by academics including; copyright, trustworthiness of repositories and plagiarism. On a balanced scale 48% IR/faculty librarians indicated that academics were forthcoming with materials for deposit while 48% said they were not forthcoming. Amongst the ranks of the scholars, there was a higher acceptance and response rate to IRs, with lecturers in the forefront, followed by senior lecturers, professors, research fellows, teaching assistants and staff development fellows. However, some library directors said support cuts across

all levels, therefore, they could not pin point which group was more active than the other, others said the seasoned academics while another said the young junior lecturers. This result reflects that all the academics and scholars across all ranks in Zimbabwe's universities, where they participate, were forthcoming. "Content recruitment is the core of the IR [and] a critical mass is needed to attract users and additional content" (Troll Covey 2011:2). It is acknowledged that persuading faculty to deposit their research in the repository remains a challenge (Mercer, Rosenblum and Emmett 2007) even though most scholars and academics seem to agree on the validity of the principle of OA but several factors influence their decision to accept and use the institutional repository. This explains why deposit of content into the repositories of all the universities was mediated by the library.

In all the universities, academics were not permitted to self-archive except one academic (a champion) in one of the universities who was trained to self-archive. Academics were not self-archiving because the librarians opined that they had not yet reached that stage because the scholars were not fully skilled to do it. The libraries were still grappling with enculcating the culture of depositing articles in the repositories amongst the academics. "Academics may be radical in their thought but they are conservative in their behaviour, and there is a great deal of inertia in the current publishing systems" (Ware 2004:17). A significant finding was that the university libraries also harvest content from online journals and other databases as evidenced by 64% of the IR/faculty librarians who said 'Yes', and confirmation by library directors who indicated that they use the Google scholar alerts and SCOPUS alerts to capture recent publications by their academics and scholars. The university management and librarians have to devise strategies to shift the mindsets of the academics and scholars towards acceptance and use of the repositories and ultimately increase visibility, availability and accessibility of the institutions' intellectual output and obtain a return on their investment.

It was also found that the institutions did not have an enabling environment for the development of the IRs as evidenced by the lack of incentives for scholars when they deposited their works and policies that were not aligned as evidenced by the statement made by one of the library directors that:

> *"But for us we have to go back to the people and try to ask, drum up, beg for the content…So for us to be able to lay our hands on those papers is pretty hard given the environment like what you are saying that they may say looking at the IR policy*

and say no we accept but then other policies and the enabling environment in terms of supporting the IR policy."

As mentioned earlier, two universities offered financial rewards to their academics for depositing their works but one of them withdrew the incentive, while the rest of the institutions did not offer incentives at all. The institutions that offered financial reward for deposit reported increase in deposit rates but for one of the institutions that removed the incentive, a decline in the deposit rate was experienced. The tenure and promotion conditions of all the universities do not require their academics and scholars to deposit their works; deposit of research works was mandatory only for research funded by the institutions but the policies to this effect were not readily available on the universities' websites for the academic communities to access. To exacerbate the situation, the institutions were incapacitated to fund research and as a result, where academics secured funding from other sources on their own, they were not willing to deposit such research to the institution because they believed the institution would not have contributed to the research, thus making it difficult for the libraries to populate the repositories. This clearly illustrates that the environment in which the libraries and the repository operated were not encouraging for content recruitment by the library.

However, mandating is regarded as somewhat of a slow and incremental process (Mercer, Rosenblum & Emmett 2007:191; Sale 2006) and academics have been reported to respond negatively to compulsion (Jain 2011), hence the low response to mandated deposit by Zimbabwe's scholars and academics. Studies have suggested that compliance is higher if OA is mandated or if it is linked to a direct advantage for authors (Caruso Nicol and Archambault 2013:19). The two universities that were offering financial rewards for deposit reported increase in deposit rates but the moment the incentive was withdrawn by one of the institutions, a drop in deposits was experienced. Therefore, a university mandate void of 'incentive structures' is bound to fail (Jantz and Wilson 2007). A study by Gargouri et al. (2012) to test the Finch hypothesis on the green OA mandate effectiveness found that strong mandates attract more deposits, that is, they generate deposit rates of 70%+ within two years of adoption." The Universite de Liege of Beligium ties deposit to research performance evaluation and the deposit has to be done immediately upon publication devoid of waiver. This was found to be the strongest mandate model.

Copyright clearance and permissions processing were found to present challenges for the libraries thereby, slowing down progress in populating the repositories. A significant finding was that in all the institutions the libraries had the responsibility for copyright clearance and 68% of IR/faculty librarians indicated that they engaged in copyright clearance activities with publishers in order to make published faculty research available in the IR. They used mostly the SHERPA/RoMEO and SPARC platforms, the copyright Act, Copyright clearance centre and the OAKlist to verify permissions, they also sought copyright permissions from authors and publishers. In one of the universities the library worked closely with two members of staff, one who is an IP expert and the other was in charge of making sure that all research done in the institution was patented whenever they had to check for copyright permissions. Three universities required their academics to ask for permission from their publishers. This can be assumed to be one of the reasons they were having challenges getting content from the academics. Despite these efforts, the libraries reported having challenges with copyright clearance and permissions processing particularly, in order of their popularity, obtaining publisher copyright policies (48% respondents), limited copyright expertise (44% respondents). Thirty-six percent of librarians selected *interpreting publisher policies, determining the identity of the publisher* (32%), *limited staffing for copyright clearance activities* (28%), *creating a scalable model for copyright clearance* (20%) and *limited time for copyright clearance activities* (20%) respectively. These challenges were rubber stamped by research directors who complained that the libraries were taking too long to process copyright permissions and clearance.

This finding is an indicator that there is a gap of skills to successfully process copyright permissions. "OA work in libraries encompasses a shifting structural, technical, legal, interpretive, ethical, and political framework" (Potvin 2013:69).

> Also, as the use of open licenses (such as Creative Commons) become more commonplace, it will be necessary to understand how to publish, re-use, adapt and so on, especially when multiple licenses are at play (Czerniewicz 2013:10).

A significant finding was that 68% of IR/faculty librarians said they train academics on issues of plagiarism, creative commons, self-archiving and so on, while 32% said they do not train them. Research directors indicated that the issues were mentioned in training workshops conducted by the library, such as, e-resource training and the communication skills courses but training

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particularly on these issues has not been done. Two universities have the Turnitin anti-plagiarism software while another two hold anti-plagiarism workshops where attendance by academics and scholars was said to be really good. Amongst those who do not train, it was interesting to learn that in their institution research issues were the purview of the research and postgraduate studies unit and could not be discussed by the library but one librarian said that they were engaging Africa University for training needed on IP issues. Of those librarians who confirmed that they train scholars, 64.7% acknowledged that the scholars were able to demonstrate an understanding of their rights as authors. They explained that *"some are able to clear with their publishers before sending their papers for uploading. But generally there is a lack of understanding of their rights."* However, the finding in 6.5.4 showed that academics and scholars in Zimbabwe's universities still held fears of having their works plagiarized if they deposited them in the IRs. Sixty-nine percent indicated that they would deposit their articles if they were protected from plagiarism. Education of scholars by the universities on such issues is a necessity.

6.3.3 Strategies to overcome the challenges

This question sought to establish the strategies that can be employed to overcome the challenges to the acceptance and use of OA/IRs by scholars and researchers in Zimbabwe's public universities. This research question is largely informed by the UTAUT variable 'facilitating conditions'. Facilitating conditions is concerned with the "degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al. 2003:453).

Lack of management support was found to be one of the challenges faced by half of the universities in Zimbabwe in their efforts to establish institutional repositories. Chan and Costa (2005:154) proffered that "this is because senior administrators and policy makers themselves are often unaware of the benefits of OA for their institutions and for their faculty's research impact". IR development and management requires adequate funding, sustainable support and commitment from the university management and scholars (Jain 2010). The requisite technological infrastructure to support implementation and maintenance of the repositories has implications on operating costs that will be incurred. That is, the costs of staff involved in the management and maintenance of the system, vendor fees and procedures involved in supporting preservation plans,

such as, system backup. Without commitment and support from management it would be difficult for the university libraries to succeed with their repository projects.

As mentioned earlier, "content recruitment is the core of the IR [and] a critical mass is needed to attract users and additional content" (Troll Covey 2011:2). One of the library directors said that they would like to enhance content recruitment and increase the rate of submission of papers; this was said on the backdrop of the Minister of Higher and Tertiary Education, Science and Technology Development's emphasis on the need for increased visibility of universities. A significant finding was that five universities had OA/IR policies while one was still working on but the rest did not have policies. An IR policy should inform and guide all stakeholders in the institution on what is expected of them in contributing to the success of the IR. Deposit mandates are regarded as one strategy of promoting an institution's repository.

The OA/IR policies of the five universities had clauses mandating the university community to deposit all university funded research to the IR which were in alignment with the research policies of the institution (as echoed by research directors in 6.5.4). Therefore, universities in Zimbabwe should develop their policies following the Scholarly Communication in Africa Programme's (SCAP) recommendation 3.1 that universities in Southern Africa should develop mandatory institutional OA policies which "align with each other and with funder mandates" (Swan, Willmers and King 2014b:5) as a way of operationalising OA. The SCAP emphasized alignment of policies so that authors are not confused by conflicting demands particularly when they receive funding from several sources. It was found that 60% of the IR/faculty librarians were aware of the existence of the mandate for academics and scholars to deposit all research funded by the institutions. Knowledge of this should empower and give them confidence to vigilantly pursue academics requesting for their research articles to be deposited in the repositories.

> It appears that adopting the new tools entails some perceived risk and effort, as it does with providing OA to research, even when the risk and effort are illusory, institutions and funders may first have to adopt new rules to induce people to change their behaviours so as to begin to enjoy the benefits (Harnad 2011:37).

It was interesting to find that 64% of IR/faculty librarians had adopted a strategy of harvesting content of publications by their academics from journals and other online databases as a way of populating the repositories. They made use of the Google Scholar and SCOPUS alerts services

and, other means to capture recent publications by their scholars. The alerts services would inform them of new publications by their academics. This shows proactivity and commitment by the universities' libraries to ensure success of the IRs and get maximum return on investment. The university libraries are also encouraged to continue archiving articles on behalf of the academics and scholars for a period of approximately five years, otherwise there could be a decline in deposits if they left the scholars to self-archive.

The career advancement culture in academia favours the practice of Scholars publishing in prestigious journals which are associated with exclusivity; difficulty getting published has a higher value attached to it, giving the impression that the more exclusively distributed a publication is, the higher its value; an attitude which is benign and self-defeating (Fitzpatrick 2012:355). If universities in Zimbabwe are committed to the development of the IR system and increasing visibility of the institution's research output, they have to adopt policies that promote publication by scholars and academics in OA and IR platforms and also consider strengthening and enforcing deposit mandates. This view is supported by the IR/faculty librarians where the majority (mean 3.88) of them agreed with the notion that academic libraries should encourage campus administration to adopt tenure and promotion policies that support a faculty member's decision to publish in OA sources. Seven library directors had mentioned the issue at various fora in the university but one of the universities had not taken a step in doing that. Two library directors, in passing comments on the OA/IR initiative in Zimbabwe, said they wanted to influence management to adopt tenure and promotion conditions that support deposit in the IR as a way of increasing deposits to the repositories.

Caruso, Nicol and Archambault (2013:13 citing Björk and Paetau, 2012) purported that more than 100 universities in Europe had issued mandates requiring authors who had received funding from them to deposit their works in green OA. A study by Gargouri et al. (2012) found a 60% uptake level in universities that had instituted mandates a few years back in comparison to an uptake of around 15% in universities that did not have a mandate. This finding demonstrates the determination of Zimbabwe's libraries to ensure increased uptake of the IR initiative by advocating for the universities management to tie tenure and promotion conditions to IR deposits. It was quite interesting to realise that the Pro-Vice chancellor of one of the universities mentioned in a strategic planning meeting, as reported by the library director that, *"…we don't really need to over*

emphasise. You have stuff and you want to be tenured, we have to look at our IR." A director of research from one university also expressed that she had recommended that if anyone wanted to be tenured or promoted, they should have their articles in the IR but management had not taken up the recommendation. A mean of 3.52 of the IR/faculty librarians agreed that academic libraries should encourage faculty to deposit scholarly work that they do not intend to publish via traditional means (such as working papers, datasets, or multimedia presentations) into open access digital repositories. This would ensure that all the intellectual capital of the institution is captured, shared, disseminated and stored for posterity.

Awareness of the importance of endorsing and implementing national OA strategies is increasing among governments globally but most governments address the OA issue through informal instruments such as their research funding agencies' guidelines (Caruso, Nicol and Archambault 2013). A significant finding of the study was that the ZULC took a step forward to advocate for a national OA mandate and management of open data through a workshop it hosted in November 2015 to formulate a draft OA policy for Zimbabwe. Stakeholders such as the Minister of Higher and Tertiary Education, Science and Technology Development, the Zimbabwe University Vice-Chancellors Association (ZUVCA) and the Zimbabwe Council for Higher Education (ZIMCHE) were invited to participate. However, the ZUVCA representatives did not attend the workshop. It was expected that the stakeholders would drive the advocacy for OA in higher offices such as the Ministry of Higher Education which is responsible for any development in higher education. The United States (US) and Brazil proposed legislation that directly address OA and the US became the first country to adopt a national OA mandate (Caruso, Nicol and Archambault 2013: i). In the US, the Consolidated Appropriations Act 2008 was the basis on which the National Institutes of Health (NIH) OA policy was developed and quite a number of countries in the European Research Area (ERA) have instituted national policies, programmes and principles related to OA. For example, in the UK, the Higher Education Funding Council for England (HEFCE) and the Research Councils UK (RCUK) were pushing for increased access to publicly funded research, thereby putting the UK in the forefront of developing OA to peer-reviewed publications (Caruso, Nicol and Archambault 2013: i). Brazil introduced a bill in May 2007 which proposed to require all public institutions of higher education and research units to establish IRs, so that all technical and scientific research outputs would be deposited and made freely available online (Caruso, Nicol and Archambault 2013:4). Therefore, Zimbabwe's universities are not fighting a lone battle by

advocating for the institution of a national OA policy, it is actually for the good of the country. Given that Zimbabwe's economy is in the doldrums, more benefits lie in enabling increased access to research output which will accelerate and broaden opportunities for adoption and commercialisation of research findings, resulting in greater returns on public investment in research and development (R&D). In turn, this could lead to increased "productivity in certain sectors of the economy and the potential for the emergence of new industries based upon OA content" (Houghton and Sheehan 2009 cited in Caruso, Nicol and Archambault 2013:3). The Ministry of Higher Education pledged its support for the initiative by ZULC to push for the country to formulate a policy.

Some countries have established national archives for OA content or harvesting systems that can access OA material through national portals (European Commission 2011; Caruso, Nicol and Archambault 2013:3). A significant finding was that the Research Council of Zimbabwe (RCZ) had established a repository of all research that is generated within the country particularly research it had funded, named the National Repository Trust. The RCZ's intention is to provide access to research articles that are contained in Zimbabwe's universities' repositories. The universities will give the metadata of the contents in their repositories and then provide a link on their repository which will be visible to researchers outside the country. Library directors suggested that OA should be embraced at the national level and ensure that publicly funded research output is easily accessed. One library director advocated for establishment of a strong partnership between the RCZ and institutions of higher learning in developing standards and guidelines for IRs at a national level and suggested that the RCZ should lead in developing a national policy pertaining to research output from Zimbabwe. It is envisaged that these are baby steps towards the establishment of a national archive for OA content in Zimbabwe.

In order for the IR initiative to succeed in universities, the libraries "should provide guidelines instructing authors on how to deposit items; promote repositories and OA policies amongst academics, management, staff and students" (Caruso, Nicol and Archambault 2013:27) through a variety of strategies. IR/faculty librarians in Zimbabwe's universities used the following strategies to create awareness of the IR by the academic community; OA awareness campaigns, advocacy at meetings such as faculty board, door to door office visits, training workshops, posters and pamphlets, social media platforms, library website, use of champions, email alerts and mandating

deposit. One of the universities used induction seminars for new staff where the library is given a slot, they celebrated the annual OA week where library staff spent the week talking to students, researchers and lecturers about OA. They also held workshops during the OA celebrations where they invited lecturers and students to raise awareness of OA and the IR. Three universities had invited renowned academics and OA champions such as, Professor Mashingaidze from Chinhoyi University of Technology, to talk to academics about archiving research output in the IRs. The Zimbabwe University Libraries Consortium (ZULC) had even invited the professor to talk to librarians about the concerns of academics. Jantz and Wilson (2007) proposed that academic libraries should take a market segmented approach to deliver targeted services. Zimbabwe's university libraries utilised the services of early adopters of the IR technology, as change agents who could influence their colleagues to follow suit. Mercer, Rosenblum and Emmett (2007) in their paper tell the story of the Kansa University where they involved early adopters in the planning and development of their ScholarWorks repository. The early adopters were asked to identify scholars from across the university, who could "learn to use the system, submit some items, and provide feedback to refine the IR" (Mercer, Rosenblum and Emmett 2007:193). This approach tallies well with the social influence construct of the UTAUT model which theorises that individuals adopt certain behaviours because of the influence of peers or the significant others.

It was found that in one university, in 2012/2013, recognition was made of those scholars who contributed the highest number of articles to the repository by publicising them on the library's social media platform alert pages. This got the attention of other scholars and aroused interest in them and they started submitting their work to the library. Another university presented usage statistics at the Vice Chancellor's briefings and the library committee meetings which were chaired by the Pro-Vice Chancellor so that they entice the academics to cooperate. They also used article citation statistics as a way of motivating others to deposit. "Data on downloads from institutional repositories or citation counts for open access articles can demonstrate to faculty the value of open access" (Troll Covey 2009:249). Seven libraries also marketed the IR at the various university committee meetings such as faculty board, Senate, Council and the library committee and it was through such meetings that two libraries succeeded in convincing the university senate to mandate deposit of publicly funded research to the IR. Giesecke (2011:537) tells the story of the University of Nebraska-Lincoln libraries who hired a coordinator for scholarly communication who happened to be the former director of the University of Nebraska Press. The coordinator used the strategy of

appealing to the self-interest of the scholars by using monthly download statistics on the use of their research as a way of convincing them of the value of the repository. The coordinator informed the scholars that citation of their works would increase due to their visibility on Google and Google scholar. According to Giesecke (2011:537) when the active scholars began to get feedback on download statistics of their articles, they began to spread the word to their colleagues about the statistics they were getting. Scholars then, began to compete with each other for the most downloads and the scholars began to promote the repository amongst themselves. Like in the Daedalus project, some of Zimbabwe's university libraries also employed the strategy of providing download statistics and posted them on their social media platforms in an effort to entice the inactive scholars to participate. They professed yielding an increased response from the scholars.

A significant finding was that the libraries were training the library staff on OAIR issues to discuss with faculty in marketing of the IRs but it appears the training was either not effectively executed or it was not done in all the institutions given that almost a balanced scale of 52% of IR/faculty librarians indicated they had not been trained and 48% saying they had been trained. On the other hand, all library directors said that IR/faculty librarians had been trained in-house and off-the-job through workshops held by ZULC, or they sent them to the University of Zimbabwe for training. One director mentioned that *ZULC members share skills informally and formally.* Potvin (2013) advocated for every academic librarian to have an understanding of the OA and IR concepts and be at ease with depositing works into the IR. In addition, librarians should be well versed with uploading work to an IR and have basic understanding of legal language to enable them to interpret publishing agreements. This knowledge will motivate and enable them to carry out OA outreach activities beyond the library and provoke debate "within the library around the functionality of publishing platforms and the spectrum of OA" (Potvin 2013:70). According to Cryer and Collins (2011:104) the Duke University realized that it was wise to first educate the educators, that is, the librarians, so during the OA week they hosted a panel discussion for librarians where divergent views on OA were represented with speakers drawn from the Duke School of Law.

Another finding of the study was that in marketing and promotion of the IR librarians faced numerous challenges including; resistance from the scholars and researchers; time constraints with one respondent saying "*mobilizing, particularly teaching is difficult due to ever pressing commitments,*" limited or lack of resources such as equipment, venues and funding, absence of an

IR policy, technical jargon used was an obstacle and the multi-campus system in the university. In his article, *'Reducing psychological resistance to Institutional Repositories'*, Quinn (2010), suggests that success of IRs hinges on overcoming scholars' resistance to deposit their works in the repositories. This can be achieved by getting some insights into the psychology of resistance in order to reduce it and persuade academics to cooperate in populating the repositories before institutions resort to mandates. Quinn (2010) suggests that librarians can engage counterintuitive approaches, such as, discussing the resistance with the scholars, highlighting the disadvantages of IRs in order to win them. Another approach would be for librarians to "take time to plant the idea of …[IRs], to allow it to take root and then to nourish it" (Jantz and Wilson 2008:189). Therefore, they have to establish relationships with academics across the university through which they continually communicate issues in scholarly communication. Flyers explaining how to start depositing documents and also giving information on which publishers allow self-archiving, and creating a blogging site to encourage dialogue and using the platform to explain IR issues would contribute tremendously in establishing such a relationship. In their paper, Griscom et al. (2006), explain how at the Pennsylvania State University Library, they created flyers and a website called the *Winning Independence site,* which they used for purposes of discussing scholarly communication issues with faculty. The library staff, through this strategy can inform academics by distinguishing between the functions of the IR and the peer review function in formal journal publication and explaining that IRs are not displacing the traditional system of scholarly communication. This strategy allows librarians to understand behaviours and attitudes of the scholars towards self-archiving and work out strategies of encouraging scholars to deposit. Therefore, relationship building between faculty and the library is central to the promotion of IRs. On a five point Likert scale a mean 4.08 (Table 5.14) showed IR/faculty librarians strongly agreed that academic libraries should educate faculty about open access and institutional repositories. Reasons for agreeing with the statement were that: They felt that IRs would not succeed without buy-in by scholars and academics since they are both content contributors and consumers of the content; there was need to create awareness of the benefits of IRs; this would make content recruitment easier. Another challenge in marketing and promotion of IRs was limited or lack of resources such as equipment, venues and funding were also cited as constraints to their marketing activities. One IR/faculty librarian commented that financial constraints hinder progress of OA initiatives to ensure appreciation of IRs and cooperation by scholars.

A challenge to IR development and management is that of getting adequate funding (Geisecke 2011) and it is often difficult to maintain continued support and commitment from university management and scholars (Jain 2011; Pickton and Barwick 2006). Therefore, "administrators need to be courted and brought alongside in order to ensure sustained support" (Little 2012:66). Other marketing and promotion challenges highlighted included; scholars' concerns over IP and copyright issues; the absence of an IR policy; technical jargon used is an obstacle (these were discussed earlier), while one alluded to the challenge of the multi-campus system and poor computer literacy skills. Two IR/faculty librarians underscored the need for serious marketing of the OAIR concept for the academic community to appreciate repositories. It is interesting to note that in one university the library director indicated that there was conflict between the library and the research office where the director of research was accused of sabotaging the OA initiatives by the library. The library director, therefore recommended that the research office should speak the same language as the library in promoting OA in the institution.

In the Daedalus project at the University of Glasglow, the library, in order to get the attention of scholars, held meetings with them to appraise them on OA and self-archiving of their articles. They checked faculty websites for articles posted by scholars, checked copyright agreements on behalf of scholars before they archived them and contacted faculty with articles in journals that allowed self-archiving for permission to archive them. However, this activity was found to be time consuming so they proposed that a university-wide database system to generate annual reports on publications by academics and post the full-text article without contacting each author (Geisecke 2011:532). Libraries in Zimbabwe, as earlier mentioned, indicated that they harvested content generated by their scholars from online journals and databases and in some instances, they sought copyright clearance for their scholars as well. Despite such efforts, the deposit rates remain low as evidenced by the number of items in the repositories to date. It could be too early to conclude that the strategies are not yielding any fruits since the repositories are still in their infancy. So in the same vein, Zimbabwe's university libraries are encouraged to adopt the same strategy (those who had not adopted the strategy) to lure the academic community to participate in populating the repository.

Regarding acceptance and use of IRs by rank of the scholars and academics in Zimbabwe's universities, it was found that senior lecturers were in the lead, followed by professors, research fellows, teaching assistants and staff development fellows respectively. However, some library directors indicated that all levels are equally supportive of the IR initiative while other opined that seasoned academics were more proactive but others felt the it was the "junior young lecturers" who were more supportive. One library director underscored the need to lobby for use of IR content by local researchers and scholars. He said that the current statistics show that most of the downloads are by American, Chinese, British and Russian researchers and therefore, suggested that lectures should refer students to content in the IR. This finding suggests that even though the scholars across the ranks show enthusiasm over the IR initiative, they lack commitment to its development as evidenced by the size of the repositories. Vigorous marketing and promotion initiatives have to be developed and implemented by the libraries to ensure increased use of the repositories and ultimately their success.

6.4 Summary of the chapter

The chapter analysed and interpreted the results of the study. A significant finding was that all the universities in Zimbabwe being wary of global scholarly communication standards, which place emphasis on quality which is largely determined by peer review, had one repository for the public domain. Scholars will be driven to use IRs if they conform to acceptable standards and values of scholarship. However, the IR concept is still in its infancy in Zimbabwe's universities, given that most (87.5%) IRs have been operational for three to six years. All the universities use the DSpace OpenSource software which was designed to operate in an institutional setting, allowing faculty members to self-archive and utilises communities (departments, schools, faculties and so forth) to build digital collections. The fact that scholars in this study showed that they largely prefer scholarly materials is an indicator that the inclusion of varied materials outside the confines of those they prefer could be a contributory factor to low participation by faculty in building the institutional repositories in universities. However, representation of all stakeholders in IR teams assists in establishing the repositories' authority and value. Content deposits remain low and more needs to be done to boost the deposit rates by scholars besides continued mediated self-archiving or research by librarians. At the ZULC level spirited efforts should continue to encourage

institutions to have IRs up and running, and ensure searchability of the repositories through internet search engines and that the repositories should be registered on the OpenDOAR for increased visibility of Zimbabwe's research output and attraction of a wider readership.

The economic crisis in the country could have influenced the late adoption of repositories by some of the institutions since they require huge financial and human resources commitment. The crisis has seen universities putting in place some cost cutting measures which threaten long-term sustainability of the repositories. Redistribution of staff and assignment of IR responsibilities should take into account talent, interests and skills of the library staff so that the development of the repositories is not stalled due to resentment which could develop when they find the job to be too taxing and time consuming. There's also need for capacity building for staff in numerous skills in order for them to execute their duties effectively and efficiently. Policy makers and scholars were aware of OA, they appreciated the initiative and policy makers were positive that it contributes to the advancement of career prospects for scholars. Given that there are very few safeguards against predatory publishers, universities should publicise lists of predatory publishers and journals such as the Beall list and increase internet literacy skills for detecting the predatory behavior of publishers. The universities recognize OA publishing in tenure and promotion but as long as the research and promotion policies do not stipulate OA issue the tenure and promotions committee will use their discretion whether to accept or reject OA publications in their considerations. Deposit mandates are only for research that is funded by the university and voluntary deposit for other research not funded by the universities. Unfortunately, most scholars were not aware of the existence of the mandates in their institutions, so a policy support system is required to educate scholars about the requirements of the research policies of the institutions. Consideration should be made of tying tenure and promotion to deposit since most of the scholars and academics in the universities are still in their prime years of publishing and would want to be tenured and promoted.

The libraries were facing several challenges in developing the repositories and getting depositors to cooperate in populating the repositories. These included copyright clearance and permissions processing, concerns over the quality of IR content and plagiarism. This shows a deficit in education and training of both librarians and scholars on OA, copyright and IPR issues. Universities can also draft contract forms which outline the rights they retain and the scholars

would attach the addenda to the agreements they sign with publishers. Relationship building between librarians and academics need to be promoted so that they can continually communicate issues in scholarly communication. Flyers explaining how to start depositing documents and also giving information on which publishers allow self-archiving, and creating a blogging site to encourage dialogue and using the platform to explain IR issues would contribute tremendously in establishing such a relationship. The next chapter will summarise and conclude the study, and recommend strategies for improvement in practice and policy in relation to OA and IRs.

CHAPTER VII: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter summarises the findings of each research question which were presented and interpreted in Chapters 5 and 6 respectively and these findings are discussed in the context of the Unified theory of Acceptance and Usage of Technology (UTAUT) model discussed in Chapter 2 and literature review in Chapter 3. It is from the findings that conclusions and recommendations of the study are drawn. The study's contributions to theory, practice and policy are also discussed and suggestions for further research are also made. The purpose of the study, as mentioned in Chapter 1, was to explore the acceptance and usage of institutional repositories, as open access platforms, in Zimbabwe's public universities so as to establish strategies that can be adopted in policy and practice by the institutios to enhance usage of the repositories and ultimately obtain a return on investment. The main objectives of the studywere to explore the utilization of institutional repositories in Zimbabwe's public universities, and ascertain the reasons as to why scholars were not depositing their works to the repositories. This was against the backdrop that universities worldwide, including Zimbabwe, have established IRs but their functionality is a cause for concern. The order of the discussion in this chapter, as with the previous chapter, follows the order of the research questions.

7.2 Summary of findings

This section presents a summary of the findigs of the study

7.2.1 Status of the repositories and categories of documents included in the IRs

All public universities in Zimbabwe established multi-disciplinary institutional repositories between 2009 and 2012 and only five had repositories that were searchable on the internet. A national repository had been established by the Research Council of Zimbabwe which seeks to link all repositories in the country. However, there was no consensus amongst librarians, research

directors (policy makers) and the academics on the content composition of the repositories. The libraries were selective about the kind of content to be included in the repository while academics and some of the policy makers emphasised content that is published within academic circles (scholarly work) and others preferred both research and teaching materials. Most of the universities had OA OR policies either as draft or adopted policies and the ZULC was lobbying for the development of a national OA policy.

The biggest repositories were in three universities with items ranging from 390 to 450 and the repositories are at most 7 years old. Very few library directors were satisfied with the milestones they had achieved and expressed that they had not yet reached a desirable level of success in terms of content submission by academics and discoverability of the repositories.

7.2.2 Role of the academic librarian in promoting the institutional repository

The management and maintenance of IRs in the university libraries was shouldered by a mixed bag of designations and levels across the universities which included; faculty librarians, IR librarians, deputy librarians, manager, reader services librarians, assistant librarians, senior library assistants (SLAs), the systems librarians, and IT experts who maintain the system and train library staff. Therefore, both senior and junior staff are involved in the running and management of repositories in Zimbabwe's public universities even though some of the universities have created positions specifically for IR maintainers. Library staff in all the universities were affected by the establishment of the repositories with most of them having new responsibilities added to the existing ones while some were reassigned to take up new responsibilities. However, in assigning IR responsibilities, some of the universities took cognisance of staff interests and skills, that is, IT competencies. Thus, Zimbabwe's public academic libraries enlarged and enriched the jobs of existing staff in order to run the repositories. The current freeze on jobs in state institutions, due to the economic crunch facing Zimbabwe, hindered the libraries from recruiting additional staff to shoulder IR responsibilities. However, in a few instances, additional staff were recruited particularly, IT personnel.

The staff received training on the Greenstone and DSpace open source repository software; attended workshops facilitated by INASP and the university libraries consortium in-house or on-the-job and also self-trained. All the universities established IR teams or IR management committees whose compositions in some institutions comprised academics/scholars, the Pro-Vice

Chancellor academic (management), librarians, ICT personnel and a lawyer. Thus, most of the institutions were involving all stakeholders to establish the repository's authority and value in the institution.

The librarians appreciated the role of the repositories in facilitating scholarly communication and opined that IRs would motivate scholars to publish once their works began to be accessible to a wide readership. However, most of the librarians did not have knowledge and skills of publishing which are an added advantage to the IR maintainer and developer as they would understand the nature of scholarly publications. Most librarians agreed that 'the principles of OA are in tandem with the role of academic libraries' and that 'OA IRs would fail without the active involvement of academic libraries'. They indicated that libraries played a critical role in information dissemination, enable access to information through indexing and abstracting of materials; and disseminate, store and preserve information. IR/faculty librarians were involved in content recruitment from faculty in the universities but this activity was made difficult by lack of cooperation from the academic community. The libraries liaised with faculty and only five universities' libraries also liaised with their research offices which supplied them with research output collected from academics. Only three universities lacked collaboration between the library and the research office and in one university the librarians engaged champions amongst academics to influence their colleagues to participate in building the institution's repository. Most of the institutions processed copyright clearance and permissions on behalf of faculty in order to make published research available in the IR. However, a few universities required their academics to process the copyright clearance on their own.

7.2.3 The institution's contribution to the promotion of OA

There was high awareness, understanding and appreciation of the concept of open access by the directors of research, as administrators and policy makers in research issues in the universities. However, some of the directors were skeptical about the riguor and credibility of the peer review process in the OA domain and were wary of the influx of predatory journals and the article processing charge (APC). On the other hand, some of the directors thought the peer review process was not affected in any way by OA and were in support of the author paying for publication since they believed that the purpose of the APC was to enable the work to be made OA. Thus, a debate was provoked by the policy makers over the APC and its effect on quality in scholarly

communication. Most of the policy makers were positive that OA contributes to the advancement of career prospects of scholars and researchers as they indicated that it increases visibility and citation of one's works. Despite these indications of appreciation of the OA initiative, the perceptions held by some of the policy makers are tell-tale signs of mistrust of OA.

In an effort to guard against scholars falling prey to predatory journals, the research offices of all the universities in collaboration with the libraries, compiled lists of both accredited journals and predatory journals which they used for verification purposes before payment of publication fees and for evaluation of individual scholars' articles for promotion purposes. Unfortunately, the compiled lists of accredited journals are not accessible on the university websites for the academics to see. Therefore, Zimbabwe's public universities have instituted measures to prevent scholars from falling prey to fraudulent journals and publishers but have not publicized these measures to the intended beneficiaries (academic community).

Five universities' tenure and promotions committees accepted publication by their scholars in accredited journals irrespective of the platform (OA or closed access), as long as these had an impact factor. Therefore, the institutions are trying to promote publication by scholars in OA platforms. However, the tenure and promotion conditions of all the universities did not require academics to deposit research to the IR and only three universities in Zimbabwe had signed the Berlin Declaration on open access to knowledge in the sciences and humanities which advocates for recognition of open access publication in promotion and tenure evaluations in universities. Therefore, Zimbabwe's public universities seem to lack commitment to the OA ethos and thus, are lagging behind in supporting the OA initiative on the global sphere. The research policies of all the universities mandated deposit of all research output (abstracts of research or conference presentations and published papers) funded by the institution either to the research office or the library but they could not force scholars to deposit research that had not been funded by the institution. Only one institution's new research policy mandated deposit of research published using institutional affiliation even though no funding had been extended towards the research. However, the research offices in most of the universities collaborated with the library to promote acceptance and usage of the repositories. Thus, despite not committing to the OA ethos, as mentioned above, Zimbabwe's public universities are making strides towards promotion of OA in their institutions through deposit mandates.

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A few universities incentivised their scholars for depositing their research by offering financial rewards, publicizing names of those who would have deposited the highest number of papers within a particular period and providing usage statistics. Resultantly, increased deposits were realised and admittedly, for the institution that later withdrew the incentive, deposit rates decreased. A majority of the institutions did not offer any incentive and relied on the existing deposit mandate and in some universities, the research office participated in promoting the repositories through workshops and the research newsletter where they encouraged scholars to deposit their works. Therefore, incentives in cash or otherwise motivate Zimbabwean scholars to deposit their materials and this increases deposit rates. The policy makers were aware of the benefits accruing to the institution from use of IRs.

In response to academics' concerns over intellectual property rights (IPR), authenticity, data integrity, peer review and so on, the universities instituted several measures including; establishment of an ethics committee, a quality assurance committee within the institution to ensure that all research done in the institution is cleared by this body, they developed IP policies, use of anti-plagiarism software, such as, Turnitin through which all Masters and DPhil theses pass before they are accepted. Thus, the universities have put stop-gap measures in place to allay the fears of the academic community and addressed issues that could arise in the conduct of and dissemination of research by their scholars.

7.2.4 Attitudes and concerns of academics towards IRs

Staffing in Zimbabwe's public universities is dominated by males and also by young inexperienced academics and scholars who are still building their publication portfolios. Therefore, the universities have a depleted experienced academic staff compliment characterized by a gender imbalance. There was a high awareness and understanding of OA and IR concepts amongst academics and they were also aware of the existence of a repository in their universities. Therefore, the universities are playing a significant role in creating awareness of OA/IRs in their academic communities. A majority of the scholars supported the notion that scholarship should be made OA and recommended that universities should use IRs. Thus, indications are that scholars in Zimbabwe's public universities are ready to accept and use OA platforms to publish and disseminate their research.

However, a majority of scholars and academics had not deposited their research in the IR but had valuable unpublished works, while only a few had used disciplinary or subject repositories and other popular web repositories to deposit their research materials. They did not deposit their institutions' repositories due to lack of training on how to self-archive, lack of information on the importance of IRs, lack of motivation to deposit, lack of published papers, lack of awareness of the IR, lack of confidence in the IR and that their research would not have been funded by the university. Therefore, even though the academics and scholars showed readiness to use repository technologies, they shunned their institutional repositories in preference for disciplinary or subject repositories and other internet platforms. Scholars who deposited their works to the repository did not do it themselves but had librarians do it for them and in isolated cases champions self-archived. The universities' librarians viewed the academics unskilled to self-archive and since they were struggling to convince the scholars to submit papers for deposit, it was prudent for them to focus on getting buy-in from them first and once indications of readiness were visible, they would show them how to self-archive. So in essence academics in all the public universities in Zimbabwe do not self-archive, as per the actual sense of the word (that is, do it themselves), but experience mediated self-archiving of their materials by the library. Thus, the universities are not training academics and scholars to self-archive on the pretext that mediating deposit would enable them to populate repositories. Most of the academics were willing to attend training sessions so that they could gain knowledge and understanding of the IR concept and be skilled in self-archiving while a few indicated that they did not have time to attend the training sessions. However, the benefits accruing to the academics and scholars if they use the repositories to deposit their materials would significantly motivate them to participate in populating the repositories. Many academics had searched for information in an IR and would recommend their peers to use IRs in order to provide access to information, to share and disseminate information, to deposit and store their works and for visibility and awareness. Thus academics and scholars in Zimbabwe's universities are highly aware of and appreciate the role of institutional repositories in scholarly communication. The scholars appreciate that they can find valuable information in these repositories and have confidence in the capabilities of repositories in scientific discourse.

Most of Zimbabwe's public universities had OA/IR policies either as operational, draft documents or work in progress. The institutions had instituted deposit mandates enshrined in both their research policies and OA/IR policies, but the policy documents were not readily available or

accessible on the universities' websites for the academic communities. As a result, most academics and scholars in these universities were not aware of the deposit mandate and its conditions but very few of them knew of the mandate and were aware that their publishers allowed them to deposit their research in the IR on expiry of the embargo period. Thus, the universities have not publicized their research and OA/IR policies or educated the academic communities about the policies, neither have they sensitised the scholars about publisher policies yet they require compliance from a community that is not informed. The scholars and academics also have not taken time to familiarize themselves with both their institutions' policies and conditions of service, and their publishers' OA policies to know what is permissible and what is not. Most scholars and academics in Zimbabwe's public universities had not discussed copyright transfer agreements with their publishers and only a few had done so. They echoed mixed sentiments on copyright ownership with some opining that the author should retain copyright, others said the publisher should retain ownership, while others advocated for co-ownership by the author and publisher. Thus, Zimbabwe's scholars and academics lack knowledge of copyright and understanding of their intellectual property rights. The institutions are also not educating them on IP issues to which librarians agreed that academic libraries should educate faculty about intellectual property issues.

The university libraries helped scholars and academics to understand the repositories by instructing them on how to use the IRs and also with storage and preservation of their work. Therefore, Zimbabwe's universities libraries are making strides in getting buy-in from the academics and scholars in order to capture the intellectual capital of the institutions for posterity lest they lose the research due to brain-drain. However, the universities' libraries were not assisting the scholars and academics in negotiating with publishers, offering CV services with links to their publications, provision of citation counts and impact assessment and locating other useful publications in the IR. Thus, the universities are neglecting the most pertinent services in research and scholarly publishing which could motivate their scholars to participate in populating the repositories and the institutions would benefit in terms of visibility, access and wider dissemination of research to as wide an audience as possible and resultantly impact their ranking.

Factors that would significantly inhibit Zimbabwean scholars and academics from participating in populating the IRs included the fear that; lack of peer review would undermine their work, IRs could breach confidentiality of some data and that IRs risked reducing the value of the peer review

process. However, they would be motivated to deposit their works in the IR if the integrity of their work was upheld, if they could still publish in journals, if their works were protected from plagiarism and if there was assurance of long term preservation. Thus, Zimbabwean scholars and academics are not well versed about the functions of IRs and do not trust IRs as places for depositing their research. Though the universities were promoting the IR concept amongst academics and scholars, they had not yet managed to allay their fears and perceived negative implications of OA on scholarship and assure them that they could trust the IR technologies. Other conditions under which the academics and scholars in Zimbabwe's universities would participate in IR development included that the IRs had to be searchable on the web and if the material was indexed. Thus, the scholars are concerned about their works being discoverable to a wider audience for wider dissemination. However, factors that were not significant challenges for scholars and academics to deposit of their materials in repositories included the fact that; IRs would expose more research to plagiarism, depositing to an IR added extra workload, IRs were not as easy to use as journal indexes and that when everyone deposits there would be no competitive advantage. Thus, the scholars are not threatened by factors that are external to scholarship in their decision to deposit materials in the repositories. The universities' librarians acknowledged that they made mention of plagiarism, creative commons, self-archiving and so on, in workshops they conducted on e-resources training and the communication skills courses but training particularly on these issues had not been done. It is, therefore, clear that the communication of this critical issue through the training sessions conducted by the libraries is not effective. Thus, the institutions have not been very successful at created a facilitating condition for adoption of the IR technologies.

7.2.5 Challenges faced by the academics and librarians in contributing to and managing the IRs

The establishment of IRs in half of Zimbabwe's public universities was stalled by lack of management support but the other half had management support, hence they were quick to establish their IRs. Getting technical expertise and proper equipment for hosting the repositories was quite difficult for all the university libraries, as a result, delays were experienced in establishing the repositories. Very few university librarians had difficulty getting their OA/IR policies approved by management and this stalled progress. Thus, administrators and management in some of Zimbabwe's public universities lacked commitment to the development of the

repositories and remained unconvinced that IRs were crucial drivers of scholarly communication and would benefit the institution and its scholars tremendously.

Content recruitment was the biggest challenge faced by the public universities which could, in part, be attributed to fears and misconceptions held by the academic communities over OA/IRs which included; copyright, trustworthiness of repositories and plagiarism. However, librarians indicated that all levels/ranks of academics were supportive of the IR initiative and could not pin point which group was more active than the other. Thus, the academics and scholars in Zimbabwe's universities, to some extent appreciated the role of repositories but were yet to be convinced to fully embrace the technology, hence the mediated deposit of works by librarians.

The policies in some of the universities are not aligned and only three universities offered incentives for depositing works to the repository either monetarily or recognition of active depositors, as a strategy of increasing deposits, but one of the institutions later withdrew the financial reward, while the rest of the universities did not offer incentives at all. The tenure and promotion conditions of all the universities did not require their academics and scholars to deposit and deposit was only mandatory for research funded by the institutions. However, the policies to this effect were not readily available on the universities' websites for the academic communities to access. To exacerbate the situation, the institutions were incapacitated to fund research, as a result, where academics secured funding from other sources on their own, they were not willing to deposit such research to the institution. Thus, Zimbabwe's public universities were not creating an enabling environment for content recruitment and development of the IRs.

Copyright clearance and permissions processing presented challenges for the libraries particularly, obtaining and interpreting publisher copyright policies since they had limited copyright expertise. They also had limited staff and time for them to carry out copyright clearance activities as a result the libraries were taking too long to process copyright permissions and clearance. Thus, there is a copyright skills gap for Zimbabwe's librarians for them to successfully process copyright permissions. Zimbabwe's public universities did not offer training particularly on plagiarism, creative commons and self-archiving. Even though librarians indicated that some scholars and academics demonstrated understanding of their rights as authors while others lacked understanding of these rights, the academics and scholars still held fears of having their works plagiarised if they deposited them in the IRs. Thus, the universities had not effectively educated the scholars and

academics on OA, plagiarism, self-archiving and copyright issues which could be attributed to the skills gap mentioned above.

7.2.6 Strategies that can be employed to overcome the challenges

All the universities had difficulty recruiting the requisite staff to run and manage the repositories. The universities' libraries reassigned existing staff to new IR responsibilities and in some cases had to enrich and enlarge the jobs of the existing staff. In order to increase the rate of submission of research output, all the universities' research and OA/IR policies mandated the university community to deposit all university funded research to the IR. Thus, the institutions that developed OA/IR policies and aligned their policies so that authors were not confused by conflicting demands, however, all the universities had not totally committed to promoting OA by not including a mandate clause in the tenure and promotion conditions. Therefore, librarians and some policy makers advocated for their universities to tie tenure and promotion conditions to IR deposits. Thus, voices are being raised in Zimbabwe's public universities to tie tenure and promotion to deposit as a strategy to ensure increased uptake of the IR initiative and increase content deposit, whose ripple effect would be increased visibility and access to Zimbabwe's research output. In addition, the universities' libraries were harvesting content of publications by their academics from journals and other online databases through Google Scholar and SCOPUS alerts services and, other means to capture recent publications by their scholars. In addition, some of the universities sought copyright clearance for their scholars as well. Thus, the libraries were committed to the success of the IRs so that a return on investment in the repositories would be realized by striving to increase content in their repositories in the face of resistance from content creators. Even though the scholars across the ranks show enthusiasm over the IR initiative, they lack commitment to its development as evidenced by the size of the repositories. Moreover, ZULC is advocating for a national OA mandate and management of open data at a national level and they initiated this drive by hosting a workshop where stakeholders such as the Ministry of Higher and Tertiary Education, Science and Technology Development, the ZUVCA representatives and ZIMCHE were invited to attend. Thus, Zimbabwe's universities are determined to ensure that OA is recognized and embraced at a national level for the good of the country. The RCZ established a repository of all research that is generated within the country called the National Repository Trust. The RCZ's intention is to provide access to research articles that are contained in Zimbabwe's universities'

repositories. Thus, at a national level, Zimbabwe is making strides towards recognition of OA publishing and establishing a national archive for its research output and OA content.

In efforts to create awareness of the IRs by the academic communities in Zimbabwe's public universities, the libraries conduct OA awareness campaigns, advocacy at meetings such as faculty board, door to door office visits, training workshops, posters and pamphlets, social media platforms, library website, use of champions and email alerts. Some of the universities recognized those scholars who contributed the most articles to the repository by publicising them on the library's social media platform alert pages and presented usage statistics at the various university committees' meetings. Thus, the universities were indeed making an effort in marketing and promoting acceptance and usage of their repositories by the academic community in the country. In-house and off-the-job training of library staff on OA IR issues was conducted but it appears the training was not effectively conducted given that 52% of IR/faculty librarians indicated they had not been trained and 48% saying they had been trained. However, the institutions were doing good to educate the educators so that they would not be found wanting when it came to marketing and promoting the repositories to the academics and scholars.

7.3 Conclusions

In this section conclusions are drawn from the findings of the study that explored the status of institutional repositories in Zimbabwe's public universities and the reasons why academics in these universities were not depositing their works to the repositories. It was therefore concluded that:

7.3.1 Research output from five public universities is now accessible, searchable, harvestable and useable by a wider readership on the global sphere, potentially increasing research impact and attraction of collaborative research and funding from research funders. However, the concept of IRs in Zimbabwe is still in the infancy stage as most of the repositories contain very few items and have been operational for at least six years. In essence, Zimbabwe's public universities face a daunting task of populating their repositories in order to get a return on their investment in IR establishment; so far the repositories have not been successful. However, the use of the DSpace open source software to host their repositories is an indicator that the institutions have long term preservation plans for the research stored in their repositories for future use.

7.3.2 Therefore, library staff in Zimbabwe's public universities are overloaded with work. In addition, ZULC has not made a collective decision as to which level of staff or rank in the library should shoulder the IR responsibilities, a stance which is likely to demotivate staff and ultimately affect efficiency and effectiveness in the execution of their duties. However, the universities have tried to create an enabling environment for the staff to execute their duties and responsibilities effectively and efficiently through training either on or off the job. Thus, the librarians appreciated the significant role played by academic libraries in scholarly communication. In addition, the libraries have established the authority and value of the repositories by involving all stakeholders in the development of the IRs through IR teams. Some of the universities were making concerted efforts to promote usage of the repositories through collaboration with the research offices and copyright permission clearance while others had not and such behaviour could deter participation by academics in depositing content to the repositories.

7.3.3 Zimbabwe's university libraries faced numerous challenges in marketing and promoting of their repositories which can be attributed to lack of management commitment to the OA initiative and resistance from the scholars and researchers who lacked motivation to deposit their works to the repositories. This is despite the fact that there is a high level of awareness of OA and IRs within the academic communities and the existence of deposit mandates. However lack of lignment of policies within the institutions and incapacity of Zimbabwe's public universities to fund research creates a disabling environment for content recruitment and development of the IRs. Thus, the IR concept remains in the infancy stage characterized by very low content deposits and small repository sizes, which leaves a lot to be desired in terms of increasing visibility of Zimbabwe's research output on the global sphere.

7.3.4 The issue of the APC model is quite contentious amongst policy makers and the perceptions held by some of them over OA are tell-tale signs of mistrust of the initiative. Despite most of the institutions drawing up lists of accredited journals, these have not been publicized to the academic communities. Thus, reflecting a lack of enthusiasm and commitment to the OA ethos.

7.3.5 The university libraries are determined to see the IR projects succeed to obtain a return on investment in the repositories and did not allow the job freeze and lack of management support to deter them though the downside of their strategy could result in an overworked and demoralized work force. They demonstrated their resilience by reassigned existing staff to new IR

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responsibilities and in some cases had to enrich and enlarge the jobs of the existing staff. They have gone further to advocate for adoption of a national OA policy.

7.4 Recommendations

The purpose of this study was to establish the status of OA IRs and scholarly communication in Zimbabwe's public universities. Therefore, this section will recommend strategies that can be adopted by Zimbabwe's public universities in relation to practice and policy in the changing OA technology driven scholarly communication environment.

7.4.1 Intensify OA/IR education and promotion

Zimbabwe's public universities need to intensify OA/IR education of the academic community and increase engagement of scholars and academics, perhaps at a personal level, to get them to embrace the IR technologies so that they secure content for their IRs with ease. The libraries could create blogging sites to encourage dialogue and use the platform to explain IR issues while simultaneously establishing a relationship with the academic community which is crucial to content recruitment. Thus, in order for the libraries to succeed in marketing the IRs, they have to obtain insights into the culture of scholarship occurring in the different disciplines across the university. Librarians have to also work closely with the research office, particularly those institutions where collaboration lacked, in order to recruit content for the repository and increase deposits since the research office's mandate is to work with the scholars and academics in research activities of the university. Both the library and the research office are concerned with issues of research, therefore, it is befitting that they collude together and map the way forward so that the content deposit ethos and momentum is maintained and increased. Their collusion should result in increased visibility of the institution's research output on the global arena.

Universities that were not harvesting content from online databases and other sources should consider doing so in order to capture all the research output emanating from their institutions. However, there is need for adequate training for those depositors who are willing to self-archive to avoid frustration. Some scholars may show willingness to participate but in the process they mess up things particularly in creating the metadata for the items at the time of deposit, where

detailed metadata is required, which causes problems for the IR managers as well. Alternatively, the libraries are encouraged to continue archiving articles on behalf of the academics and scholars for a period of approximately five years until the ethos is imbibed by all stakeholders, otherwise there could be a decline in deposits if they allowed the scholars to self-archive sooner. However, identification of enthusiastic scholars or champions is encouraged and these should be shown how to self-archive. In order to also obtain buy-in from stakeholders' and increase acceptance of IRs, it is important that wide consultation and collaboration be done to determine the content composition of the repositories to avoid apathy by content depositors.

7.4.2 Motivate content depositors and library staff

The universities are encouraged to incentivise content depositors as a way of motivating them to participate in populating the repositories. These libraries should make available to their authors usage, and citation data, and also make the data available to the tools that compute alternative impact metrics as these factors are important to scholars in determining the impact of their research in scholarly publishing. Management should also consider offering cash rewards, particularly those universities that did not offer incentives at all, so as to accelerate deposit rates. Such strategies would entice the scholars to deposit their works to the repositories.

Given that the job freeze prevented the universities from recruiting staff for the management and running of the repositories, library staff who were affected by the establishment of IRs need to be given an incentive so that they are enthusiastic to work without feeling overburdened. University libraries that had not considered staff interests and skills or competencies in job reassignment and distribution of IR responsibilities need to take that factor into account so that they enrich the jobs of their staff so that they are not bored or demotivated by the job. Once resources permit, it is recommended that the university libraries should establish an IR position which would enable them to find a suitable placement/unit within the library for the IR (acquisitions unit or special collections and any other unit they deem to be ideal). There is also need for continuous training and offering of refresher courses for the staff for capacity building in numerous skills and tasks so that they do remain relevant, efficient and effective in the OA environment and avoid relapsing to illiteracy in cases where particular activities are not regularly undertaken. Technical expertise is also required in aggregation, harvesting, analytics and impact assessment.

7.4.3 Ensure interoperability of IRs

The universities whose repositories were not searchable on the internet should accelerate efforts at speeding up searchability of their repositories. As mentioned earlier, spirited efforts at the ZULC level, should continue to encourage institutions to have IRs up and running and have them registered in the DOAR for increased visibility of Zimbabwe's research output and attraction of a wider readership. There is also a need for the universities to establish preservation strategies and metadata quality standards to facilitate the build-up of the interoperable national repository by the RCZ.

7.4.4 Content deposit policies

If universities in Zimbabwe are committed to the development of the IR system and increasing visibility of the institution's research output, they have to adopt research policies and, tenure and promotion policies that promote or recognise publication by scholars and academics in OA and IR platforms and also consider strengthening and enforcing deposit mandates. The policies should incorporate clauses that refer to treatment of OA publications in making decisions for faculty tenure and promotion as a way of showing their commitment to the OA initiative. Therefore, the universities should consider tying deposit of research works in the repository to tenure and promotion if they want to be considered for promotion, so that the institutions develop their repositories. Remedial measures should be devised to assist scholars and academics who fail to observe the policy deposit requirements in order to deter retrogressive behavior. Given that academics and scholars use institutional affiliation when they write grant winning proposals in order to be considered for award of the funding and in their publications, it is recommended that the universities should consider mandating deposit of such works even though they would not have funded them. The universities should also publicise their research and OA/IR policies amongst scholars/academics, management and students to keep them abreast of the institution's expectations of them, for example, through the university, research and library websites; library social media platforms and; the university internal staff mailing system. In addition, there is need for publicity of compiled lists of predatory journals and publishers through the same strategies just mentioned above.

7.4.5 Tackle IPR issues

The university libraries have to continually communicate issues in scholarly communication to the academic community. Librarians have to give them information on publishers' OA policies and process copyright permissions on behalf of the authors and at the same time sharpen their IP skills. The university libraries could send their staff to institutions like the Africa University for training on IP issues. Universities in Zimbabwe should draft contract addenda for their authors to use for negotiating with publishers for retention of some of their intellectual property rights in order to facilitate archiving of articles in the institutional repository with limited or no restrictions.

In order for IR librarians to understand the nature of materials they will be dealing with (scholarly publishing) there is need for them to have background knowledge of publishing so that they understand the publishing process from solicitation of manuscripts, through the production process to the finished product, copyright and permissions issues and online dissemination. So there is need for the librarians to self-train through research and also training on the basics of scholarly publishing. Now that, the National University of Science and Technology offers a degree in publishing, the libraries could send their staff for training at the institution so that they sharpen their skills.

7.4.6 Develop IR documentation

The libraries are encouraged to create IR documentation that is comprehensive and easily accessible to the staff, academics/scholars and students. The documentation could include brochures, flyers, posters and so forth, highlighting content recruitment and submission procedures and also give motivation for one to self-archive.

7.5 Contribution of the study to theory and practice

The findings and recommendations of this study will significantly influence theory and practice in Zimbabwe's academic libraries in terms of establishment of repositories, their management, promotion and use. According to Geletkanycz and Tepper (2011:257) the most outright implications of a study to theory stem from the interpretations of the findings of a study, that is, what the results reflect "about underlying theoretical constructs, principles and their relationships," under what circumstances the patterns emerge (when?) and the context in which they occur and

how they enhance appreciation of the underlying theory. This study was informed by the UTAUT model of technology acceptance to understand the behavioural intentions of individuals towards acceptance and use of IR technologies in Zimbabwe's public universities. Though this study did not contribute any new dimensions to theory, it served to confirm theory.

Two qualitative studies on institutional repositories in Zimbabwe's universities were carried out by Nyambi and Maynard (2012) and Kusekwa and Mushowani (2014). Nyambi and Maynard's study identified challenges and enablers for IR growth and also evaluated operational issues that could have been affecting the setting up of IRs in the country. Their units of analysis included library directors, the International Network for the Availability of Scientific Publications (INASP) project team and the AuthorAid team but excluded shop floor librarians, scholars and researchers who contribute content to the repositories. The study by Kusekwa and Mushowani sought to map progress made by institutions in ZULC in establishing IRs and promoting OA in Zimbabwe. Their unit of analysis was library directors and they relied on their assumptions on scholars' attitudes and disregarded the voice of the content contributors (scholars and researchers). In contrast, this study's population included library directors, IR/faculty librarians, academics/scholars and policy makers (research directors). Therefore, this study unveiled holistically, the attitudes and concerns of academics in these universities towards OA and IR development and established the challenges that are faced in managing and developing the repositories, therefore, contributing to literature on OA and IRs in Zimbabwe, Southern Africa and the continent at large.

This study also took a holistic approach to studying the status of IRs in Zimbabwe's public universities by employing a mixed methods approach including both qualitative and quantitative approaches, document analysis, literature review and bibliometric analysis of Zimbabwe's university repositories. According to Fidel (2008:265) it has not yet been established in LIS if and how MMR has shaped research. There has not been any significant discourse around the use of MMR in LIS research discourse in Sub-Saharan Africa (Ngulube 2010:253; 2012). Nguliube's study (2010; 2012) found that 7% of the articles used MMR but with the quantitative approach predominating while other studies (Feehan et al. 1985; Manda 2003; Ngulube, Mokwatlo & Ndwandwe 2009) found research in LIS developing towards either quantitative or qualitative methodology while the historical and survey methods dominated. Therefore, this study contributes to the discourse around MMR in LIS research in Southern Africa.

It is quite intriguing to say that this study has contributed to knowledge in the preservation of indigenous knowledge systems through a chapter in a book which explored the role of institutional repositories in increasing visibility of indigenous knowledge. The article is entitled *"Visibility and accessibility of indigenous knowledge on open access institutional repositories at universities in Africa* published in the *Handbook of research on theoretical perspectives on indigenous knowledge systems in developing countries* edited by Patrick Ngulube (2017).

If the findings and recommendations of this study were to be followed and implemented by Zimbabwe's institutions of higher learning, in practice, the study would have contributed tremendously to practice in the establishment, running, management and promotion of repositories. The findings of the study revealed that without stakeholder buy-in (management support and interest of content creators and depositors), it is quite difficult to promote the OA IR ethos in the institution and influence acceptance and use of the IR technology. So if the findings were to be acted upon, institutions that are yet to establish their own repositories would be well informed of the strategies to employ in order to increase chances of obtaining stakeholder buy-in and thereby, increase success of their IRs.

The findings also revealed that academic library staff require OA skills capacity building in order for them to remain relevant, efficient and effective in the execution of their duties in the OA environment. Therefore, this study emphasized the need for continuous training in varied areas such as IP issues, copyright interpretation and clearance processing and promotion strategies. Observance of the study findings and implementation of the recommendations of the study will also influence decision making, thereby impacting practice in Zimbabwe's research institutions, colleges and universities.

7.6 Contribution to policy

Through the study, it is hoped that policy makers in institutions of higher learning, research institutions and government will be informed and guided in the development and implementation of policies pertaining to OA and institutional repositories. This study comes at an opportune time when ZULC is lobbying for the development of a national OA policy which will highlight the

centrality of OA and IRs in knowledge sharing and generation of knew knowledge. This study should assist in the formulation of regulatory frameworks that will lead to the establishment of the requisite infrastructure for OA IR establishment in all academic institutions in the country, the national repository and the national content harvesting systems. Therefore, it is hoped that the study will help the stakeholders to achieve success in their objectives of increasing visibility of the country's research output and have a presence on the international arena by developing policies that support the OA ethos.

Policy makers in both government, research institutions and the universities will also be guided on pertinent issues to consider in IR policy formulation and develop measures that will enable them to motivate researchers to participate in the development of the institutional repositories and increase content deposits while simultaneously creating an enabling environment for OA development in both the institutions and the country at large. They should be informed on whether to mandate deposit of publicly funded research output or make it voluntary and also realise the importance of synchronizing all policies within the institution which impact on research activities and its dissemination. For example, alignment of library content deposit policies, IP policies and research policies in order to avoid confusing scholars and repository managers and maintainers. In addition, it is hoped that the study will contribute to (re)formulation of copyright legislation and regulatory frameworks in the OA environment. The formulation of such a policy should rope in publishers of scholarly materials in designing regulations on deposit of scholars' works in the institutional and RCZ national repository. Institutions should also be guided by the study in the development of contract addenda for their scholars which they will submit to their publishers.

The findings of the study should also facilitate development of strategies by both government and policy makers in universities and colleges across the country to retain experienced staff so that there is lifelong mentoring of researchers so that scholarly communication skills will be passed on to emerging scholars and researchers.

7.7 Suggestions for future research

Several gaps have been identified in this study which need further probing. This study focused on the status of repositories in public universities, therefore, there is need to probe the situation in both private universities and colleges in order to obtain a comprehensive picture of the status of IRs in Zimbabwe's institutions of higher learning.

Though academics and scholars in public universities showed readiness to use repository technologies, this study including Onyancha's (2011) study established that they shunned their institutional repositories in preference for disciplinary or subject repositories, personal and departmental websites, and other internet platforms. Therefore, there is need for further studies to explore the underlying causes of such behavior in order to find lasting solutions.

In addition, it was found in this study, including other studies (Harnard 2011, Sale 2006, Cullen and Chawner 2011) that despite the various marketing and promotion strategies employed by institutions and deposit mandates instituted by the universities, content deposit rates remained low. There is no known study to have investigated this pertinent issue on which the success of IRs hinges. Therefore, further studies to probe the underlying causes of such a scenario need to be probed.

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LIST OF APPENDICES

Appendix 1: Questionnaire for Academics

Title of study: **The status of open access institutional repositories in Zimbabwe's public universities**.

This study seeks to establish the current state of institutional repositories in public universities in Zimbabwe. It also aims at assisting scholars and their institutions develop strategies to make their research output more accessible on such IRs.

Please complete this questionnaire to assist with achievement of the study objective.

Instructions:

a) *Indicate the most appropriate answers by a tick (√) in the brackets.*

b) *Each question should have only one tick (√) for your chosen answer, unless stated.*

c) *Where the space is provided, write your answer in it.*

d) *Please use a pen to answer this questionnaire.*

A. Demographic data

1. Institution: …………………………………….

2. What is your job title?

   Professor ( )   Associate Professor ( )   Senior lecturer( )

   Lecturer   ( )   Research fellow ( )   Other (specify) _____

3. Academic qualifications:

   Masters ( )   PhD ( )   Other (specify) _____

4. Age :

   20-30 ( )   31-40 ( )   41-50 ( )   51-60 ( )   61+ ( )

5. Gender:

   Female ( )   Male ( )

6. For how long have you been at this institution?

   0-5yrs ( )   6-10yrs ( )   11-15yrs ( )   16-20yrs ( )   20+yrs ( )

7. What is your post qualification experience?

   0-5yrs ( )　　6-10yrs ( )　　11-15yrs ( )　16-20yrs ( )　20+yrs ( )

8. What is your discipline?

   Arts &Humanities　　( )　　Social Sciences ( )　　　Applied Sciences ( )
   Health Sciences　　　( )　　Engineering　( )　　　　Education　　( )
   Agricultural Sciences ( )　　Law ( )　　　　　　　　Development Studies ( )
   Other (specify) _____

B. Awareness of Open Access

9. Are you aware of the Open Access Initiative?

   Yes ( ) proceed to the next question　　　No ( ) go to question 11

10. Can you say how you came to know about the initiative?

   ----

11. Explain what you understand by'open access'?

   ----

12. What is your opinion of the open access initiative?

   ----

13. Does your institution have an Open Access Policy?

   Yes　( )　　　　　No　( )　　　　　I don't know　( )

14. To what extent do you agree with the statement that 'scholarship should be freely available on the web'

   Strongly agree　　　( )　　　　　　　　agree　( )　　　　　disagree　　　( )

   strongly disagree　　( )　　　　not sure ( )

15. Are you aware of institutional repositories (IRs)?
   Yes ( )　　　No ( )

16. Do you recommend that universities use institutional repositories?
   Yes ( )　　　No ( )

17. Does your institution have an institutional repository (IR)?
   Yes ( )　　　No ( )　　　I don't know　( )

18. If your answer is 'Yes', how did you get to know of it?

Campus newsletter   ( )   librarian ( )   A friend ( )

Internet ( )   Journals ( )   Other (specify) _____

C. Perception of IRs

19. Have you deposited any of your research papers to the institutional repository? (You can tick 2 options)

Yes   ( ) proceed to question 23 then skip question 24

No ( ) proceed to question 24, skip questions 27-30

Deposit elsewhere   ( )

20. If you deposit elsewhere, do you do it,
In addition to ( )   or   Instead of   ( )

21. Where did you deposit?
Subject repository   ( )   Personal website   ( )   Funding body ( )
Disciplinary repository   ( )   Other (specify) _____

22. What type of materials have you deposited?
………………………………………………………………………………………………

23. If 'No' what are your reasons for not depositing?
………………………………………………………………………………………………

24. Do you have any valuable unpublished works?
Yes   ( )   No ( )

25. What (will) motivate(s) you to deposit research output to the repository?
Rate your opinion of the level of importance you attach to depositing to an IR on a scale of 1 to 5 where 1= Unimportant, 2 = Of little importance, 3 = moderate, 4 = important, 5 = very important

Reason	5	4	3	2	1
To make my research available to my students and colleagues					
As a way of increasing exposure to my work					
It is a good way of preserving my materials and listing my research output					
It is a way of attracting other researchers to our institution and increases exposure of the institution					
Citation of my materials and impact factor increases					
It is one way I can increase my reputation					
My colleagues are contributing					

Increases chances of tenure and promotion					
My work is protected from plagiarism					
My work is published alongside other high quality research					

Other (specify) ---

26. If you have contributed material to the IR, how often do you do so?

Very often ( )   often ( )   rarely ( )   not at all ( )

27. Do you archive the materials to the IR yourself or someone else does it for you?
Self ( )   Someone ( )

28. If someone does it for you, who does it?
………………………………………………………………………………………....
....
29. Why?

I don't know how to do it   ( )   It's time consuming   ( )

The librarian prefers to do it ( )

30. If training on self-archiving were to be offered would you attend the sessions?

Yes ( )   No ( )

Explain why?
…………………………………………………………………………………………

31. Have you ever searched the IR for information?

Yes ( )   No ( )

32. Would you recommend use of the IR to your peers?

Yes ( )   No ( )   Not sure ( )

Explain why?
…………………………………………………………………………………………

33. Which materials do you feel should be accepted for the IR?
Peer reviewed articles   ( )   non peer reviewed articles ( )

Articles awaiting peer review ( )   Conference papers ( )

Theses/dissertations   ( )   Datasets ( )

Teaching materials ( )   Other (specify): ………………………………

34. Does your institution require (mandate) you to deposit your work into the repository?

Yes ( )   No ( )   I don't know ( )

35. If 'Yes" is the mandate subject to your publisher (for published journal articles) giving you permission to deposit?

Yes ( )   No ( )   I don't know ( )

36. Do the journal publishers you deal with allow you to deposit your research in the IR?
Yes ( )   No ( )   I don't know ( )
Explain
……………………………………………………………………………………………
37. Do your institution's tenure and promotion conditions encourage deposit of materials into the IR?
Yes ( )   No ( )   I don't know ( )

Explain

……………………………………………………………………………………………
38. Have you ever discussed the copyright transfer agreements with your publishers?

Yes   ( )   No   ( )

If 'No" why

……………………………………………………………………………………………
39. What are your sentiments on copyright ownership?

……………………………………………………………………………………………
40. Which of the services listed below does your institution assist you with to understand the repository?

Service	Yes	No
Instruction on how to use the repository		
Assistance in negotiating with publishers		
Storage and preservation service for my work		
Citation counts and impact assessment		
CV services with links to my publications in the repository		
Research assistance in locating other useful publications in the repository		

41. To what extent do you agree with the following statements relating to the challenges regarding depositing research to IRs?

Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
IRs risk reducing the value of peer review process					
IRs will expose more research to plagiarism					
When everyone deposits there is no competitive advantage					
IRs are not as easy to use as journal indexes					
IRs may breach confidentiality of some data					
Depositing to an IR adds extra workload					
Lack of peer review will undermine my work					

Explain your concerns

……………………………………………………………………………………………

42. Under which conditions would you be prepared to deposit your works in the IR? Please select the applicable one(s)

No conditions	
If the integrity of my work is upheld	
If I can still publish in journals	
Protection from plagiarism	
Assurance of long time preservation	
If the material is indexed	
If the IR is searchable on the Web	

43. Any other comments on institutional repositories?
……………………………………………………………………………………………

Thank You

Appendix 2: Questionnaire for Faculty and IR librarians

Title of study: **The status of open access institutional repositories in Zimbabwe's public universities**.

This study seeks to establish the current state of institutional repositories in public universities in Zimbabwe. It also aims at assisting scholars and their institutions develop strategies to make their research output more accessible on such IRs.

Please complete this questionnaire to assist with the objective of the study.

Instructions:

e) *Indicate the most appropriate answers by a tick (√) in the brackets.*

f) *Each question should have only one tick (√) for your chosen answer, unless stated.*

g) *Where the space is provided, write your answer in it.*

h) *Please use a pen to answer this questionnaire.*

The following series of statements pertains to your personal opinions about academic libraries' involvement in scholarly publishing and institutional repositories.

A. IR establishment

1. Institution:

   …………………………………………………………………………………………

2. What is your designation?

   Faculty librarian ( )   IR Librarian ( )   Other (specify)…..………………………….

3. State the Faculty/Department/Institute you represent.

Arts &Humanities	( )	Social Sciences	( )	Applied Sciences	( )
Health Sciences	( )	Engineering	( )	Education	( )
Agricultural Sciences	( )	Law	( )	Development Studies	( )

   Other (specify) _____

4. What role do you play with regards to the IR?

   …………………………………………………………………………………………

5. How many years has your IR been operational? …………………………………….

6. Approximately how many items are currently in your IR? ………………….

7. How current is the IR content?

    ………………………………………………………………………………………………

8. How is the IR discoverable
    On the internet ( )   On intranet ( )

9. Is your IR user friendly?
    Yes   ( )   No ( )

    Explain your answer

    …………………………………………………………………………………………………
10. Are IRs easy to search using different search strategies? ……………………………

    Yes   ( )   No ( )

11. What is your perception of IRs as information resources for academic research?

    …………………………………………………………………………………………………

12. When the IR was established, did it in any way affect your work?

    Yes   ( )   No ( )

13. How were you affected?

    I was not at all affected   ( )
    New job responsibilities were assigned   ( )
    IR responsibilities were added onto the existing load   ( )

14. Do you agree with the notion that academic libraries should create professional positions
    for the management of open access initiatives, projects and repositories.

    Strongly Disagree   ( )   Disagree   ( )   Not sure   ( )
    Agree   ( )   Strongly Agree   ( )
    Explain……………………………………………………………………………………

15. Did you receive any training on IR maintenance, content recruitment, etc.?
    Yes   ( )   No   ( )

16. If "yes" describe the mode of training

…………………………………………………………………………………………………

17. Do you think IRs are an important driver of scholarly publishing?

Yes   ( )   No   ( )

Explain………………………………………………………………………………………

18. Do you have any qualification or experience in publishing?

Yes   ( )   No   ( )

19. Do you think the principles of open access are in tandem with the role of academic libraries?

Strongly Disagree ( )   Disagree ( )   Not sure   Agree ( )

Strongly Agree ( )

Explain:…………………………………………………………………………………………

20. To what extent do you agree with the notion that open access institutional repositories will fail without the active involvement of academic libraries.

Strongly Disagree ( )   Disagree ( )   Not sure ( )

Agree ( )   Strongly Agree ( )

Explain:…………………………………………………………………………………………

B. Marketing and promotion of the IR
21. Is there a mandate in the institution for depositing research to the IR (theses, conference papers etc.)?

Yes   ( )   No   ( )

22. What strategies are you using or intend to use in creating awareness of the IR for the academic community?

…………………………………………………………………………………………………

23. Were you trained/appraised on the pertinent issues to discuss with faculty in your marketing of the IRs?

Yes   ( )   No   ( )

Explain………………………………………………………………………………………

24. To what extent do you agree with the statement that academic libraries should educate faculty about open access and institutional repositories?

Strongly Disagree　　( )　　　　　　　Disagree　　( )　　　　　　　Not sure　　( )

Agree　( )　　　　　　　Strongly Agree　　　　　　( )

Explain:………………………………………………………………………………

………………………………………………………………………………………

25. What challenges do you face in your marketing and promotion of your institutions IR?

………………………………………………………………………………………

26. Which level of academics has a higher acceptance and response rate to IRs?

Professors ( )　　　　　Senior lecturers ( )　　　　　lecturers ( )

Research fellows　( ) Teaching Assistants　( )　　Staff Development Fellows　( )

Explain:………………………………………………………………………………

C. Content recruitment

27. Are you responsible for content recruitment?
Yes　　( )　　No　　　( )

28. If 'No', whose responsibility is it?

………………………………………………………………………………………

29. List the types of materials you accept into your IR?

………………………………………………………………………………………

30. Would you say the academics are forthcoming with materials for deposit?
Yes　　( )　　　　　　No　　　()
31. Is deposit mandatory or voluntary?

Mandatory　　( )　　　　　　Voluntary　　( )

32. Do you agree with the fact that academic libraries should encourage faculty to deposit scholarly work that they do not intend to publish via traditional means (such as working papers, datasets, or multimedia presentations) into open access digital repositories.

Strongly Disagree　　( )　　　　　　Disagree　　( )　　　　　　Not Sure　　( )

Agree　( )　　　　　Strongly Agree　　( )

33. To what extent do you agree with the notion that academic libraries should encourage campus administration to adopt tenure and promotion policies that support a faculty member's decision to publish in open access sources?

Strongly Disagree   ( )   Disagree   ( )   Not Sure   ( )

Agree ( )   Strongly Agree   ( )

34. Who does the deposit of content into the IR?

Self-archiving by academics ( )   Faculty Librarian   ( )

IR Librarian   ( )   Both (academics and Librarian)   ( )

35. Do you also harvest content from journals and other databases?

Yes   ( )   No   ( )

36. Does your institution engage in copyright clearance activities with publishers in order to make published faculty research available in the IR?

Yes   ( )   No   ( )

37. How do you deal with copyright permissions?
……………………………………………………………………………………………………

38. Who does the copyright clearance?

Author   ( )   Librarian ( )

39. What resources or services does your institution use to determine publisher IR deposit policies? (tick all that apply)

SHERPA/RoMEO   ( )   Copyright Clearance Center ( )

Copyright policies from publisher website   ( )   OAKList   ( )

Author license agreements downloaded from publisher website   ( )   Other ( )

40. What copyright clearance challenges do you face? (tick all that apply)

Determining the identity of the publisher   ( )
Obtaining publisher copyright policies   ( )
Interpreting publisher copyright policies   ( )
Creating a scalable model for copyright clearance   ( )

Limited time for copyright clearance activities   ( )
Limited copyright expertise   ( )
Limited staffing for copyright clearance activities   ( )
Other   ( )

41. Do you agree with the fact that academic libraries should educate faculty about intellectual property issues?

Strongly Disagree   ( )   Disagree   ( )   Not sure   ( )

Agree ( )   Strongly Disagree   ( )

42. Do you train academics on issues of plagiarism, creative commons, self-archiving etc?

Yes   ( )   No   ( )

43. If 'Yes', are they now able to demonstrate an understanding of their rights as authors?

……………………………………………………………………………………………

44. If 'No', why not?

……………………………………………………………………………………………

45. Any other comments

……………………………………………………………………………………………

Thank you

Appendix 3: Interview guide for Library Directors

Title of study: The status of open access institutional repositories in Zimbabwe's public universities.

This study seeks to establish the current state of institutional repositories in public universities in Zimbabwe. It also aims at assisting scholars and their institutions develop strategies to make their research output more accessible on such IRs.

Instructions: Please respond to the following questions to the best of your ability and as honestly as possible.

A. Institutional repository establishment

1. Institution: …………………………………………………………
2. How many IRs do you have? ……………………………
3. When were these IRs established? ……………………
4. Which software do you use to host the IR?

    ……………………………………………………………………………

5. If you have 2 or more repositories, are they discipline or general repositories?

    ....

6. How long did it take you to have the repository functional from the time you conceived the idea?

    ……………………………………………………………………………………
    ……………………………………………………………………………………

7. Have you registered the repository with a repository directory e.g. OpenDOAR & ROAR? (If 'yes' when? If 'no' why?)

    ……………………………………………………………………………………
    ……………………………………………………………………………………

8. Is the repository available on the internet and or intranet?

    ……………………………………………………………………………………
    ……………………………………………………………………………………

9. What challenges did you encounter in getting support from your institutions management to develop the IR?

    ……………………………………………………………………………………

10. Do you have an IR team/committee and what criteria were used in the selection of the team?

………………………………………………………………………………………………

What implications did the establishment of the repository have on staffing?

………………………………………………………………………………………………

Which categories of staff are involved in the management of the IR?

………………………………………………………………………………………………

Did they receive training on open sources and IR issues? Explain the nature of training they received.

………………………………………………………………………………………………

Outline the types of materials you include in your IR.

………………………………………………………………………………………………

B. Roles of library staff

11. Do you liaise with faculty regarding the depositing of research materials and use of the IR?

………………………………………………………………………………………..

12. Has there been any reorganization of library staff and were IR duties added to the existing ones?

………………………………………………………………………………………………

What IR responsibilities are fulfilled by your staff?

………………………………………………………………………………………………

13. Does the IR librarian liaise with faculty librarians?

………………………………………………………………………………………………

What strategies do you use to encourage academic staff to deposit their materials?

………………………………………………………………………………………………

14. Are there any challenges to content recruitment and how are you overcoming them?

………………………………………………………………………………………………

Who is responsible for posting to and harvesting content for the repository (academics or IR librarian)?

………………………………………………………………………………………………

Which level of academics is more supportive of the IR initiative (professors, senior lecturers etc.)?

…………………………………………………………………………………………………

How do you deal with copyright permissions processing and whose responsibility is it (author or IR librarian)?

…………………………………………………………………………………………………

C. Marketing and promotion of the IR

15. Do you have an IR policy?

…………………………………………………………………………………………………

Is it mandatory for academics to deposit their papers to the repository?

…………………………………………………………………………………………………

16. Have you made any efforts to encourage university administration to adopt tenure and promotion policies that support a faculty member's decision to publish in open access sources?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

17. What IR marketing strategies do you employ to increase deposits by the academic community?

…………………………………………………………………………………………………

18. Do you conduct any training for academics on issues pertaining to plagiarism, creative commons, self-archiving, etc?

…………………………………………………………………………………………………

19. Would you say your IR has been successful so far?

…………………………………………………………………………………………………

20. Any other comments?

…………………………………………………………………………………………………

Appendix 4: Interview guide for Research Directors

Title of study: The status of open access institutional repositories in Zimbabwe's public universities.

This study seeks to establish the current state of institutional repositories in public universities in Zimbabwe. It also aims at assisting scholars and their institutions develop strategies to make their research output more accessible on such IRs.

Instructions: Please respond to the following questions to the best of your ability and as honestly as possible.

A. Institutional repository establishment

1. Institution: ……………………………………………………………………………….

2. What is your understanding of open access publishing?

   …………………………………………………………………………………………

   What implications does open access publishing have on peer review and career

   advancement for your academics?

   …………………………………………………………………………………………

3. Does your institution have a policy that supports academics publishing in open access

   sources?

   …………………………………………………………………………………………

   Has your institution signed the Berlin Declaration on open access to knowledge in the

   science and humanities?

   Yes ( )   No ( )

   If, No, please explain

   …………………………………………………………………………………………

4. Your institution has established an institutional repository (IR), what benefits does it
   bring to the university?
   …………………………………………………………………………………………

5. Which types of materials should academics deposit in the IR?
   …………………………………………………………………………………………

6. Is there collaboration between your office and the library IR team in content harvesting
   and recruitment?
   …………………………………………………………………………………………

7. Open access publishing and institutional repositories have issues that are of concern for academics, e.g. Intellectual property rights, peer review, authenticity, data integrity, etc. What measures have been or are being employed by your institution to address such concerns for academics?

………………………………………………………………………………………………

………………………………………………………………………………………………

8. Do the tenure and promotion conditions of your institution encourage academics to deposit research to the IR, i.e., can the IR be used to produce a list of publications by an individual for consideration of promotion?

………………………………………………………………………………………………

………………………………………………………………………………………………

9. Is there a mandate for the academics to deposit materials onto the IR?

………………………………………………………………………………………………

………………………………………………………………………………………………....

Any other comments

………………………………………………………………………………………………

………………………………………………………………………………………………

Appendix 5: IR checklist

Title of study: The status of open access institutional repositories in Zimbabwe's public universities.

1. Institution: ....

2. What software is used to host the IR?

   …………………………………………………………………………………………………

3. How current is the deposited content?

   ....

4. What types of content is uploaded to the repository?

   ....

5. Is the repository searchable on the internet?

   ....

6. Is it user friendly?

   ....

7. Is the repository listed on OpenDOAR or ROAR or any other open source platform?

   ....

Appendix 6: Ethical clearance letter

UNIVERSITY OF KWAZULU-NATAL ™

INYUVESI YAKWAZULU-NATALI

15 September 2014

Mrs Mass Masona Tapfuma (213574095)
School of Social Sciences
Pietermaritzburg Campus

Protocol reference number: HSS/0941/014D
Project title: The status of open access institutional repositories in Zimbabwe's public universities

Dear Mrs Tapfuma,

Full Approval – Expedited Application

With regards to your response to our letter dated 14 August 2014, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully
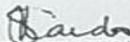
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Professor Ruth Hoskins
Cc Academic Leader Research: Professor Sabine Marschall
Cc School Administrator: Ms Nancy Mudau

Appendix 7: Letter of introduction

UNIVERSITY OF
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

25 October 2015

Dear Respondent,

Invitation to participate in a survey

My name is Mass M. Tapfuma, a PhD in Information Studies candidate at the University of KwaZulu-Natal. I kindly invite you to participate in this research project entitled **"The status of open access institutional repositories in Zimbabwe's public universities"**. I am conducting this study as part of the requirements of the Doctoral degree programme.

The aim of this study is to establish the current state of institutional repositories in public universities in Zimbabwe. It also aims at ascertaining the reasons why scholars do not deposit their works to their IRs with a view to assisting scholars and their institutions develop strategies to make their research output more accessible on such IRS. Results of the study will be disseminated through conferences, workshops and publications.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Please note that your name will not be included in the report and your confidentiality will be maintained throughout the study. There will be no monetary gain from participating in this research project. The information that you will provide will be used for academic purposes only and not otherwise.

Your participation in answering the questions is completely voluntary. You have the right to withdraw at any time during the study. I appreciate the time and effort it would take to participate in this study. The questionnaire will take 20 minutes to complete.

Yours sincerely,

Mass M. Tapfuma

Telephone number: +27 (0) 842333998 or   +263 (0) 774566572
Email address: maitapfuma@gmail.com or   213572095@stu.ukzn.ac.za

Supervisor: Prof Ruth Hoskins
Institution: University of KwaZulu-Natal
Telephone number: + 27 (0) 33-260 5093
Email address:hoskinsr@ukzn.ac.za

HSSREC Research Office: Ms P Ximba
Institution: University of KwaZulu- Natal
Telephone number: +27 (0) 31 260 3587
Email address: ximbap@ukzn.ac.za

Appendix 8: Informed consent for questionnaire survey

Please complete this form.

Title of study: The status of open access institutional repositories in Zimbabwe's public universities

I..., hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participate in the research project as outlined in the document about the study.

I acknowledge that I have been informed of the purpose of this survey. I am aware that participation in the study is voluntary and I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participant

Signature …………………....................................
Date: ....
Email: …………………………………..……….

Researcher

Signature …………………………………………
Date: ………………………………………..

Appendix 9: Informed consent for interviews

Please complete this form

Title of study: The status of open access institutional repositories in Zimbabwe's public universities

I.., hereby confirm that I understand the contents of this document and the nature of the research project, and I agree to participate in the research project as outlined in the document about the study.

I consent / do not consent to have this interview recorded.

I acknowledge that I have been informed of the purpose of this interview. I am aware that participation in the study is voluntary and I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participant

Signature ……………….....................................
Date: ....
Email: ……………………………….…..…….

Researcher

Signature …………………………………
Date: ……………………………………..

Appendix 10: Letter of request to conduct research

University of KwaZulu-Natal
Pietermaritzburg
Information Studies,
School of Social Sciences,
College of Humanities
Pte Bag X01,
Scottsville, 3209

26 March 2014.

The Registrar
Name of University
Address
Zimbabwe

Dear Sir/Madam

RE: REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH

My name is Mass M. Tapfuma (213574095), a PhD student in Information Studies in the School of Social Sciences, College of Humanities at the University of KwaZulu-Natal, Pietermaritzburg.

As part of my doctoral studies I am undertaking research on the "Scholarly publishing and the status of institutional repositories Zimbabwe's public universities. My supervisor is Professor Ruth Hoskins. Some of the methods that will be used in gathering data for the research include questionnaires for academics/scholars, interviews with research directors and librarians and repository analysis. The outcomes of this study will be beneficial to scholars and researchers when they realise and acknowledge the value of open access institutional repositories in scholarly publishing and communication of research findings in order to attempt to solve the Zimbabwean research access and visibility problems with a Zimbabwean solution. The survey will also guide policy makers in government and the universities on pertinent issues to consider in IR policy formulation and develop measures that will enable them to motivate and retain experienced staff so that there is lifelong mentoring of researchers and publishing skills will be passed on to emerging scholars and researchers.

The purpose of this letter is to request permission to conduct these interviews, distribute the questionnaires and analyse your institutional repository, and to request any other information that could assist this research. I intend to collect data from January-March 2015. The data collected

will be treated with confidentiality and anonymity. I shall be very grateful for your assistance and I appreciate your cooperation in advance.

Yours sincerely,

Mass Tapfuma
E-mail: maitapfuma@gmail.com or 213574095@stu.ukzn.ac.za

Appendix 11: BUSE Permission to conduct research

REGISTRY DEPARTMENT

P Bag 1020
BINDURA, Zimbabwe

Tel: 0271 – 7531-6, 7621-4
Fax: 263 – 271 – 7534

DURA UNIVERSITY OF SCIENCE EDUCATION

HUMAN RESOURCES

6 June 2014

Mr Mass Tapfuma
University of KwaZulu-Natal
Pietermaritzburg
Information Studies
School of Social Sciences
College of Humanities
Pte Bag X01
Scottsville, 3209
SOUTH AFRICA

Dear Mr. M Tapfuma

**RE: APPLICATION FOR PERMISSION TO CARRY OUT EDUCATIONAL
RESEARCH IN THE UNIVERSITY**

Permission to carry out Research on:

**SCHOLARY PUBLISHING AND THE STATUS OF INSTITUTIONAL REPOSITORIES
IN ZIMBABWE'S PUBLIC UNIVERSITIES**

Bindura University of Science Education has granted you the permission on the following
conditions.

a)   That in carrying out this research you do not disturb the programmes of the
Department.
b)   That you avail to the University a copy of your research findings.
c)   That the permission can be withdrawn at any time by the Registrar or by any higher
officer.

I wish you success in your research work and in your University College studies.

Yours faithfully

TF Rumhuma (Mrs)
REGISTRAR

Appendix 12: CUT permission to conduct research

CHINHOYI UNIVERSITY OF TECHNOLOGY
✉: P. Bag 7724, Chinhoyi ☎: 263-67-22203-5 🖷: 263-67- 27214 E-mail : vicechancellor@cut.ac.zw

Vice-Chancellor's Office: Prof. D. J. Simbi – PhD, BSc, MIM, CEng, FZ'welE, FICorr, FZAS, Hons FZ'welE

3 June 2014

Mass Tapfuma
University of KwaZulu Natal
Pietermaritzburg
CHINHOYI

Dear Mass Tapfuma

RE: <u>REQUEST TO CARRY OUT A RESEARCH PROJECT AT CHINHOYI UNIVERSITY OF TECHNOLOGY</u>

We acknowledge receipt of your application letter dated 26 March 2014 seeking permission to undertake a research on the "Scholarly publishing and the status of institutional repositories in Zimbabwe's public Universities'.

You are kindly advised that permission to undertake your study is hereby granted. However, you are reminded to observe the University Official Secrecy Oath.

The University would also expect results of your research upon completion.

Thank you.

T.A. Kaseke (Mr)
DEPUTY REGISTRAR, HUMAN RESOURCES

Appendix 13: GZU permission to conduct research

Registrar
Ms S. Tirivanhu
P O Box 1235
MASVINGO
Tel: 039-252100
Fax: 039-252100

Off Old Great Zimbabwe Road
MASVINGO
E mail: stirivanhu@gzu.ac.zw

GREAT ZIMBABWE UNIVERSITY

15 April 2014

M. Tapfuma
University of KwaZulu-Natal
Pietermaritzburg
Information Studies,
School of Social Sciences,
College of Humanities
Pte Bag X01,
Scottsville, 3209

Dear M. Tapfuma

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH WITH GREAT ZIMBABWE UNIVERSITY

The above matter refers.

This is to confirm that your request has been approved, but please note that we would request a copy of your findings too.

Wishing you good luck in your studies.

Sincerely

S. Tirivanhu (Ms)
Registrar

GREAT ZIMBABWE UNIVERSITY
REGISTRAR'S DEPARTMENT
1 5 APR 2014
P.O. BOX 1235, MASVINGO
TEL. (039) 252100 : FAX (039) 252100

Appendix 14: HIT permission to conduct research

Harare Institute of Technology
P.O. Box BE 277
Ganges Road, Belvedere
Harare, ZIMBABWE
Tel: 263-4-741422-37
Fax: 263-4-741406
Email: Admin@hit.ac.zw

REGISTRAR'S OFFICE

7 July 2014

Mrs Mass Tapfuma
University of KwaZulu-Natal
Information Studies
School of Social Sciences
College of Humanities
Pte Bag X01, Scottsville, 3209
SOUTH AFRICA

Dear Mrs Tapfuma

RE: PERMISSION TO CARRY OUT RESEARCH

Your letter dated 26 March 2014 in connection with the above matter refers.

Please be advised that you have been granted the permission to carry your research at Harare Institute of Technology. Kindly submit a copy of your research document to this office upon completing your research.

Yours sincerely

L. Kusema (Mr)
DEPUTY REGISTRAR- ACADEMIC AFFAIRS

Cc: Vice Chancellor
Registrar

Appendix 15: LSU permission to conduct research

Lupane State University

5ᵗ Floor
Pioneer House
P O Box AC 255
Tel: +263-9-63310 (Direct) 73770/1
Telfax: +263-9-63311
BULAWAYO,
ZIMBABWE
E-mail: jmakunde@lsu.ac.zw

Registrar's Office

3 April 2014

University of KwaZulu-Natal
Pietermaritzburg
Information Studies,
School of Social Sciences,
College of Humanities
Pte Bag X01,
Scottsville, 3209

Dear Mass Tupfuma

REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH

The above subject refers.

This letter serves to grant you permission to undertake a research on the "Scholarly publishing and the status of institutional repositories in Zimbabwe's public universities" in our university from January to March 2015 as requested.

Thank you

J Makunde
REGISTRAR
cc   Running File

Appendix 16: MSU permission to conduct research

Approved

30/06/14

UNIVERSITY OF
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

University of KwaZulu-Natal
Pietermaritzburg
Information Studies,
School of Social Sciences,
College of Humanities
Pte Bag X01,
Scottsville, 3209

26 March 2014.

The Registrar
Mr E. Mupfiga
Midlands State University
P. Bag 9055
Gweru
Zimbabwe

Dear Sir,

RE: REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH

My name is Mass M. Tapfuma (213574095), a PhD student in Information Studies in the School of Social Sciences, College of Humanities at the University of KwaZulu-Natal, Pietermaritzburg.

As part of my doctoral studies I am undertaking research on the "Scholarly publishing and the status of institutional repositories in Zimbabwe's public universities". My supervisor is Professor Ruth Hoskins. Some of the methods that will be used in gathering data for the research include questionnaires for academics/scholars, interviews with research directors and librarians and repository analysis. The outcomes of this study will be beneficial to scholars and researchers and will highlight the value of open access institutional repositories in scholarly publishing and communication of research findings in order to attempt to solve the access and visibility problems to Zimbabwean research The survey will also guide policy makers in government and the universities on pertinent issues to consider in Institutional Repository (IR) policy formulation and develop measures that will enable them to motivate and retain experienced staff so that there is lifelong mentoring of researchers and publishing skills will be passed on to emerging scholars and researchers.

The purpose of this letter is to request permission to conduct these interviews, distribute the questionnaires and analyse the management and content of your institutional repository, and to request any other information that could assist this research. I intend to collect data from January

Appendix 17: NUST permission to conduct research

National University of Science and Technology

P. O. Box AC 939. Bulawayo, Zimbabwe

Cnr. Gwanda Road/Cecil Avenue

Telephone: 263-9-282842/288413/39/58

Fax: 263-9-289057

From Registrar F. Mhlanga Dip Edu, BEd, MSc(UZ); MBA (NUST)

FM/sm

27 May, 2014

Mrs M M Tapfuma
National University of Science and Technology
Department of Publishing
P O Box AC 939
Ascot
BULAWAYO

Dear Mrs Tapfuma

REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH AT THE NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

Reference is made to your letter dated 26 March, 2014 and re-sent to us 22 May, 2014 on the above request.

We would like to inform you that you have been granted permission to undertake research in partial fulfillment of your Doctor of Philosophy study on the research title "*Scholarly publishing and the status of institutional repositories in Zimbabwe's public universities*".

We would like to emphasize that all the information gathered should be for research purposes only and that confidentiality has to be exercised.

The University wishes you all the best in your research.

Yours sincerely

NATIONAL UNIVERSITY
OF SCIENCE AND TECHNOLOGY
REGISTRAR

2014 -05- 2 7

P.O. BOX AC 939, ASCOT
BULAWAYO
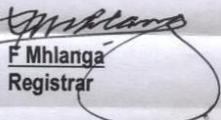
F Mhlanga
Registrar
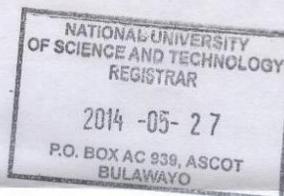
cc   Dean of Faculty of Communication and Information Science
        Librarian

Appendix 18: UZ Rejection letter

P O Box MP 167
Mount Pleasant
Harare, Zimbabwe
General Line: +263-4-303211 Ext 11105
Direct Line: +263-4-303284
Fax: +263-4- 308941
e-mail: officeoftheregistrar@admin.uz.ac.zw
website: www.uz.ac.zw

From the Registrar
Sergeant Chevo

UNIVERSITY OF ZIMBABWE

3 July 2014

Ms Mass Tapfuma
University of Kwazulu – Natal
Pietermaritzburg
Information Studies,
School of Social Sciences,
College of Humanities
Pte Bag X01,
Scottsville, 3209
SOUTH AFRICA

Dear Ms Tapfuma

Email: maitapfuma@gmail.com
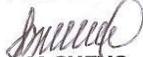   213574095@stu.ukzn.ac.za

RE: **REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH**

Reference is made to your letter dated 26 March 2014.

I regret to inform you that the request for approval to conduct research at the University of Zimbabwe was not successful.

Please be advised accordingly.

Yours sincerely

S M CHEVO
Registrar

/lg

Appendix 19: ZOU permission to conduct research

ZIMBABWE OPEN UNIVERSITY
"Empowerment Through Open Learning"

REF: NC 14/1

27 May 2014

Mass Tapfuma
University of KwaZulu-Natal
Pietermaritzburg
Information studies
School of Social Sciences
College of Humanities
Pte Bag X01
Scottsville, 3209

RE: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH AT
            ZOU

Reference

'A' Your letter dated 26 March 2014 on the above matter refers.

Kindly be advised that your request to carry out research at the Zimbabwe Open
University has been granted. Upon completion of your research kindly submit a
copy of your research to the Registrar's Office.

Thank you

D NDUDZO
REGISTRAR

Distribution:
Internal
Information
Vice Chancellor

4th Floor STANLEY House*Corner 1st Street/ Jason Moyo Avenue
P. O Box MP 1119 Mount Pleasant Harare
TEL: 263-4-793009 FAX: 263-4-703679

Appendix 20: Editor's report

c/o B16 Coronation Cottages
Fife Street
Bulawayo

14 December 2016

Appendix 19: Editor's Report on Mass Masona Tapfuma Thesis

On the two days of editing this Thesis, I have not had time to go beyond stylistic and consistency editing to assist this well written presentation.

1. Have checked all chapter headings against content listing for errors.

2. Have checked chapter headings for punctuation or use of capitals.

3. Have checked subheadings within chapters for consistency.

4. Have checked for consistency in spaces above and below headings and sub headings of same weight.

5. Presentation of Tables and Figures consistency checked.

6. Captions spacing checked.

7. Consistency in use of italics especially on itemized points throughout the chapters.

8. Searched for widows and orphans.

9. Questioned numbering of items 7 – 12 instead of 1 – 6 for justification.

10. Checked the policy on illustrative figures and tables for chapters 6 and 7. Why not?

11. Checked on blank page number 205. Justification.

12. Confirmed consistency of alphabetic listing of Private Universities on text page 2.

13. Confirmed some small errors in the abstract pages, dedication and acknowledgement.

There was not sufficient time to read the Thesis line by line or word for word.

Conclusion

The issues dealt with by the editor brought to the fore that the candidate devoted a lot of time and thought in the presentation of this document and must be commended for the very low editorial issues raised. This speaks a lot also to the skills of those who read he work during its chapter by chapter development.

The Editor recommends that the candidate attends to the obvious queries befor submission.
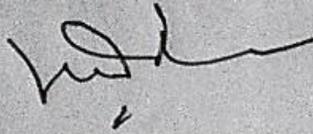
Dr. (Rev.) Ndabezinhle Luke Dlodlo
D.D. [AIHT]; MPA [UZ], B.Sc. Hons. [Brunel - UK].