INSTITUTIONAL AND EXTERNAL FACTORS AS CORRELATES OF SUSTENANCE OF INSTITUTIONAL REPOSITORIES IN NIGERIAN UNIVERSITY LIBRARIES

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ABSTRACT

Nigerian universities are embracing Institutional Repositories (IRs) to digitise local grey literature (theses, dissertations, inaugural lectures, and monographs), to maximise their visibilities and intellectual output impacts. However, evidence has shown that most of the Nigerian universities that have adopted IR find it difficult to sustain. This study, therefore, was designed to examine the extent to which institutional (awareness, Lecturers' Attitude towards IR- LAtIR, infrastructure, funding, and Digitisation Procedures- DP) and external (Technological Changes- TC and Copyright Issues- CI) factors correlate with IRs' sustenance in Nigerian university libraries.

Vroom's Expectancy Theory and Davis' Technology Acceptance Model served as an anchor, while the survey design was adopted. Eight universities (Ahmadu Bello University, Zaria (ABU); Covenant University, Ota (CU); Federal University, Oye Ekiti (FUOYE); Federal University of Technology, Akure (FUTA); Obafemi Awolowo University, Ile-Ife (OAU); University of Ibadan, Ibadan (UI); University of Jos, Jos (UNIJOS) and University of Nigeria, Nsukka (UNN)) that were operating IRs as at 2016 were adopted. Three faculties (Science, Social Science and Arts/Humanities) that were common to these universities were adopted, while three departments were randomly selected from each faculty. Proportional sample size technique was adopted to select 10.0% of the lecturers in each department; making a total of 844 lecturers. Instruments used were Institutional (with five sub-scales) and External (with two sub-scales) factors questionnaires, IRs' Sustenance Scale (r=0.82) and IRs Questionnaire (r=0.76). In-depth interviews were conducted with the 24 digitisation staff. Analysis of quantitative data were done with descriptive statistics, Pearson product-moment correlation and Multiple Regression at 0.05 level of significance while the qualitative data were thematically analysed.

Respondents' age was 45.5 ± 2.65 years, while 51.5% were aware of IR , only 19.1% were knowledgeable about it, and 50.3% had positive attitude towards IR. Material contents of IRs were: theses/dissertations (25.9%), inaugural lectures (24.1%) and staff publications/journal articles (17.3%). The level of awareness of IRs was low in all the universities: FUOYE (37.0%), OAU (27.0%), UI (27.0%), FUTA (21.0%), UNN(14.0%), UNIJOS (13.0%), ABU (12.0%) and CU (12.0%). The CU(64.3%), OAU (53.6%), UNN (51.4%) and UI (51.0%) had favourable attitude towards IRs compared to others. Only CU had adequate infrastructural facilities and funding for IR sustenance. Awareness (r=0.27), LAtIR (r=0.47), funding (r=0.31), DP (r=0.15) and TC (r=0.18) had significant relationships with IRs sustenance. The independent measures had a joint significant prediction (F$_{(2;748)}$=159.29; Adj. R^2=0.30) on IRs sustenance, accounting for 29.7% of its variance. Lecturers' Attitude towards IR (β=0.40), funding (β=0.33), awareness (β=0.15), DP (β=0.09) and CI (β=-0.09) contributed to IR. Technological support, inadequate computer system, software adoption, inadequate funding and infrastructural facilities and insufficient network were the major challenges to IR sustenance.

Lecturers' negative attitude, poor funding, Low level of awareness, digitisation challenges, inadequate infrastructure, technological and copyright issues influenced the sustenance of institutional repositories in Nigerian universities. Therefore provision should be made for adequate funding, effective technological support and improved computer networking as well as embarking on mass awareness campaign, to ensure better sustenance of institutional repositories in Nigerian universities.

Keywords: **Institutional repositories, Library digitisation, Nigerian grey literature and Nigerian university libraries**
Word count: 499

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DEDICATION

The research is solely dedicated to my gem of inestimable value and faithful husband: Pastor Stanley Onyeka Okoroma, for his unconditional and sacrificial love, wholesome support, prayers, and encouragement that helped in shaping my life as well as in realising this thesis.

CERTIFICATION

I certify that this work has been carried out by Mrs. Francisca Nwakaego OKOROMA in the Department of Library, Archival and Information Studies, Faculty of Education, University of Ibadan, Nigeria.

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LIST OF ACRONYMS

ABU	Ahmadu Bello University
AGORA	Access to Global Online Research in Agriculture
ANA	Association of Nigerian Authors
ARNO	Academic Research in the Netherlands Online
BOAI	Budapest Open Access Initiatives
CAUL	Consortium of Anatolian University Libraries
CDL	California Digital Library
CI	Copyright Issues
CU	Covenant University
CURL	Consortium of University Research Libraries
DATAD	Database of African Theses and Dissertation
DOAJ	Directory of Open Access Journal
DP	Digitisation Procedures
DOAR	Directory of Open Access Repository
EUA	European University Association
EV	Expected Value
FUOYE	Federal University, Oye Ekiti
FUTA	Federal University of Technology
GDLS	Greenstone Digital Library Software
HINARI	Health Internetwork Access to Research Initiatives
ICTs	Information and Communication Technologies
IR	Institutional Repository
IRs	Institutional Repositories
IRQ	Institutional Repository Questionnaire
JISC	Joint Information Systems Committee
LAtIR	Lecturers' Attitude towards Institutional Repository
LDL	Librarian's Digital Library
MIRACLE	Making Institutional Repositories a Collaborative Learning Environment
MIT	Massachusetts Institute of Technology
NCC	Nigerian Copyright Commission.

NGE	Nigerian Guild of Editors
NULIB	Nigerian University Libraries
NUC	National Universities Commission
OA	Open Access
OAA	Open Access Archiving
OAI	Open Archives Initiative
OAIS	Open Archival Information System
OARE	Online Access to Research in the Environment
OAU	Obafemi Awolowo University
OSU	Ohio State University
PEOU	Perceived ease-of-use
PU	Perceived Usefulness
REPRONIG	Reproduction Rights Organisation of Nigeria
SHERPA	Securing a Hybrid Environment for Research Preservation and Access
SNA	Society of Nigerian Artists
TAM	Technology Acceptance Model
TC	Technological Changes
UNIJOS	University of Jos
UNN	University of Nigeria, Nsukka
UI	University of Ibadan
UNECA	United Nations Economic Commission of Africa
UTAUT	Unified Theory of Acceptance and Use of Technology
WWW	World Wide Web

CHAPTER ONE
INTRODUCTION

1.1   Background to the study

The significance of setting up higher education institutions is basically to equip the general public with the aim of imparting knowledge, conducting researches and manpower training. Higher education institutions can barely accomplish the set objectives and impact the society unless its scholarly communication is well accessible and used by the university community and those at the helm of decision-making. Consequently, it is expected that the academia should be facilitators in documenting, disseminating as well as the preservation of the scholarly communication of the academic members of their faculties, undergraduates, postgraduates, including other members of staff for the best access and use to achieve the aims, visions, and missions of the institutions. The division of the university that ensures that there are effective management and diffusion of information to sustain the prompt as well as efficient accomplishment of the objectives of the institution is the library.

However, several academic libraries are faced with information and knowledge resources drought, particularly as regards local intellectual content (such as research work of faculty members, inaugural lectures, theses, and dissertations) due to economic recessions. A vast disconnect has been observed between the universities and those who utilize the knowledge and information for research, human capital development and for education purposes. A study carried out by Shulenburger (2007) on systems for sharing the researchers' scholarly outputs, showed that a small quotient gave any sort of positive reaction. That means that there is virtually no system that caters for the publication of research output within the universities.

In most parts of African states, much resources are utilised in carrying out researches which are however not commensurately accessed, most especially grey literature, according to Aina (1995) and Okoroma (2011). For example, as affirmed by the National Universities Commission (NUC, 2016), the country has one hundred and forty-one higher institutions of learning or universities, which exceed other nations across the Sub-Saharan Africa. All such institutions serve as crucial centres for scholarly exploration in Nigeria. Hence, the quantity of scholarly output that originates from universities focusing on local issues in the country is

expansive. However, a large number of these scholarly outputs tending to issues endemic to the area exist in vagueness.

Due to the confinement of having access to information, there is limitation in science and technology progression which additionally has grievous consequences on the general public. In the academia, the main acceptable method of dissemination of theses, dissertations, inaugural lectures, seminars, and workshops is through publication in peer-reviewed journals and the procedure for this is usually rigorous, slow, and quite expensive. Many libraries in the advanced economies are under pressure to subscribe to the journal articles and books that they want, whereas payments are almost impossible for universities in developing countries, especially in Africa. Emerging nations are currently faced with two challenging options: either to become an essential portion of the education-based worldwide way of life or to confront the risk of being seen at the wrong side of digital divides. This and many other corresponding reasons are compelling changes in the configuration of publishing in academic journals. Some of the other factors as captured by Crow (2002:5) are technological changes such as the ever-present networking and digital publishing technologies, increased volume of research which is a strain on the print publishing model capacity, contributing to dissatisfaction on the users' side, conventional print and online journal prices which have become more difficult to sustain as a result of rising cost and flat budgets of library among other factors.

Researchers have ascertained that it is evident to the academic community that the subscription of journals using the conventional system of academic communication is more of a barrier to access to scholarly literature instead of being an aid to it. It should be noted that journals were an efficient way of disseminating research output in the seventeen century, since writers did not need to fund the publishing procedure to get their works published neither were they remunerated for their scholarly publications. The publishers then were mainly university presses and academic societies. Therefore, libraries were regarded as centres for making the journals available to the public apart from the subscribers. However, after World War II, Robert Maxwell started to buy small university presses and academic journals. Thereafter, he decided to charge authors for publishing their papers to remunerate for the processing expenditures. This resulted in an increase in subscription prices for libraries, while library budgets became strained. During this period, the academia could not control their academic outputs while contents were increasingly less significant than the dissemination. Reluctantly, academics had no other option

but to accept the situation due to the requirement to make public research outcomes, as it contributes to promotions. Also, publications were essential in academic measurements and there seemed to be no other option for scholarly communication.

However, during this period of journal crisis, the internet was still in early stage of development and non-journal intellectual communication made an impact by the use of such medium to communicate research output. By the early 90s the World Wide Web (www) emerged, this opened new chances and aiding publishing in a new dimension, while serving an unlimited potential readership. Open Access (OA) and Open Content developed as mediation in the zone of digital journals (Hernand, 2010).

Prosser (2004) and Willinsky (2003) reported that with the emergence of OA, Internet access to scholarly papers has created diverse opportunities, as well demonstrated that other alternatives to financing the systems can be explored. Open access journals not only deliver articles freely available but also lead the institution into the use of the electronic medium. Many of the early OA journals were pioneered by academics during the period at the point when customary membership-based academic journal articles were still only paper-based published. Consequently, in year 2000, access to computerized scholarly materials and peer-reviewed journal papers were much of the time prompt, free, and without obligations on the web. Libraries had to start to subscribe to electronic journals in the place of print journals while some canceled journals that are for gain for open access articles. The aforementioned have evolved to bring about new desires in the academia for the creation, dissemination, and exchange of academic correspondences and to cause a reexamination in the importance of librarians, writers and publishing firms. In such a domain institutional repository was born. The institutional repository movement originated from the Open Access movement.

Institutional Repository is a system or a resource that engages in the capturing, archiving, preservation, and distribution of an institution's scholarly outcome in a digital format (Rosenblum, 2008). Others view IR as online documentation for the scholarly work of a specific organization for the collection, storage and dissemination of the scholarly effort of the people. This represents a collection of services given by institutions to its stakeholder to provide and maintain the digitized materials. Subsequently, IRs assume unavoidable importance in safeguarding and spreading institutional research work, which in the long run turns into a vital piece of worldwide research output. Institutional repository does not just act to preserve an

organisation's scholarly items but will similarly add to a basic, semi-permanent change in the structure of academic correspondence.

According to Christian (2008), in academic and research based institutions across Third World countries for instance, the deployment of IR will ensure maximum worldwide visibility and utilisation of their research outputs as well as introduce new and innovative research with focus on meeting the standards and principles of the global community. This is because the knowledge by a researcher of the fact that his or her research work will be made available openly worldwide will influence a rethink on his research standard and focus.

Furthermore, IRs give round the clock access to a diverse range of knowledge embedded in logical and innovative information necessary for societal advancement. Institutional repositories offer options to explore researches and resources from different institutions to uninhibitedly distribute scholars' works as well as encourage open access to the result of their research exercises, particularly since it is now clear to the academic society that the customary model of academic correspondence is all the more a hindrance to access to literature instead of being a catalyst to it. Chisenga (2006) ascertained that IRs and Open Access archives initiatives present enormous opportunities for the advancement of African countries. This makes the development and sustenance of IRs in universities and other related research-based institutions across the continent a genuine formative problem that must be tackled with urgent attention.

With the innumerable advantages of institutional repositories, higher institutions of learning and other academic establishments worldwide execute IRs as means for overcoming any issue among authors, researchers, scientists and different information users as well as to conserve their abundance of learning materials. In April 2004 for example, institutional repository came to the cutting edge of Turkish data management leading to the establishment of the Consortium of Anatolian University Libraries (ANKOS), and this turned into the foremost Turkish member of the Networked Digital Library of Theses and Dissertations. The year 2003 denoted the establishment of the Middle East Technical University Library Electronic Theses and Dissertations Archive. Ohio State University's Knowledge Bank is also an example of IR undertaking that tends to the goals of IR. It serves wider advanced objectives, becoming the University's Distance Learning Education Committee. The bank plans to incorporate into their IR content, all the computerised data administrations and resources accessible to the Ohio State University (OSU) people group, regardless of whether made by OSU constituents or not.

Rieh (2009) presented that each institution ought to have an institutional repository but there is some sort of uncertainties about how the institutional repositories should be sustained. All things considered, it is essential to join the institutional repository at present if an establishment does not have any desire to fall behind. A library executive who took an interest in Reih's situation ascertained that institutional repositories ought to be viewed as an institution's investment for the future.

Recognising the significance of a new method of data access, Nigeria's academic libraries are saddled with the duty to digitize their system. Funding organizations like the Federal Ministry of Education (FME) in the country, initiated the Virtual Library Project, with the aim of drawing assets collectively by electronic means, linking together every instructional libraries in the country with the centre at the National Universities Commission (FME, 2000). All participating libraries emerged as access factors to universal information resources. Bozimo (2008) upheld openaccess via IR demands. Opinion on the worldview would potentially make Nigerian scientists and administrators gain preferred standpoint, move high, and turn out to be a piece of the worldwide system of researchers. This is in recognition that whether through a consortium or elite membership, scholarly libraries obtain and disperse electronic entrances and databases.

From the foregoing, IR is a significant infrastructure worthy to channel resources. However, it is not just establishing IRs that is the issue but can the repositories stand the test of time? How can the institutional repositories be sustained?

In the view of Christian (2008), many research and higher institutions of learning in developing nations are yet to conquer numerous hindrances in their endeavor to sustain their IRs. The author further noticed that advancements in the sustenance of institutional repositories in South Africa appear to have been gaining more prominent ground while their partners in Nigeria are caught up in various confusing issues. Okoroma and Abioye (2017), and Okoro and Okogwu (2017) examined the challenges in the management of IRs in Nigerian university libraries and identified some problems such as copyright issues, inadequate ICT infrastructure, and inadequate funding. Okoroma (2019) identified factors such as low server arrangement, low bandwidth, unreliable electricity supply, inadequate funding. Others are technology related and challenges of IRs infrastrural sustainability in Nigeria university libraries.

Also, the IRs established in Ahmadu-Bello University encountered "The smashing of the Dspace server" in 2010 which led to the loss of more than 1200 theses (Abdulkadir, 2013). This further raises the issue of the sustenance and continual utilisation of IRs in universities across the country. The sustenance of IRs has to be emphatically addressed if Nigeria is to achieve the feat of joining other advanced nations in harnessing universities' wealth of knowledge.

The word sustenance according to Oxford Advanced Learner's Dictionary (2006) is the process of making something to continue to exist. Sustenance of a system has to do with the processes engaged in meeting the present need a system requires to deliver, and yet not compromising the needs of the future. Eschenfelder, Shankar, Williams, Salo, Zhang, and Langham (2019) reported that sustainability in the context of a digital repository involves individuals and work practices' arrangements that ensure digital services subsist from time to time despite continuing challenges. The sustenance of IRs refers to the process of making repositories to remain functional by addressing the necessities of the present without compromising the requirements of future generations, through support, provision, and maintenance. In this case, adaptability to changes and innovations is very inevitable if institutional repositories are to attain longevity.

Smit and Pilifosova (2003) defined adaptation as adjustments to the changes in practices, processes, and structures (of IR), in response to the expected or actual stimuli and their impacts or effects. Adaptation of a system on the other hand so much depends on the system's adaptive capacity or the adaptability of the affected system. The capacity of an individual or group to adapt varies considerably amongst regions, countries, and socioeconomic background, and will yet differ with structures that are put in place, over time. Therefore, the enhancement of adaptive capacity means enhancing sustenance. This represents a realistic means of coping with modifications and unpredictable occurrences, including variability and extremes. Therefore, ensuring the sustenance of institutional repositories necessitates putting certain structures in place for the system, and the willingness of the community (affected system) to adapt, cooperate and contribute to the efficient running of their institutional repositories.

Nkiko, Bolu, and Michael (2014) opined that systems back-up are necessary to avert interruption and alleviate the consequences of potential disaster. To determine the required metadata to be adopted for an IR system, attention needs to be given to the problems associated with system necessities, cost, enactment, functionality, safety, usability, workflow, and

interoperability. The authors further proposed that universities should put up intensive programmes to sensitise, enlighten and educate the faculty on copyright dynamics with their intellectual properties to enhance the sustenance of IRs. This is bearing in mind that ensuring the sustenance of institutional repositories requires the collaboration of the entire academics and user community with the libraries' management team and the other stakeholders of IRs. These groups must work in unison to put up some structures that will cause the IRs to meet up with the present mandate and to adapt to the future technological and other environmental changes that may arise. But literature revealed that there are challenges in this regard.

Eke (2011) featured a portion of the difficulties related to the sustainability of IR in the country as inadequate awareness, the poor attitude of lecturers, copyright/legal aspects, policy development (e.g. digitisation process/procedure, content), and infrastructural issues. While Okoroma (2018) supported this position by addressing the issues of knowledge, awareness as well as lecturers' disposition towards IRs in libraries across Nigerian universities. The findings indicated that several lecturers in the academia are not familiar with IR as a concept and display inadequate understanding of its aims and objectives; therefore, the lecturers have low disposit ion to submit their intellectual outputs. Again, Okoroma and Abioye (2017) averted that there is a lack of the existence of workable policies as far as copyright and its implementation, plagiarism, Publishers Contract Policy which gives authors the mandate to give away their copyright in order to publish their works, and a lack of enlightenment programs to educate authors on their intellectual property right. These are all hindrances to IR sustenance in Nigeria.

These divergent issues affecting the sustenance of IRs can be grouped under institutional and external factors. Institutional factors of IRs refer to issues within the universities that influence the sustenance of IRs. Institutional factors of IR include awareness of IR by lecturers, lecturers' attitudes, content, funds, infrastructural, and policy development issues.

Institutional factors originate from within the institutions. By their nature, these limitations can equally be tackled and eliminated by the institutions. The faculty members, the institutional repositories implementation committee and other stakeholders can see the eradication of these impediments. For instance, the content gathering is a very crucial phase of IR (there cannot be IR if the intellectual resources are not there in any case), however, a research conducted by ARL libraries pointed out that the number one issue contending with the implementation of IRs is content recruitment (Bailey, 2006). Other studies constantly maintained

that recruiting content for an IR is thorny (Ware, 2004; Rowlands and Nicholas, 2005; Davis and Connolly, 2007; Salo, 2008 and Okoroma, 2018**).** Harnad (2009) again declared that there is difficulty in populating IRs through voluntary submissions, and this has led to agitating for authorization. Salo (2008) overview of the condition of institutional repositories, painted a complete picture of university teachers' lack of interest to add to institutional repositories. If there is an apathetic disposition towards institutional vaults by academics who are the significant stakeholders of IRs, how at that point can the system be sustained? IRs cannot keep on existing without the undaunted help of the lecturers, thus the need to investigate the attitude of mind of the lecturers towards their institutional repositories.

The disinterest undoubtedly is linked to the mindset of the faculty members. There are many definitions ascribed to attitude by scholars. Brown (2002) characterised it as "a mix of convictions, thoughts, and emotions that impact a person to respond in a constructive or antagonistic approach to objects, individuals, procedures or establishments". Disposition is a sort of mentality, but it can as well be changed because of the way it is displayed by specific boosts. Along these lines, the introduction of counter stimuli and mind reorientation can change a negative attitude to positive or the other way round. Content recruitment for IRs is reliant on lecturers' attitudinal change and different authors to IR sustenance. Another factor is on awareness and advocacy of institutional repositories which is a requirement in lecturers' trust building and other researchers central in populating IRs. Covey (2011) opined that recruiting a significant mass of IR content is dependent on increased awareness, aligning deposit with existing workflows, and provision of value-added services which can meet needs presently unmet by other tools.

Nwokedi (2011) surveyed lecturers' awareness of the existence of IR in the University of Jos, Nigeria and their readiness to submit their intellectual outputs. Surprisingly, he found out that most of the respondents (79%) never had any information about Open Access IR, while just 21% professed to know about the presence of IR in their institution of learning through training led by the library on IR. In any case, when IR advantages were highlighted to the respondents during the research, majority constituting 91.6% affirmed the significance of IR. This therefore emphasizes the role awareness and advocacy play in the attitudinal change of members of the faculty towards IR sustenance.

Furthermore, there is also the question of what should constitute the content of IRs among scholars. The content of IR is very diverse and varies from one institution to another, but most times captures dissertations and theses, unpublished preprints, published papers, working papers, datasets, conference presentations, teaching materials, and so many other materials that are relevant to each institution. Most institutional repositories include grey literature, which by their nature, are usually difficult to access by researchers. In corroboration, Manjunatha (2011) further maintained that IR may contain diverse publications, including theses, dissertations, research reports, conference papers, pre- and post-prints of journal writings, videos, datasets, software, audios, including other intellectual materials. Through this process, scholars' intellectual outputs in the institutions are made freely accessible to the entire knowledge society across the globe. In the opinion of Pennock (2007), series of digital materials generated by institutions of learning and its diverse members of community are extremely different. For example, an institutional repository may include teaching and e-learning materials, e-theses, conference papers, pre- or post-prints of published papers or research reports, datasets and primary research data, among many others. A repository with a mixture of these materials is known as a 'hybrid' repository. Covey (2011) also ascertained that to bridge the differences between disciplinary cultures and their belief systems do present a major challenge in IR marketing as well as in the development of coherent guidelines for deposit. Deciding what to include in the IR has implications on the policy which has to be articulated in IR planning. That means that strategic planning is very crucial for the sustenance of IR.

Deloreto (2004) added that there is a need for a project implementation plan. That will help to channel the resources appropriately and keep driving the project to the finishing line while ensuring the sustenance of the existing system. In respect of the sustenance of IRs, appropriate and adequate planning need be put in place to achieve enduring success. The institutional repositories' committee needs to set up a policy when planning. The policy will spell out what should constitute the content of the IR, and digitisation approach and procedure to be deployed. Again, it has to specify the services that are appropriate for the repository programme, who may contribute to the repository, preservation and migration/copyright, as well as the management and cataloging (Metadata Creation) and time frame amongst others.

It is also worthy of note that the management of institutional repositories is capital intensive. Obtaining resources to finance the sustenance of IRs in university libraries across

Nigeria can be very challenging, considering the current economic recession, coupled with ever decreasing funds available for university libraries in Nigeria. This harms human resource recruitment and infrastructural procurement for the sustenance of the project. For instance, a digitisation project is an inevitable and resource-intensive core aspect of the institutional repository. Dabholkar (2008) informed that for a comprehensive IR implementation, proper infrastructure is needed. This includes hardware and software requirements. There are several software options *viz*: EPrint and DSpace, Greenstone Digital Library Software (GSDL). The procurement of these resources needs a reasonable amount of funds. It also calls for analysis and debate to make the right choice for a sustainable IR and considering the peculiar/local issues of an institution. The awareness, lecturers' attitudinal change, funding, infrastructure, and policy development needed to embark upon a sustainable IR venture can be determined by the stakeholders within the institution. The institutional factors thus reside within the universities and no doubt can be addressed within.

External factors of IR refer to the elements that are without (which the university may not have control over) that could affect the sustenance of institutional repositories. They are the general issues contending with the deployment of IRs worldwide. Prominent among the external factors are technological and copyright issues. External factors most often than not originate from outside of the institutions and so the solutions should embrace stakeholders beyond the institutions. For instance, one of the issues that continues to complicate the deployment and sourcing contents for IR is copyright. The greatest hindrance to self-archiving is the concern of academics on copyright issues (Kim's, 2010) and this has a negative influence on IR sustenance. So many other studies (Kingsley, 2008; Abrizah, 2009Creaser, 2010; Cullen and Chawner, 2010; Manjunatha and Thandavamoorthy, 2011) noted that there is still uncertainty over the copyright status of their intellectual outputs due to reluctance to submit such work in the IR so as not to contravene copyright law. Okoroma and Abioye (2017) acknowledged the negative influence of copyright issues in lecturers' contribution towards the sustainability of IRs in Nigerian university libraries. If the lecturers refuse to submit their works to IRs, the system will eventually collapse so IR can never be sustained.

It should be noted that copyright law is not formulated to hinder access of the public to information rather it was instituted to enhance public access to it by guarding authors' moral and economic rights thereby ensuring publication of more works (Okwilagwe, 2001). Copyright is

the special legal rights granted to replicate literary, musical, or artistic works as well as publish, put up for sale, or distribute same (Webster, 2018). Copyright was formulated mainly to inspire creative people in the production of works of culture as well as to give incentives for effective publication of works. The level of violation of copyright in Nigerian tertiary institutions is depressing (Egonwa, 2005). According to him, reprography is one of the most important ways different activities that amount to copyright infringement (for instance piracy, plagiarism, and counterfeiting) are achieved. This calls for the need to strengthen digital preservation and the effective management of copyright systems to encourage lecturers' participation in the sustenance of IR. The more fear of copyright infringement exhibited, the lesser the lecturers are likely to self-archive, and the lesser the lecturers are willing to archive, the lower the level of IR sustenance.

Additionally, issues bordering on technology should be addressed and further strengthened if sustainability of IRs is to be attained. Okoroma (2019) pointed out that there are numerous challenges as regards technology and infrastructure influencing the sustainability of IRs in libraries across Nigerian universities, including low server configuration as well as insufficient and outdated software and hardware components. As opined by Lynch (2003), institutional repositories need to be supported by ICTs in every area and at all time. Technological changes management and digital content migration from a category of technology to another, as a share of the organisation's obligation to provide storehouse services are strategic services that makeup an IR. Lynch further ascertained that it was quite simple to conserve information in the print age, since the academic paper is in a durable type when adequately prepared and stored in an appropriate place. However, in the inforrmation age, it is more difficult to preserve information; as digital information is delicate and face many threats, including digital storage media deterioration and technological obsolescence (Li, 2011).

Bailey (2006) noted that preservation can be regarded as one among the three top values of institutional repository. Hence, it is important to identify file formats through which institutional repositories will offer lasting access. When making decisions on the preservation of file formats, Jones (2006) proposed that IR personnel should ponder on the format of the file if it is an open format, human-readable and extensively used, if the associated technology is probable to be conserved. Mountain (2002) averred that currently and in the future, institutional repositories have not turn out to be an option for the trusted digital repositories with the aim of

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providing reliable, lasting access to manage digital resources to selected communities. The aforementioned on IRs are required to be tackled to attain IRs sustenance.

It should be noted that there is a lot to be desired as regards the establishment and sustenance of IRs. There exists a despairing record of the adoption of IRs in the developing nations, especially Nigeria, and uncertainty about the continuity of institutional repositories as some have experienced system crash (Abdulkadir, 2013). This may be attributed to the institutional issues as well as external factors militating against the sustainability of IRs. Tonta (2008) pointed out that even the number of European Union countries that have attained an advanced stage in IR is few (in France, UK, Germany, Italy, Denmark, Sweden and The Netherlands). For instance, a study carried out by Association of Academic Health Sciences Libraries (2007) in a 2006 additional research for the Annual Statistics of Medical School Libraries in the United States and Canada, only 28 out of 125 libraries' respondents have developed IRs, while 70 of the respondents continue to plan or contemplate establishing a repository. The project team at the University of Michigan named Making Institutional Repositories a Collaborative Learning Environment (MIRACLE) reported that about half of four-year colleges and universities in USA completed implementation or are at advance stage of planning IRs while the remaining half had no plans for their IRs (Markey, 2007).

Markey (2007) further noted that in the United States, though most of the small and medium-sized institutions have no plans for their institutional repositories, they surprisingly tend to have a positive attitude about IRs and were definitely interested in information on how minor establishments are sustaining their IRs. This means that institutional repository sustenance is a global issue. It has become obvious that institutions are in dire need of identifying with the issues in the sustenance of IR and the resolution to the factors influencing the sustenance of IR in their peculiar environments. The foregoing has brought to the limelight, not only the need for the deployment of IRs in the universities but also the dire need to appraise and challenge the differing institutional and external constraints of IRs to ensure the sustenance of institutional repositories.

1.2   Statement of the problem

Universities are expected to be the custodian of intellectual, research output as well as other valuable literature. A significant part of such literature could remain unpublished and may

never really be fully utilized by the public. An obvious divide continues to exist between exponential literature in university libraries and the users. An IR becomes very necessary in order to maximise the access, impact of intellectual outputs globally. Also, the time-consuming, rigorous, expensive and failure to attend for the grey materials are considered as a flaw of the publishing model currently in use. As a result of the immeasurable benefits accruable from an active IR, libraries over the world are establishing them as a coping mechanism for the preservation, and dissemination of the growing body of scholarly production from universities. Scholars have reported challenges and uncertainties about the sustenance of the existing institutional repositories in Nigeria. The problem of sustenance of IRs can be blamed on institutional and external issues linked to its operations. This ranges from awareness, the disposition of lecturers to yielding their research to the IRs, infrastructure, fund, and copyright-related issues, most importantly in less developed nations. For instance, one of the major challenges of IR remains content development, and lecturers are the key contributors to IRs. If they are not willing to deposit their work to IR, the system will eventually collapse since there cannot be IR without content recruitment.

To tackle the divergent institutional and external factors influencing the sustenanceof institutional repository, there is the need to investigate these factors and come up with knowledge on how they can be effectively controlled to enhance institutional repositories sustenance and further hasten the adoption rate in the country and globally. Therefore, the research set out to investigate the institutional and external factors as correlates of the sustenance of university libraries' IRs across Nigeria with a view to accelerating rate of deployment, maximize access and utilization and positively influence scholarship.

1.3 Objectives of the study

The study's aim is to investigate both institutional and external factors influencing sustenance of university libraries IRs in Nigeria.

The study's specific objectives are as follows:

i. find out the level of awareness and knowledge of Nigerian lecturers on institutional repositories;

ii. ascertain lecturers' attitude to the submission of their research publications to their universities' institutional repositories;

iii. determine the infrastructural issues influencing the sustenance of IRs in libraries across Nigerian universities;

iv. find out the sources of funding for IRs in libraries across Nigerian universities;

v. ascertain the content of IRs in Nigerian university libraries ;

vi. determine the procedures for digitisation of materials in the institutional repositories in libraries across Nigeria;

vii. identify factors relating to technology affecting the sustenance of IRs in Nigerian university libraries;

viii. ascertain the copyright-related issues affecting the sustainance of IRs in libraries across Nigeria; and

ix. identify the structures for sustaining of institutional repositories in Nigerian universities.

x. determine the significant relationship between the institutional factors and the sustenance of institutional repositories in university libraries in Nigeria

xi. find out the significant relationship between external factors and the sustenance of institutional repositories in university libraries in Nigeria.

xii. Identify the important relationship between institutional factors and external issues affecting sustenance of IRs in libraries across Nigerian universities.

xiii. examine the significant relationship between institutional factors and external factors on the sustenance of institutional repositories in Nigerian universities.

xiv. ascertain the significant relative influence of institutional factors and external factors on the sustenance of IRs in Nigeria.

1.4   Research questions

Premised against the aforementioned objectives, research questions were raised for the study:

1. How knowledgable and aware are the lecturers of IRs in universities in Nigeria?

2. What attitude do lecturers display towards the submision of their academic findings to IRs?

3. What infrastructural factors affect sustaining IRs in libraries across Nigerian university?

4. What are the sources of funding for IRs in Nigerian university libraries?

5. What constitutes the content of institutional repositories in Nigerian university libraries?

6. What digitisation procedures are required for the implementation of institutional repositories?

7. What are the technological issues impacting the sustainability of IRs in university libraries in Nigeria?

8. What are the copyright-related issues affecting the sustenance of IRs in university libraries in Nigeria?

9. What are the structures put in place for the sustenance of IRs in university libraries?

1.5 Hypotheses

The research tested the following hypotheses at 0.05 significance level:

H_O1: There is no significant relationship between the institutional factors and the sustenance of institutional repositories in Nigerian university libraries.

H_O2: There is no significant relationship between external factors and the sustenance of institutional repositories in university libraries in Nigeria.

H^03: There exists no significant relationship between the institutional factors and the external factors affecting the sustenance of IRs across Nigerian libraries.

H_04: There exists no significant relationship between institutional and external factors on the sustenance of institutional repositories in university libraries in Nigeria.

H_05: There exists no significant influence of institutional and external issues sustaining IRs across Nigerian libraries.

1.6 Scope of the study

This research focused on the organisational factors (awareness, lecturers' attitude towards IR, infrastructure, funding, and digitisation procedures) and external factors (technological and copyright) as correlates of the sustenance of repositories in universities and proposed solutions, to enhance IR sustenance in Nigeria universities. This study examines how awareness, lecturers' attitude, infrastructure, funding, technology as well as copyright influence the operation and institutional repositories sustenance in libraries across Nigerian universities.

The research focused on eight universities in Nigeria that have adopted and successfully implemented an institutional repository project. This is because the universities' lecturers and librarians are the ones that, because of experience, can make rational contributions towards

institutional repository sustenance, for documentation for institutions looking forward to actualising their dreams of IR. The eight universities used in the study are ABU, Zaria; CU, Ota; FUTA, Ekiti State; OAU, Ile-Ife, UI, Ibadan; UniJos, Jos; UNN, Enugu State and FUOYE, Oye-Ekiti.

1.7 Significance of the study

The research is expected to enhance the sustenance of institutional repositories, thereby impacting on the academic community, the university as an institution, the government, professionals in the field, and policy implication and implementation in the library.

The research will expand the advocacy and awareness of IR among Nigerian academics. Effective awareness as well as advocacy on repositories in citadel of higher learning will achieve a positive change in attitude difference in academics towards buying into institutional repositories through the voluntary release of their intellectual outputs for addition to the repository as well as self-uploading into the repository. Again, the literature search uncovered a dearth of literature as well as experimental research on institutional and external factors as correlates of sustenance of IRs in Nigeria. Hence, the need for more research in this area as it relates to the Nigerian circumstance. This work is anticipated to bridge this gap thereby affording academics the opportunity to synthesis the literature for the more academic endeavour.

Furthermore, academics, unlike commercial publishing, scarcely get immediate motivations for the work they publish. Instead, they publish for professional success and expert acknowledgment, to add to the expansion of knowledge in their study area. Research has exposed the fact that with a fitting search component and index, free access to articles online have very high reference rates compared to articles published in the traditional format. This kind of exposure and perceived ability holds great prospects for both the the author's host establishment and the author. Institutional repositories usage by academics will, among other things, collocate their research outputs, expose their research profile, increase the rate of citation, provide long term protection and upgrade access to other researchers' work as well as enhance collaboration with their counterparts all over the world.

In the case of the university as an institution, sustaining institutional repositories in universities in Nigeria will bring about tremendous benefit to the university community. Not only will institutional repositories preserve and communicate the intellectual research of the

university community to the scientific world, it will also help to produce new publications at a lower cost. The resultof this study will be useful to institutions looking forward to actualising their dream of IR, as universities involved will serve as models for others to adopt in the formulation and execution of institutional repository plans and sustenance. Institutional repositories will also enable resource sharing between different universities regionally and globally as well as provide maximum visibility to the institutions that host them, by showcasing their intellectual output on the internet.

On the other hand, the government as the research funder benefits from institutional repositories in all the manners in which organisations responsible for research funds do, e.g. gaining value for the resources used in research, through research availability, access, and optimal utilisation. Institutional repositories also promote democracy by sharing government data as speedily and generally as could be expected under the circumstances. Institutional repositories furnish various arms of government with data on research outcomes to make rational decisions.

Additionally, institutional repositories will impact on the professionals by creating and sharing knowledge, and through the building of personal and collective learning models that facilitate organisational learning. Institutional repositories allow professionals to have access to the peer-reviewed papers, the majority of which is not accessible in open libraries. It likewise empowers researchers, writers, technologists, doctors, among others to utilize current and quality materials to their advantage.

Again, when institutional repositories are well established and sustained, they will help to explore and integrate grey literature and other local literature to the general collection of the university libraries for the promotion of research, teaching, and learning. This indicates that institutional repositories will help in the preservation and conservation of grey literature in away. Furthermore, institutional repository activities support more library usage, which will result in a high level of visibility within the university and beyond. Institutional repositories present opportunities for librarians, by making them to be relevant in scholarly communication, web-based information dissemination, and to take a lead in copyright issues. Institutional repositories also enhance academic librarians' and faculties' working relationship. This is expectedbecause as libraries move to help staff in the computerised distributing exercises; the libraries' importance to the workforce improves.

Finally, the sustenance of institutional repositories will result in the formation of consortia: within the universities, regionally, and globally. This will help to resolve developmental issues, as data on developmental issues will be freely made available for access, and utilisation by decision-makers to accelerate development across the world and more specifically Nigeria while providing better lives for the citizens.

1.8 Operational definition of terms

According to the framework of the research, the underlisted terms were operationalised within the context in which they have been used.

Attitude: The lecturer's opinion towards institutional repositories (by lecturers) can be a positive, negative, or mixed evaluation of institutional repositories in Nigerian universities.

Awareness: A conscious alertness of the knowledge, concept, and benefits of institutional repositories by lecturers to appreciate and accept the phenomenonin Nigerian universities.

Copyright: Is the Intellectual property right of an authorin Nigerian universities.

Digitisation process: Refers to the step by step method deployed to put the document into digital form for use in a digital computer.

External factors: Refer to the global issues that influence the sustenance of institutional repositories.

Institutional factors: Issues within the organisation that influence the sustenance of IR

Institutional Repository: is a system that engages in the capturing, management, maintenance, and distribution academic works and outputs belonging to an institution (including pre-print: theses and dissertations and post-print: articles, conference papers, datasets, working papers and teaching aids) in an electronic format.

Institutional repositories sustenance: The process or structure for making institutional repositories to continue to exist, through support, provision, and maintenance.

Sustenance: The maintenance and continuous usage of IRs in Nigerian universities.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The chapter highlights general empirical studies (both print and online) on institutional repository activities going on across the globe. It highlights the need for IR sustenance and factors hindering the sustenance of IR.

The relevant literature on the topic of study is reviewed under the following subheadings:

2.2 Institutional repository activities in university libraries.

2.3 Institutional Repository and Open Access

2.4 Sustenance of institutional repositories in university libraries

2.5 Sustenance of institutional repositories in university libraries in Nigeria

2.6 Institutional factors and the sustenance of institutional repositories in university libraries

2.6.1 Awareness and attitude of lecturers to the sustenance of institutional repositories

2.6.2 Infrastructure and digitisation process in the sustenance of institutional repositories

2.7 External factors and the sustenance of institutional repositories in university libraries

2.8 Technological issues and the sustenance of institutional repositories

2.9 Copyright issues and institutional repository sustenance

2.10 Theoretical framework

2.11 Conceptual Model

2.12 Appraisal of the literature review

2.2 Institutional repository activities in university libraries

Institutional repository (IR) was proposed in 2002 by SPARC. IR according to Crow(2002), refers to "digital collections, capture and preservation of all academic works of one or more university communities. Institutional repository lessens the expenses which are incurred from academic publications. Also, it increases access to research of academics and scholars learning in higher institutions by ensuring that they are hosted in professional societies in the institution, or website of third-party providers. As clarified by Crow IR addresses two key strategic issues which academic institutions are encountering: IRs offer key element that reforms scholarly communications by enhancing innovation in a disaggregated publishing structure: these serve as real indicators that describe the excellence of an institution and in doing so causes

an increase in its public value, prestige, and visibility. Another way of defining an IR is by the purpose that it serves. IRs captures, collects, manages, and disseminates the 'intellectual output of a single or multi-university community' (Markey, Rieh, Jean, Kim and Yakel, 2007).

Rieh (2007) is of the opinion that: IR gives access to the collections which nobody would have an idea of their existence. A library staff member showed excitement while making a claim that states that IR permits opportunistic discoveries across fields of study that were once seen as impossible. This makes it easy for scholars to give their works necessary publicity beyond the confines of their university professors and themselves. Rosenblum (2008) explained that IR is a system or resource that makes it possible to collect, store, preserve and disseminate scholarly materials in digital format from an institution. These outputs are not constant and they vary from one institution to another. They usually store theses and dissertations, while others capture teaching materials, working papers, published papers, unpublished preprints, conference presentations, data sets and so on. A good number of institutional repositories include grey literature which due to their nature is very tough to be accessed by researchers. Institutional repositories also help to complement and in the boosting of library services and resources. Also, IRs offer an urgent and very important component to the existing scholarly model. It also stimulates innovation in a new disaggregated publishing structure that in a given period will begin to evolve and improve. Additionally, they leverage on a budding grassroots faculty practices of self-posting research online.

According to Sharma, Saha, and Meichieo (2008), IRs complement existing parameters for measuring institutional productivity. However, Buehler and Boateng (2005) opined that IRs permit libraries facilitate access to scholarly contents directly rather than going through publishers and book vendors. This aids in alleviating serial subscriptions, which is usually slow, expensive, and cumbersome. In academic institutions, institutional repositories can accomplish two basic requirements: firstly, it provides a method that disseminates research under the auspices of the university. Also, represents the central location and aggregation of all academic output of the institution's research, results and other information (Jones, 2007).

A university-based IR as described by Lynch (2003) constitute range of services an institution of higher learning provides for its community members particularly for the management as well as the dissemination of digital contents generated by university stakeholders and within its area of operation. The set of services represent an organisational obligation of

production, including organisation of digital materials as well as maintenance of same where appropriate in the long-term. Lynch predicted that attempts made to develop institutional repositories could go wrong if IRs are regarded by the university administration only as an instrument of regulating intellectual works of its faculty stakeholders; or saddle IRs with extraneous policies (i.e. "gatekeeping" function), while not keeping in mind the fact that IRs are just infrastructure. Institutional repositories can equally have a function of preserving the intellectual work product of an institution while being a contributor to a fundamental long-term change in the structure of intellectual communications. Westell (2006) as regards IR added that IR can offer outstanding ideas that speak directly to research and learning. In addition, it can offer vital data to demonstrate the extent of academic works undertaken within the university. Therefore, IRs can to a great extent enhance increased access to established intellectual content by also making sure the faculty that will make use of dissemination capabilities offered by the network are empowered.

Some trends drive additional organisational approach to dissemination of research. According to Michelle (2012), those trends are exploding journal prices, federal policies, and the development of consciousness of the value inherent in datasets and determining how to facilitate uninterrupted access to the assets. Institutional repositories are very crucial to the enhancement of the institution's intellectual effort, its visibility, and access to this wealth of knowledge. Apart from centralizing, preserving, and ensuring access to universities intellectual resources, institutional repositories will constitute a significant aspect of global system of interoperable repositories that is capable of establishing basis for a new disaggregated paradigm of academic publishing.

A leadership role is played by many academic libraries in their institutional repository projects, such as the following:

1. The Academic Research in the Netherlands Online (ARNO) project which was proposed in September 2000, and implemented by the Library staff of the University of Twente, the University of Amsterdam, and Tilburg University.

The ARNO project's objective is to design as well as launch digital archive servers for institutions to preserve the academic output (this includes pre-prints, theses and dissertations, research reports, as well as research works published in regular academic journals) of

member institutions. The major purpose of the project is ensuring the accessibility of the repository is through OAI interoperability standards. The library staff of the University of Twente, the University of Amsterdam, and Tilburg University have the task of implementing the project.

The project included three specific goals: Connecting the document servers to international dispensed digital archives and to the Dutch national information infrastructure; developing an infrastructure to be able to couple with the manufacturing strategies of scientific publishers and provide an excellent foundation for dealing with peer evaluation and connecting seamlessly to digital studying environments.

2. California Digital Library (CDL) eScholarship Repository

The CDL eScholarship Repository, introduced in April 2002, clarifies the continuum amongst digital libraries extensively and institutional repositories. The CDL released the eScholarship repository, an internet web page, and a group of digital support services, to provide access to working papers and academic research at the University of faculty. The CDL provider followed the OAI metadata harvesting protocol to participate in the worldwide community of shared repository contents. The CDL initiative consists of a set of virtual serves in the storage and dissemination of faculty works in virtual formats. The CDL device makes use of the internet-based bepress (supplier system) in the management of paper submission, processing, and dissemination.

3. DSpace is a collaborative venture by the Massachusetts Institute of Technology (MIT) libraries and Hewlett-Packard.

DSpace is developing a robust, lengthy-time period virtual repository to hold the enormous body of articles and different scholarly materials generated through MIT researchers every year. As a matter of fact, it assembles a repository tool which could assist a federation of institutional repositories that will accept the tool. When accomplished, the DSpace code may be discharged as Open Source.

4. University of Ohio State Knowledge Bank.

 5. University of Utrecht institutional repository

(OpenDOAR, 2014).

The University of Oslo Institutional Repository (DUO-Digitale utgivelser ved UiO) is among the IRs located in Norway. The university decided to initiate the deposit of researchers, staff works, and dissertations into the repository.

Some of the advantages highlighted to be derived from the submission of research work to DUO by Alemayehu (2010) include the following:

Intellectual publications visibility to the l world through DUO's digital publishing. DUO follows the global Open Archive Initiative standard for exchange of metadata and scholarly communication. As such, the outputs of researchers at the university can be retrieved through local and international information services, such as OAIster.

Apart from the DUO facilitating electronic distribution of intellectual outputs in Nordic countries and global research society, research results will equally always be made accessible to the academia in the universities and others via a stable network address because the research work has been stored in DUO, UiO's electronic archive.

Roach (2013) opined that during the tenth anniversary of the Budapest Open Access Initiative, the scholars promised that they are seriously at the center of a global campaign and their readiness to set up a next goal: "Within ten years, OA will become the default method for distributing new peer-reviewed research in every field and country." Findings showed that the advancement achieved in OA is slow and irregular particularly in some fields (e.g., math, science and technology) while it is mainly overlooked in other fields (humanities and social sciences) (Levine, 2012; Parry, 2012).

OpenDOAR (2014) reported that in the meantime, there exists over 3,370 open access directory of OA journals listed, DOAJ (www.doaj.org) maintained at the Lund University. The proportion of repositories by continents is as follows: Europe – 1194 (46.1%); North America – 527 (20.3%); Asia – 454 (17.5%); South America – 231 (8.9%); Africa – 95 (3.7%); Australia – 59 (2.3%); Caribbean – 15 (0.6%). As can be seen, Africa is lagging due to so many factors. Such factors include inadequate knowledge of open access initiatives, restrained faculty and library policies, and global emphasis on access to the printed document at the detriment of one's own knowledge and content (Dam, 2010).

The Open DOAR website also reported a dreary record of IR adoption in the country. Out of 95 open access IRs in Africa, Nigeria can boast of just 8 (7.9%) while South Africa has 28 (31.5%). The eight repositories in Nigeria are owned by six universities because one of the

universities (Covenant University, Ota) owns three institutional repositories (OpenDOAR, 2014). The implication is that out of one hundred and forty-one (141) universities comprising forty (40) federal universities, forty (40) state universities, and sixty-one (61) private universities (NUC, 2016), only five higher institution of learning which include ABU; CU,; FUTA; Unijos; and UNN all have functional open access institutional repositories (OpenDOAR, 2014). The eighth repository is owned by Federal University of Technology, Oye-Ekiti, and is still at the trial stage.

Swan (2009) studied the values that repositories deliver to institutions. According to the author, IRs will expose intellectual outputs of the institutions to a global audience thereby maximise the impact and visibility of scholarly outputs. IRs will showcase the institution to potential students and staff, including other stakeholders; collect and curate digital materials; manage/evaluate research and teaching activities as well as collapse time and space for collaborative and large-scale projects. This will not only facilitate the growth and distribution of digital teaching materials and aids for supporting learners' endeavours, but will as well provide access to intellectual works as well as a location for the growth of e-portfolios.

It has been ascertained that the present scholarly communication system is a limiting factor, rather than an expansion factor to the availability and utilisation of most scholarly output, at the same time making vague its institutional origins. Several journals' subscription prices have increased which has resulted in subsequent cancellations of subscriptions, this further reduces the audience. In light of this, the function of IRs in breaching the domination of publishers and enhancing the knowledge of academic outputs become increasingly unavoidable. Furthermore, IRs can help to deliver this role if locally implemented (in individual universities) or in joint consortia projects (Wyly, 1998 and Crane, 2001). Piorun,(2008) remarked that digitising dissertation collections increased access. While on the research, the print collection was used 723 times in the past five years, while the electronic collection was used 17,555 times in 17 months. The difference is quite enormous. This aligns with Earwage (2008) benefits of the institutional repository which noted that repositories make room for the storage and easy retrieval of various kinds of institutional information resources. Again, it creates the platform for the organisation and maintenance of all the institutions' scholarly materials into one location to ensure the visibility of the university and its faculty member.

Clients worldwide gain access to universities' outputs through digital repository which can be found in a variety of ways. For instance, if it is a well-known work and author, a user can

Google the author's name and topic to be taken to the repositories file. The fact that academics across the globe can access other scholarly writings and research is a pointer that institutional repositories enhance free information sharing and collaboration, as well as extensive research activity and institutional education.

Intellectual works that are accessible via a repository would possibly have amplified prominence of authors as the citation level of their effort will be enhanced. The diversity of access points, ease of retrieval, coupled with well-organised and maintenance characteristics of IRs amongst other factors should be the issues might be responsible for the enormous use of the digital collection which is in contrast to the print collection, as identified in Piorun (2008). Agyen-Gyasi and Frempong (2011) added some other benefits of institutional repository which are: the provision of useful opportunities to enhance management and faculty recognition, and of their publications or research fields, getting proper right to use the wealth of information in the form of technological and scientific information critical for global development, and making available the scholarly outputs that are captured and preserved in its repository to its faculty and the rest of the members associated with it. Repositories are exceptional advertising and marketing tools as it links the capacity and quantity standard of the organisation by exhibiting research efforts and related activities of both the faculty and student.

Adebayo (2009) in his contribution noted that IRs bring all research materials of an organisation together; preserve them for research and posterity, as well as provide the bases to see at a glance and appreciate an organisation's research output. Crow (2002) identified the effect that institutional repositories may additionally have on the numerous stakeholders, such as research sponsors, faculty, students, administrators, librarians, as well as publishers. According to Crow, an institutional repository is likely to augment or compete with the functions played by the archives of universities, depending on the university. University archives usually provide two key functions: managing the administrative records of the university to satisfy lawfully mandated retention necessities as well as preserving materials which are connected to the history of the institution, the achievements, in addition to faculty members' activities, officers, members of staff, students and former students of the institution. In comparison with IRs whose goal is to safeguard scholarly outputs of the university, the university archivists is cautious in establishing the research works and other digital materials to gather and preserve. The prospective similar use of two repository-types deserves attention within institutions that aid the both.

The content of IR is diverse. Institutional repository may comprise of any intellectual material created by the faculty, students, non-faculty researchers, including personnel of the establishment, according to the objectives slated by the institution. This material content could be teaching materials, students' electronic portfolios, video-recordings, and yearly reports of the institution, data sets, computer programs, photographs, and some digitised materials that the institution is willing to conserve. Teper and Beth (2002) also noted that the content may include materials such as pre-prints, monographs, peer-reviewed articles, permanent instructional gadgets, datasets coupled eith works-in-progress, supplementary research resources, grey literature, conference papers, as well as theses and dissertations submitted in electronic format. These will help to eliminate any vacuum, in case of any absenteeism from lectures by lecturers or on the part of students, as well as enhance learning. This is due to the fact that students can study lecture topics ahead of lecture times, and with the audiovisuals, learning is made easier.

IR, if well incorporated into every university can constitute a crucial force to bridge the gap that exists between authors, researchers, scholars, and various information users worldwide. This is due to the effect that IRs have on existing scholarly communication models, their implications for present stakeholders (including faculty members, librarians, students, administrators, research sponsors and publishers) in the process, and possible benefits delivered to the institutions that act as sponsors is very enormous.

Tonta (2008:8) reported that at the National Theses Center of the Higher Education Council, its collection includes more than 200,000 graduate dissertations and theses. In 2007, about 70,000 theses were utilised by about 13,000 researchers which is estimated to be approximately a 12-fold (813,882) surge theses utilised and over five-fold (73,699) rise in total users recorded during the 2008 first quarter. As from 2008, full-texts of over 25,000 ETDs for which authors' consents were obtained were made accessible. It is left for one to speculate the total number of theses offered through the online platforms.

This result implies that institutional repository activities support more library usage. Institutional repository programmes therefore, holds a lot of promises as it gives libraries an unprecedented visibility in the university and beyond. Jain (2011), and Cullen and Chawner (2009) reported that IR presents an opportunity for librarians to be relevant in scholarly communication and web-based information dissemination and to take a lead in copyright issues, as well as enhances academic librarians and faculties' working relationship. The fact that

libraries intend to promote digital-publishing undertakings of faculty, the importance of the library to the faculty, the institution, and overall society will increase. In the case of libraries intending to invest in the organisational objectives in the future, IRs provide a convincing move to meet such goals. As the number of remarkable online open access academic contents enlarges the function and importance of journal collections is bound to reduce commensurably. Library programmes and financial plan need to be reshuffled to help faculty have open access to publishing activities so as to make sure the library remains relevant. Establishing an IR programme is an indication that libraries seek to go beyond custodial position to that of actively contributing to the progressive change in intellectual communication.

If the library decides to lead in the organisation and growth of an IR, it is equally going to take up the imperative administration outreach and faculty education functions, information contributors, change agents and end-users. Crow (2002) stated that in the lengthy-time period, establishing and maintaining digital content material and aiding faculty as content contributors and beneficiaries should continue to be the library's responsibility. This is because they are mostly suitable for providing a great deal of document processing know-how (e.g. document format control and maintenance of standard of the archivals) to assist authors in uploading their work to the IRs. In the same vein, libraries can offer expertise in areas such as authority controls, metadata tagging, and other content management necessities that enhances access and use of data in a most effective way.

Academics: Academic authors unlike commercial publishing, hardly receive any form of direct incentive for the research output which they publish, instead, their publications are used for career development, professional recognition and to expand knowledge in their field. Research by Lawrence (2001) has shown that, if there are appropriate search mechanisms and indexing, open-access online articles have a more tangible high rate of citation compared with print articles. This kind of awareness and visibility augurs well for both the author's host institution as well as the researcher. (Tennant, 2002). Institutional repositories usage by academics will, among other things, collocate their research outputs, expose their research profile, increase the rate of citation, provide long term preservation and enhance access to other researchers' work (Cullen and Chawner, 2009).

By doing away with the limitations posed on the physical page that is associated with print materials, digital-publishing enlarges the quantity of research that can be review-worthy. As such, IRs offer an avenue for great number of researchers to upload their research in a recognised forum. Apart from the advantages for authors in faculties, IRs equally render great advantages to teaching faculty members by including durable teaching contents like visualisations, illustrations, concepts, training videos among others, produced by faculty. In this case, the repository is to serve as a resource to support classroom teaching. Additionally, electronic dissertations and theses of students offer reasonable content materials to be captured with IRs resource. As such, this makes students stakeholders in such repositories. In all, IR is an enabling device for teaching, learning, and research. It creates marketing activities for a scholarship, attracts high-quality students, staff and funding; in addition to a location for the centralisation, storage, and lasting preservation of different institutional outputs (Jain, 2011; Cullen and Chawner, 2009; Prosser, 2003; Johnson, 2002).

Publishers: The open access (OA) feature of institutional repositories poses a threat to the subscription-based commercial models already in existence in addition to the streams of income generated by several academic publishers. Those that rely on subscription-based revenue streams include commercial publishers trying to establish shareholder value as well as not-for-profit scholarly societies, which depend on revenue from journals so as to subsidise their operation mode. Undoubtedly, these publishers are exposed to threats of requests by commercial platforms that exclude the payments by users (Tenopir and King, 2000; Evan and Wurster, 1997; and Arms, 2000a). Suber (2004) dwelt on a number of the possibilities created by IRs to distinctive businesses; together with authors, researchers, scholars, and institutions. For example, OA delivers a global audience for authors much more than any subscription-based journal, and enhances the visibility and impact of their work. It provides users with access to needed literature for their research works that is free of any barrier and is not restrained by the libraries' budgets where they are likely to have the privilege of access. It also enhances convenience, reach, power of retrieval and solves the pricing and permission crises that libraries experience in the subscription and dissemination of scholarly journals.

Suber (2004) collaborates that for universities, OA raises the level of visibility of their faculties, reduces recurring expenses incurred on journals, and promotes their capacity to disseminate knowledge. Also, OA makes articles highly visible, retrievable, discoverable, and

useful for journals and publishers. Funding agencies (including the government) and the citizens are not left out in the values delivered by OA institutional repositories. Institutional repositories increase the return-on-investment (RoI) in research; this is possible when there is extensively availability, discoverability, retrievability as well as people enabled access to findings of the sponsored research coupled with peer-reviewed researches which are mostly unavailable in public libraries. IRs indirectly enable researchers, manufacturers, physicians, technologists, among others to make use of cutting-edge materials for their benefits.

Governments: As sponsors of research, they gain from institutional repositories in the same manner that investment groups do. Institutional repositories also promote democracy through the sharing of authoritative records as speedily and substantially as possible. IRs supplied numerous arms of the presidency with statistics on research outcomes to make rational decisions.

Citizens: Peer-reviewed research is made easily accessible for citizens via institutional repositories and this is highly beneficial as most of such research are not available in public libraries. Additionally, it provides a better life for the citizenry when the research outcomes are used for developmental ventures.

Ezema (2011) added that since various barriers have without doubt impeded access to traditional means of scholarly communication, open access IRs therefore, emerge as an important instrument in preserving and disseminating institutional research outputs; this invariably is an undetectable part of universal research outputs. With the diversity of benefits of IRs, one would expect maximum patronage and wholesome support by academics and other stakeholders towards the sustenance of IRs in universities, yet, that has not been the case.

2.3 Institutional repository and Open Access

Institutional repositories (IRs) have been connected partially to the thought of a computerised library, which implies the capturing, processing, preservation, and arrangement of access to electronic materials, similar to the library's customary capacity of gathering, classifying, curating, saving, and giving access to analog resources. Institutional repository archives center on the institutional outputs delivered by specialists in a scholarly network or different organisations', which makes it less demanding to exhibit their social, scientific, and budgetary qualities (Dabholkar, 2008).

There are various types of institutional repositories with diverse kinds of content. The main extensively deployed sort of institutional repository is the one called 'e-print' depositaries. According to Jones (2009) E-print means electronic pre-print and post-print publications of research papers. Institutional repositories enable widespread communication of institutional research activities and education. It provides for a free sharing of information and again encourages collaboration amongst researchers and institutions. Jones (2009) explained that it is a fact that if research is accessed and understood very fast, the faster every individual will benefit from it. That means that institutional repository store can assume an effective specialised apparatus role with entirely exceptional speed. This is considering that when the various kinds of digital materials are presented in IRs, comprising faculty e-prints, work of students, and primary sources' archival, they can turn into the most profitable scholarly capital of an institution.

Tonta, (2008) announced that the principal instances of IRs were created in the mid-1990s. Since that period, the quantity of IRs has been expanding everywhere throughout the world, including the United States of America, Europe, and Asia. Institutional repository development started from two developments that went before it. They are specifically: Open Archives Initiative (OAI), which planned the OAI Protocol for Metadata Harvesting to enable every institutional intellectual property archive interoperable – so their conveyed neighborhood substance could be treated as though they were across the board worldwide and Open Access (OA) development, which characterized the essential contents of IRs residing in academic establishments (refereed academic journal articles) and crucial explanations behind keeping them (to make research materials accessible freely to online would-be users so as to maximise research uptake, usage, and impact).

Bethesda (2003) affirmed that the initiative of OA was firstly identified in the middle of 1990. The concept involved three initiatives resulting from three conventions held in quick succession in Budapest, Hungary in 2001, Bethesda, Maryland, the USA in 2003, and Berlin, Germany also in 2003. Emerging from the last two conventions was the Bethesda Statement on Open Access Publishing and the Berlin Declaration on Open Access to Knowledge in the Humanities and sciences. Correspondence from these three initiatives (the Budapest OA Initiatives (BOAI) shows that OA means "free and lasting access to peer-reviewed, scholarly deliberated content over the web and the opportunity to utilise, duplicate, circulate and adjust

that content with legitimate attribution." Bethesda (2003) characterized OA as "A total adaptation of the work…is kept (and in this manner distributed) in at least one online archive …kept up by an academic institution, scholarly society, government agency, or other well-established organisation that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving".

The principal target of the Open Access activities is to remove overarching blocks and elevate boundless access to electronic articles and academic correspondence. OA initiative deployed two ways to achieve its aims: namely the "Golden Road" and the "Green Road". Hernand (2010) ascertained that the gold road to open access means an OA journal-publishing, in which journal publishers give open access to their articles by either charging the writer or organization for refereeing or distributing active articles as opposed to charging the client for using the articles, or by simply making accessible their very own online version free for everybody. Hernand further noted that the "green road" of OA is the place writers give Open Access to their very own published papers, by making their e-print available free for all. Gold OA refers to Open peer-reviewed Access journals, publishes articles that turn out to be openly accessible. This kind of publishing has quickly metamorphosed in the last fifteen years (Laakso, Welling, Bukvova, Nyman, Bjork, and Hedlund, 2011). As of 2007, there were already over two thousand, five hundred OA scholarly writings (journals) published in all knowledge areas (Haider, 2007). Rosenberg (2008) expressed that "as libraries embrace the computerized platform, their most urgent paramount value is not that of giving e-resources, but plainly of building up assistances that encourage access to the available information". McCulloh (2006) opined that the OA initiative is dramatically modifying the processes involved in scholarly communication as well as delivering great benefits to the academic society.

Bhat (2008) stated that open access journals make their controlled quality content accessible without charges in every corner, by their use of a funding model which requires no charges from readers or their respective institutions before gaining access. Numerous operational models are available, one of them is that where the journal is set up and managed by a department in the university, distributed electronically by using only the institution's server while the editing and administration, including peer review, is handled by academics who show interest. An adjustment to this is a situation where the journal is given some kind of funding by

grants or sponsorship, to assist in few procedural or management costs (Correia and Teixeira, 2005).

Prosser (2004) asserts that OA journals and institutional repositories promise to provide fairer, more efficient and reasonable scheme of scholarly resources which can be of better service to global academic community. So many researchers have reported that the impact of open access research publications highly surpassed non-OA publications (Lawrence, 2001; Hamel, 2005; Antelman, 2004; Harnad, 2009; Hitchock, 2009; Hajjem, Gingras, Brody, Carr, & Hamad, 2005; Hajjem, Hamad & Gingras, 2005; Esyenbach, 2006). According to Chan and Costa (2005), OA enriches worldwide knowledge base by integrating the misplaced study from the Third World and enhancing the South-North and South-South Knowledge-flow.

Tonta (2008) proposed that open access resources play vital roles in academic communities, particularly for faculty members who depend on information from Library and Information Science (LIS) for their instructions. They benefit tremendously from open access research contents as readers, they also utilise as a viable source information source with less time and budget encumbrances, and it requires no journey to the library. Electronic open-access publishing are predisposed to be quicker and accessibility is much less complicated than conventional materials. IRs users get current data which covers wide areas including LIS among others. Studies showed that a many members of faculty utilise open access resources as a teaching means for lectures. It has been noted that the most popular journals are OAJ: 'Free Fulltext', 'D-Lib Magazine', and 'DOAJ (Directory of OAJ)' (40.3%, 15.9%, and 15.3%, respectively) (Tonta, 2008).

The study by Tonta (2008) discovered that scholars viewed open access journals as high Impact Factor (IF) journals. From participants' responses on the importance of open access archives/repositories in the institutons, majority felt it was very indispensable, while other responses ranged from 'moderately necessary' to 'not very necessary' or 'unnecessary', while some were not certain. On the question about the agent responsible for creating and maintaining open access archives/repositories in the universities, majority of the faculty members believe that the library should be in charge of the university's open access archives/repositories. However, as regards faculty members' needs of open access journals, the following were revealed: research funders said it is mandatory for research results to be in print in OA without delay or within six months prior its expiration; encourage OA assets as an option for the publishing of academic

works through website or newsletter; creating OA archives; as well as pursuing accreditation of open access journal.

According to Fernandez (2006) and Chan (2004), OA to scholarly articles can be achieved by publishing in an open-access journal also referred to as Open Access Publishing (OAP), or depositing in an open access repository, referred to as and Open Access Archiving (OAA), which is part of IR. OA triggers new research projects and increases the impact of publicly-funded research, thereby increasing the RoI (Lawrence, 2001; Harnad & Brody, 2004; Harnad et al., 2004; Antelman, 2004).

The European University Association (EUA) unanimously proposed OA self-archiving orders for its 791 colleges in 46 nations (European University Association, 2008) on 25th January 2008. The proposition expresses that each European college ought to create an OA institutional repository and should order that each production must be saved in the repository promptly upon completion and that a similar self-archiving command ought to be implemented in all survey results which emerge from EU financed scholarly projects and tasks (European 2008). All universities ought to be proactive in the execution of a system for research publication and conservation. Institutional repositories will, without uncertainty, assume key importance in advancing toward that path. Different colleges who have sent e-prints arrangements are Cal-Tech University, Glasgow, the University of Nottingham, and the Australian National University. Those who participated in all these programmes have highlighted their personal experiences and provided useful insights that can be beneficial to others who are deliberating on OAI-compliant e-prints implementation.

2.4 Sustainability of institutional repositories in libraries in the universities

Considering the values derived from IR, a procedure and a good structure must be put into place to ensure the continuity of every IR. An important aspect of IR system that needs attention for a sustainable IR is the digitisation processes. Digitisation project is an inevitable core aspect of institutional repository that needs to be a good address for a sustainable IR. It is a resource-intensive and expensive action that entails a tactical methodology to ensure an enduring IR. In April 2007, posting of ten suppositions about the future that would broadly impact scholarly libraries and custodians, the Association of College and Research Libraries Research Committee put digitisation as the main on the posting, expressing that, "There will be an increased

concentration on digitising collections, preserving digital archives and improving methods of data storage and retrieval" (Mullins, 2007). This is because digitisation increases access. For instance, Mary Piorun (2008) noted that the printed materials were used just 723 times in first five years, in contrast to the electronic pool which was much more utilised: 17,555 times in 17 months". Additionally, a repository may be a channel for evolving relations within the organisation by delivering the library with a new route for outreach.

Young (2008) reported that despite the level of the development of IR, interviews persistently expressed their delight for establishing IRs to preserve and provide access to digital materials. That shows that IR is viewed as an arangement for the participation of their university in the open access movement and they are certain about IRs prolonged period of sustainability. Here is an advancement in branding and scope of IRs through the years, IRs are perceived more increasingly by its purpose or goal, instead of as a set of fixed features, functions, or services.

For an undeniable execution and sustenance of the Institutional Repository, Dabholkar (2008) detailed that there is a requirement for an appropriate framework. The highlights of these prerequisites according to Dabholkar (2008):

Two units of personal computers (PCs) that have P-IV design are sufficient for the digitization process. An additional high-stop server this is sensible 24/7 is also needed.

Software Requirements: There are various free open source software (FOSS) available that can be adopted for developing an IR. The options are Architexturez, CALIBRE, ContentPro, Corisco, DigiTool, Drupal, DSpace, EPrints, ETD-dB, Greenstone, HTML, Maxwell, Nitya, Nou-Rau, OAI-CL, SciELO, Socionet, TEDE. The three popular and commonly used are DSpace, Greenstone Digital Library Software (GSDL) an EPrint. DSpace is on the top in the list of the different software deployed in the institutional repositories. Among the 242 BRICS repositories surveyed DSpace software was the highest in use, 177 (73.14%) repositories were using DSpace software, they include Brazil: 63 (26.03%) repositories, China: 39 (16.11%), India: 42 (17.35%), Russia: 14 (5.78%) and South Africa: 19 (7.85%). Eprints was the second position with 24 (9.91%) repositories. DSpace was also chosen for building IR in TIFR, due to the following reasons.

a) DSpace is modifiable to fit into the requirements. It has elasticity and functionality and can be managed with the least personnel and moment. It has Qualified Dublin Core.

b) DSpace structure enables the organization of the repository materials in line with different departments within the establishment.

c) DSpace is deployed by several libraries. Hence the software is reorganized frequently, it aids in the enhancement of the functionality of the system of retrieval.

On the creation and maintenance of institutional repository, Earwage (2008) opined that there must be cooperation among librarians, IT specialists, administrators, faculty members, and occasionally, external support services to sustain the functionality of the intellectual repository. Michelle (2012) noted that Boise State University adopted "Mediated Deposit". He stated that at Boise State, numerous tasks were completed on behalf of faculty authors while eligible publications were identified, authors permission solicited, clearing of copyright, and uploading their scholarly publications.

Wordofa, Teklemichael (2012) examined the digitisation activities and practices for managing born-digital research materials and suggested a tactical approach to digitisation. This brings together every relevant unit of the university towards the creation of a centre of digitisation with clearly defined digitisation and digital preservation strategies.

Discussion of various strategies and activities that the United Nations Economic Commission of Africa (UNECA) have taken up for the realisation of the IRs project such as; installation of highly customised Dspace to enable the MARC21 metadata, digitisation, metadata migration from the Library Integrated Management System (HORIZON) and Dspace work process customization to help in records imported for audit. As regards the accommodation process in digitisation, Dabholkar (2008) noticed that the accommodation of each archive needs to experience seven-strides in their work process. The initial three stages contain essential materials' portrayals and Dublin Core metadata components, for example, author, title, and publishing firm, and so on. The fourth step includes the computerized report transferring of PDF and picture documents that have been put away in the PCs initially. The fifth step incorporates checking and altering, where it is needed, to the information that was submitted at the initial stages. The 6th and seventh steps highlight the authorization contract and the confirmation of the process of submission respectively. When a submission is completed, the item submitted has to go all the way through some other formalities e.g. assessment, editing, or endorsement in line with the conventional guidelines. Piorun (2008: 5) added that in their submission process:

Using alumni contact data provided by the graduate school, library staff wrote to the dissertation authors to request copyright and digitisation permissions. Alumni were asked to grant permission immediately, while current graduates were given the option to add only an abstract and delay adding the full-text for one year to allow for publishing opportunities...they were scanned using a Canon Image Runner 3,300 with eCopy version 3.1, a software program used for scanning, optical character recognition (OCR), and portable document format (PDF) creation.

Piorun (2008) further added that when their IR project was almost concluded, the dean of the school of postgraduate expressed anxiety concerning the pages of signature of the theses that are being made publicly accessible. He, therefore, asked ProQuest's UMI Dissertation Publishing about its policy on this issue and UMI had to stop the scanning of signature pages in 2005. The team later resolved to make a "clear" signature page for every thesis that will hold the names of both the guide and the audit advisory group without containing their signatures. That newly made page for the signing was reinserted into the PDF records. The estimate of the time needed to process one dissertation was only 145 minutes vs. 170 minutes. The work for Software equipment was completed using the library scanning equipment that was already existing. The duplicates of the product utilized all through the procedure already exist in the library. They are Microsoft Access, Adobe Acrobat, eCopy, and Adobe Illustrator. The total costs for the project were US$23,562 (US$990 software, US$22,572) or US$0.28 for one page. In comparison with the initial estimate of US$27,750 to process the theses in-house, it is US$4,188 less and US$1,062 more than it is to outsource the dissertations to UMI. Most libraries have viewed the digitisation of materials as a very expensive undertaking.

The report by Chapman's group activities on scanning, quality control and OCR submitted that the involved in processing black and white one-page text bounded as a volume is from US$0.10 to US$1.40, based on outsourcing of the work. The Lamar Soutter Library's internal costs were similar to the aforementioned estimates, as one page costs US$0.2. One of the most critical requirements for the establishment of IRs are human resources; where it is expected that members of staff have to be competent and committed. They equally need to possess some sets of skillsnecessary for different activities involved, including various software installation, uploading of files, scanning and digitization as well as other procedures involved with DSpace, etc (Though they may not be IT professionals). Dabholkar (2008) ascertained that their existing staff was the one carrying out the pilot. Nevertheless, for a completed IR, the staff requirement,

and the needed cost include five members of staff for 12 months (5X12X7000) Rs 4, 20,000.00. In any case, the benefits derived from digitisation are much more than the costs and pains taken. Data from historical circulation shows that since 1999 to 2007, the library's dissertation collection printed were used 723 times. In contrast to the first 17 months the electronic collection was available (June 2006 through November 2007), this is significantly high. Downloads of full-text PDF dissertations from eScholarship@UMMS totalled 17,555, with 10,497 originating from Google searches (Institute of Museum and Library Services, 2006).

Studies show that people who post their research online as well as publish in conventional scholarly venues are more frequently cited than individuals who depend completely on paper publications (Lawrence, 2001, McDowell 2005, Eysenbach, 2006, Piwowar, 2007). Despite the inexhaustible values and possibilities locked up in IRs, various boundaries and problems are confronting the establishment and sustainability of the repositories. Lynch (2003) noted that IR is a range of services that an institution gives to the contributors of its community for managing and disseminating virtual materials produced through the organization and its network individuals pose both opportunities and challenges for university and university archivists. Crow (2002) noted that the direct advantages of investing in IR ought to be articulated without a doubt, categorically and frequently to engender university assistance.

2.5 Sustainability of institutional-repository in Nigeria's university libraries

The National Universities Commission (2007) upheld that academic libraries are required to gain access electronic material and to print copies in order to assist their clients better, to flaunt the permeability of their organizations, and as a proportion of esteem. Anunobi and Okoye (2011) reported that in 2008, during a transnational workshop organised at Ahmadu Bello University (ABU), Zaria, on open access repositories, universities and research libraries in the country were admonished to organise their respective intellectual outputs into IRs so that the research works would be available both nationwide and globally through open access. This is because of the numerous advantages of IR.

The Consortium of Nigerian University Libraries (NULIB) has been bought into EBSCOhost. The web entries incorporate Health Internetwork Access to Research Initiatives (HINARI), Access to Global Online Research in Agriculture (AGORA), Database of African

Theses and Dissertation (DATAD), Online Access to Research in the Environment (OARE), in addition to numerous disconnected databases, for example, MEDLINE.

In Nigerian scholarly universities, the first position in digitisation and IR has been occupied by the University of Jos library. According to Anunobi and Okoye (2011), sponsored six heads of university curators to conference on the usage of Greenstone open-source programming prompted enthusiasm for digitization by the library. They included that the digitisation of academic works and papers at the libraries of the Obafemi Awolowo and UNIJOS who gave a model to ABU to begin the digitisation of its post-graduate research. That implies that preparation and sustenance strides of certain libraries will fill in as an imperative type of inspiration for different libraries towards the establishmentand sustenance of IRs.

Nkiko, Bolu, and Michael-Onuoha (2014) examined the ever-present nature of digital IRs and their associated potentials. The study particularly projects the detailed requirements in the growth and sustainability of IR in Covenant University. The study recommended the need to sensitise the researchers to be mindful of giving out copyright to Journal publishers, while good backup systems should be provided to prevent unauthorised access to the IR database. This will invariably help to sustain the institutional repository.

Okoroma (2017) highlighted the factors influencing IRs in some Nigerian university libraries, it was found out that deployment of IR in the country is at a very slow pace and rather irregular due to several institutional as well as external factors such as low awareness and advocacy, infrastructural problems, technical issues and inadequate funding of the project. This finding was corroborated by Okoro and Okogwu (2017) who outlined the issues, prospects, and challenges bedevilling the sustainability of IRs in Nigerian university libraries. The authors described IR as an online avenue for gathering, preserving, and distributing scholarly outputs of an institution in digital format. However, challenges like copyright issues, inadequate ICT infrastructure, inadequate funding, inadequate skilled manpower, and intellectual property right are impediments to the IRs in libraries across Nigerian universities.

Again, Okoroma and Abioye (2017) focused on IRs in Nigerian university libraries and copyright challenge. The authors ascertained that there is a lack of the existence of workable policies on matters bordering on copyright coupled with its implementation, plagiarism, Publishers Contract Policy that authorises the handing over of author's copyright in order to

publish their works, and lack of enlightenment programmes to educate authors on their intellectual property right. All these hinder the use and sustainability of IR in the country.

Okoroma (2019) further identified of IRs in terms of technology and infrastructure in Nigerian university libraries. Findings of the research revealed that scanty and outdated hardware and software components, very low bandwidth, in addition to low server configuration and unstable electricity supply as a result insufficient funding were identified as problems affecting IRs in Nigerian university libraries. The study recommended providing sufficient and more bandwidth for the library system, high-quality systems configuration, utilisation of solar systems to guarantee regular power provision, and improved financial support by the universities' management through special IR budgetary allocation.

Additionally, the issues of awareness, lecturers' attitude as well as knowledge of IRs in Nigerian university libraries were addressed by (Okoroma, 2018). It was revealed that a great number of lecturers in Nigerian university are unacquainted with the IR as a concept and have vague understanding as regards IR aims and objectives. Therefore, the lecturers had low disposition to submit their intellectual output. In order to address the challenge of awareness, knowledge and negative lecturers's attitude to IRs, the study identified diverse options such as sensitisation programmes on IR and copyright issues, as well as considerable awareness in Nigerian university communities.

Primary discoveries ascertained that there are very few universities such as ABU, Zaria; Covenant University, Ota; FUTA; Unijos; and UNN that have functional open access institutional repositories in the country. However, some Nigerian universities have adopted IR and are at different stages of establishment of same, such as the UI, Ibadan, FUTA, and FUOYE.

It is absolutely obvious IR deployment in Nigeria citadel of learning is still generally novel, and at the improvement stage. The issues and difficulties identified with IRs sustenance are categorised under institutional and external factors.

2.6 Institutional factors and institutional repository sustainability in university libraries

No doubt eliminating limitations in access to literature will enhance research, improve and share learning among the affluent and underprivileged, make literature valuable, and position the platform for connecting mankind in one scholarly dialogue and search for knowledge. Institutional repositories play a key function in this regard. But there are institutional problems

that must be addressed to speed up the adoption rate and sustenance of IRs worldwide. The major institutional factors of IR are awareness, academic attitudes, funds, policy (e.g. on digitisation process and content), and infrastructural issues.

Content recruitment is a core and the most challenging aspect of institutional repository (Ware, 2004; Rowlands and Nicholas, 2005; Lynch and Lippincott, 2005; Heery and Anderson, 2005; Bailey et al., 2006; Ware, 2006; Davis and Connolly, 2007; Salo, 2008; Covey, 2011). A study of ARL libraries discovered content recruitment as the primary problem in the implementation of IRs (Bailey et al., 2006). While Adebayo (2009) added that tracking of publications, mode of stocking, staffing and staff hours, use and getting staff to agree to share their works are demanding situations. This barrier may be traced majorly to academics reluctance toward depositing their works.

Covey (2011) further opined that recruiting a significant mass of content cloth for IR is dependent on increasing understanding, providing value-added services that meet unmet needs, and aligning deposit with existing workflows. All theseunderscore the perceptibility of institutional factors in IR sustenance. Kim (2010) diagnosed four motivators and three limitations that have a statistically large impact on self-archiving level of which the most powerful is altruism. Altruism is motivated by the educational mandate to disseminate work and the anticipation that other researchers will do the same. The higher the perception within the precept of open access and the preference to help others build on research findings and provide access to academics who lacked access, the more the degree of self-archiving. Academic discipline is the second and third most effective motivators. Having a self-archiving way of life and the necessary technical abilities will increase the volume of self-archiving. Faculties in fields that normally share grey literature or require some kind of technical dexterity are very much expected to self-archive.

The second very important problem to self-archiving that Kim (2010) identified is age. He mentioned that younger college members have a propensity to self-archive a larger proportion of their research works. Kim avers that it is due to the fact that younger lecturers have better understanding of disseminating their work on the Internet than the older faculty. However, Salo (2008) interprets the impact of age from another angle: "Young scholars may be attracted to self-archiving as a way to gain a prestige system …, but older scholars are liable to resist the very idea of an open-access citation advantage". The effort and time needed to self-

archive is the third statistically remarkable limitation recognized by Kim. The more the effort and time required, the much less probability that scholars are expected to self-archive. A reduced amount of technical expertise means extra time and effort will be required. This barrier is equal lycited by Swan (2006) and Millard et al (2010). A number of research pushes aside this situation as baseless tension due to the fact that self-archiving is fast and simple (Carr and Harnad 2005; Swan 2006). Other researchers identified troubles of usability in the design of submission systems (Kim and Kim 2008; Salo 2008). Carr and Harnad (2005) posit that about ten minutes for every article can be discouraging to a busy member of faculty with excess materials to deposit.

The institutional issues and difficulties identified with IRs sustenance are unique and diverse, extending from awareness, protection, copyright, innovation, personnel/author acknowledgment, to work process, cost, arrangement advancement, and many others.

2.6.1 Awareness and attitude of lecturers to the sustenance of institutional repositories

Mark and Shearer (2006) pointed out that faculty members have not come to full agreement as regards IR establishment. Earwage (2008) added that faculty members are unwilling to contribute to institutional repository. If academics who are the key contributors to IRs are feeling reluctant to do so, how then can the system be sustained? Mark and Shearer gave three reasons why academics are not cooperating in submitting their works in the repository. Firstly, faculty individuals lack consciousness and awareness of the existence of institutional repositories. So many surveys have revealed that several scholarly authors do not have the knowledge of any institutional repositories on campus. Finally, the authors expressed concern that posting to IR need to be considered before publication of such.

Christian (2008) identified some factors hindering the development of IR in Nigeria to include: inadequate awareness of open access IRs among academics in Nigerian universities and research institutions, in addition to inadequate ICT infrastructure. Christian (2008) avers that more than 74% of the respondents in his study were naive to open access institutional repository. He found that the abysmally low level of open access to IR awareness in the country is closely associated with the problem of insufficient advocacy for open access. That means the greater advocacies given to open access; the more awareness is created for institutional repository.

Sharma, Saha, and Meichieo (2008) opined that faculty is not likely to contribute freely to a central repository except their approval had been initially sought out for, and they are confident of the process. They need to be enlightened that their contributions to a repository will boost their reputations in their various fields and bring about wider distribution of their research. This finding is in unison with Okoroma (2018) that revealed that a great number of Nigerian lecturers are unfamiliar with IR and have abysmal low knowledge level on IR aims and objectives, therefore making them have a low disposition in submitting their intellectual outputs.

Kim (2007) developed a model for comparing factors affecting researchers' contributions to institutional repositories (IR). The model showed that cost, extrinsic benefit, awareness of IR, plan to contribute, experience in the usage of IR forms part of the restrictions. The author surveyed 31 professors in the faculty with the use of a web survey and discovered that those who are aware of IR were only 9 (29%). Only 13 (41.9%) out of an entire group of 31 researchers, were discovered to be making plans to contribute to IR in the nearest future. According to the findings, 22 (71%) researchers made their studies/instructional materials freely available through other avenues excluding IR. Also, they reported that lecturers established routines to create and prepare documents. Again, faculty members observed that IR contribution involved metadata creation for contributed items on "open access self-archiving".

Swan and Brown (2005) have additionally discovered that awareness of self-archiving is a technique in making available open access of authors' artwork, only 29% of the respondents used in their research had been aware of IR and open access while the remaining 71% were not aware. In Ghana, Agyen-Gyasi, Corletey, and Frempong (2011) branded the difficulties of open access institutional repository as obliviousness of open access institutional repository. Thaotip (2011) also recounted that hurdles, issues, and misunderstandings abound as regards open access resources among academic communities in Thailand as well as in some Third World countries. Some scholars argue that IR is not really of significance to research communities as the contents in IRs are assumed to be of low quality. Jones (2009) expounde that it is unclear if IRs will take root and prosper within virtual expertise landscapes as several researchers are unwilling to publish their studies in IRs, inasmuch as they get popularity via dissemination of their intellectual outputs in prominent journals as well as through widely recognized publication medium.

Furthermore, for successful implementation and sustenance of a repository, there is a need for the users to unmistakably comprehend the services expected from the repository, duties to be offered to the repository, content control and utilisation, and broadened decision-making. Fyffe (2003) ascertained that the resource needed for a repository system cannot be reliably projected without previous decisions on some of these policy issues, such as: the services that are fundamental to the repository programme, contributors to the repository; suitable contents; conservation and migration/rights' management and cataloguing (Metadata Creation).

In 2003, a study of 45 IRs running the EPrints software widely supported, averred that there were speculations about the sustenance of IRs due to low faculty involvement as IRs were able to gather a small portion of an institution's research outputs (Ware, 2004). Ware added that grey literature constitutes the bulk of contents in IR systems, the variety of new records added to the repositories seriously fell after some months and that IRs research has imitated subject biases found in disciplinary repositories and have equally failed to attract contributions from fields such as medicine and the clinical sciences, law and chemistry. Ware argued that there was slight evidence that IRs are pioneering a change in academic publishing; and with their sparse coverage, it is unclear if IRs contributes to an enduring conservation programme. Ware (2006) concluded that it appeared that a larger percentage of authors are unaware of or uninterested in the possible advantages of self-archiving. Pinfield (2003) added that there can be greater uncertainty about wider organisational and managerial issues. One key uncertainty is institutional dedication. Some beneficial studies have been carried out in figuring out incentives for institutions and staff members to move ahead in this area. However, a great deal needs to be implemented to get the issues that border on institutional managers, plan of a higher number of lecturers, as well as other relevant stakeholders in the scholarly communication process.

A comparable survey was carried out by Swan in 2005 at universities in ten European countries – the United Kingdom, France, Belgium, Norway, Denmark, Finland, Sweden, Italy, Germany, the Netherlands – as well as in Canada and Australia (van Westrienen, 2005). The percentage of working IRs differ from as low as 1.5 percent of universities (a single instance) in Finland to as high as 100 percent in Norway, Germany, and the Netherlands. The focus on the acquisition of IRs content was almost completely (except Australia and the U.S.) on collecting faculty publications. In a United States study, the European study reported low faculty involvement in storing objects in their IRs. Van Westrienen and Lynch (2005) in their article

acknowledged various reasons for non-faculty participation, including problems associated with informing faculty and getting them to participate; misperception and ambiguity about issues of intellectual property; scholarly credit, and how materials in IRs would be utilised as well as the perception that OA content is of low quality, and insufficient compulsory policies for manuscripts deposit.

Understanding the faculty's academic values and their system of reward is very crucial for the assessment of IRs and envisaging their success in the future or sustenance. A study conducted by Mellon on scholarly communication within the rubric of academic values was undertaken at the University of California, Berkeley. The researchers discovered through their study that scholars were largely supportive of the initiative of making knowledge available for public consumption, while scholars were primarily more troubled with issues bordering on development in scholarly field such as peer review (King et al, 2006).

2.6.2 Infrastructure and digitisation process in the sustenance of institutional repositories

According to Crow (2002), it is not compulsory that each institution developing institutional repositories entirely on its own. For so many institutions, existing regional or library consortia could supply an organised infrastructure for the establishment of IRs through a collaborative effort. Such cooperation could help to reduce economies of scale as well as assist institutions to avoid the duplication of technical systems. Consortia can also prove to be the fastest means to the multiplication of institutional repositories and moving up to a critical mass of open access content.

According to Davis (2007), the sustenance of IRs has been somehow inconsistent. In a 2005 research in the United States on university and liberal arts colleges, 40% of universities and 6% of colleges had working institutional repositories. Most of them that didn't, e.g. 88% of the universities and 21% of the colleges were proposing to take part in IR consortia system. Lynch (2005) reported that DSpace was the most prominent software package indicated by the respondents. The listed sizes of the institutional repositories vary, from a few dozen (less than one gigabyte), to hundreds of thousands of objects (which is more than 10 terabytes of space). Though there was uncertainty on what is regarded as an object by the respondents. Some of the respondents assumed database as a single entity, while others regarded every record in the database as an object. The formats of these repositories' materials stored were different, ranging

from electronic theses and dissertations, e-prints, digitised rare collections, course materials to multi-media, and datasets. In all cases, the participation from each of the institution's faculty was perceived to be very low and voluntary.

The project of UK SHERPA has the establishment of varieties of e-print repositories that are institutional OAI-compliant and preservation of contents investigation as its objectives. The completed project is titled "Securing a Hybrid Environment for Research Preservation and Access". This highlights the two approaches to access and preservation objectives (SHERPA, 2002). The hybrid is referred to as the acronym where the conventional published literature can exist together with open-access e-print repositories. The Joint Information Systems Committee (JISC) and the Consortium of University Research Libraries (CURL) is responsible for SHERPA funding. The main problem with preserving e-prints just as with any electronic resource is how to overcome frequent obsolescence in hardware and software, to ensure that information is encoded in such a manner that is very user-unfriendly as varieties of 0s and 1s can continuously be decoded into more human-readable formats.

SHERPA (2002) stated that this assignment is easier for e-prints than a few kinds of electronic resource due to the fact that e-prints are distinctive, "paper documents made electronic". What distinguishes them from all other kinds of electronic content is the method of delivery instead of the file formats themselves. Presently, e-prints mostly has text and fixed images alone, this represents are part of the easiest form of e-materials to conserve. They seldom incorporate dynamic contents, e.g., audio or real-time reproductions. Also, e-prints are closely linked to conventional paper pre-prints, in which such content types are not possible. Such are commonly in print and stored in methods patterned to enhance the paper and publications printing. The metadata prerequisite, software applications, and file formats used in the management and viewing of e-prints can as well be used in managing and distributing other forms of e-materials. This clearly shows that the e-materials community needs not to resolve the technical issues associated with e-prints.

To maintain information in e-prints that is accessible via multiple generations of hardware and software, it is vital to identify how such information was initially encoded. An approach can then be developed to decode such information in the nearest future. Regrettably, a very minute portion of this preservation metadata is presently captured for e-prints; in so much that an e-print repository may be incapable of telling the exact file format it contains. One may

identify that it is an HTML file but may not be able to know the exact version of the HTML, and whether it is an HTML that is valid or not. It is reasonable to collect such information as soon as the e-print is initially submitted, instead of trying to figure it out in later years when the formats have become obsolete and the information coupled with the expertise in them are unusual. To capture this kind of information with ease, the e-print repositories will require computerized tools which can be able to recognize file formats. Though different types of tools are in existence, it is noteworthy that there is room for additional work in developing tools and aligning them to fit into e-print repository management programming.

2.7 External factors and institutional repository sustainability in University libraries

External factors are the external elements affecting the sustenance usage of IR. These factors differ from and sometimes are interrelated to institutional factors. External factors refer to identifiable elements situated on or coming from the outside of the institution. Prominent among institutional factors affecting IR sustenance are technological issues and copyright. Some other institutional factors include physical, cultural, demographic, economic, and political issues (Hasi, 2001) in Aidis Ruta (2005).

Physical factors have to do with the various infrastructural requirements in IRs. Culture refers to the tradition and ways of doing things in an institution. Cultural factors include submission process and copyright issues, while economics and governmental factors have to do with the fund and the various political/regulations impinging on IRs respectively. On the other hand, demographic factors are localised factors and peculiar attributes/attitudes of an institution. External factors are demographic, physical, economic, cultural, political, regulatory, and technological conditions that influence the survival, processes, and development of an institution (Hasi, 2001) in Aidis Ruta (2005). Institutional factors are general global issues.

Lynch (2005) commented that an institutional intellectual property archive should be bolstered by a lot of data advances at each time, a fundamental portion of the administrations that incorporates an IR is how to deal with the technological issues and the migration of digital content from one set of technologies to the next as part of the organisational commitment to the provision of repository services. There is a diversity of opinion to the software to be deployed for IRs. Jones, Paul (2009) is of the view that one must make use of open-source software for

institutional archives. Every other option would be un-archival and not sustainable in the long-run.

In one contextual analysis, Krevit (2007) clarified the issues experienced by the Texas Medical Center amid the guiding of a multi-institutional repository, for example, copyright issues. Foster and Gibbons (2005) identified that the low level of contribution to the institutional repository by academics is that they are usually concerned about copyright violation and disciplinary work practices (example, co-authoring) when they submit their works to the IR. He further remarked that if the institution-specific participation incentive is attached to professional advancement and evaluation, it will motivate faculty contributions to IR. For instance, researchers who are in disciplines with no pre-publication practice need to be given the mandate to present a pre-publication version; they might fear infringement of other acceptance problems in case they decide to submit the work for formal publication. They might also be afraid of the issues that may arise from work that have not yet benefited from peer review and editing. This necessitates a focus on capturing faculty post-publication contributions for the non-preprint disciplines, at the initial strategy. Pinfield (2002) and Kim (2008) ascertained that due to the fact that archival materials are a chief source of content in IRs, they are becoming an extension of IR archives. Krevit believed that there is so much uncertainty connected to preservation in IRs, and an envisaged, though presently, unfilled function for the archivist existence in the provision of digital preservation know-how for institutional repository.

Piorun (2008) and Frempong (2009) included some other challenges such as cost, policy development, infrastructure, funding, and advocacy. Eke (2011) ascertained that there is very little progress in the adoption of IRs in Nigeria as a result of challenges bedevilling the successful digitisation of resources in Nigerian universities. Such impediments in the project are legal aspects, finances, technical support and security, technophobia, bandwidth, difficulty in digitising some materials, users' education, and unavailability of needed materials. This could be part of the low adoption rate of IR in Africa as stated by Rotich (2012) that African contribution to the global IR is insignificant, only a few countries have managed to set up Open Access IRs. These countries include Cameroon, Botswana, Egypt, Ethiopia, Ghana, Cape Verde, Kenya, Mozambique, Nigeria, Namibia, Senegal, South Africa, Sudan, Tunisia, Uganda, and Zimbabwe. Their contribution amount to only 2.3% of the global IR collection as indicated in Table 2.1

Table 2.1: Extent of institutional archives continently

Continent	IRs Number	%
Africa	51	2.3
Australasia	71	3.2
South America	154	7.0
Asia	380	17.3
North America	487	22.2
Europe	1023	46.7
Central America	11	0.5
Caribbean	13	0.6
Total	2191	100

Rotich, 2012: By 2014 Africa *has moved from 51 to 95 repositories (Open DOAR, 2014)*

According to Harnad (2006), interesting issues that can create a problem to open access movement in Thailand and other developing countries are the lack of professionals in every institution to advocate for the establishment of institutional archives and encourage researchers to upload their papers in the archives, the lack of appropriate infrastructure such as hardwares and high bandwidth connectivity. Furthermore, a few of the authors are of the notion that the editors of well-known journals may not accept archived works. This, coupled with funding issues constitute a major obstacle to the growth and sustenance of IR not only in the country but also globally with the worldwide economic meltdown. Thaotip (2011) ascertained that a small number of open access archives/repositories (subject archives/repositories) in LIS are famous among academics such as; dLIST, E-LIS, OCLC Research Publications Repository, and Australian Library and Information Science Association, LDL (Librarian's Digital Library). Although there is a lack of OAA/OAR suject in LIS, users can retrieve any information needed in various subjects from ample multi-disciplinary archives/repositories by an open-access search engine such as OAIster, DL-Harvest, Citebase, Google/Google Scholar, METALIS and SHERPA Search). Some other external issues that attracted debate are hereby discussed.

2.8 Technological issues and institutional repository sustenance

Eschenfelder, Shankar, Williams, Salo, Zhang, and Langham (2019) discovered that technology is the most prominent framework for the sustainability of institutional repository. The technology dimension covers areas such as metadata practices, customization, data sharing, user-friendly interface, database structure, sustainable formats et cetera. An institutional intellectual

property archive backed up by lot of ICTs, at all time. An imperative part of the administration is technological changes management and the movement of digital content from a series of technology to the other, which is part of the organisational engagement in the provision of repository services.

Nkiko, Bolu, and Michael-Onuoha (2014) highlighted the ever-present nature of digital IRs and their associated capacities. The study particularly show-cased the robust processes and technical details that are involved in the developing and sustaining Covenant University IR which has been constantly ranked the number one repository in the country based on webo-metric rankings. Relying on the Strajda Process Management model, Covenant University adopted two open-source software- Dspace and E-print based on adjudged robustness of the metadata, relatively easy to setup as well as amenable to customization. The paper recommended among others that researchers should be sensitised on the dangers of ceding copyright to Journal publishers as the practice divests them of intrinsic rights and may rule out depositing their intellectual outputs on the institutional repository thereby discouraging the development of content and visibility of research outputs.

Storage is also a key constraint bedeviling IRs in Nigeria. Teper and Kraemer (2002) established that long-term access and digital preservation remains the objectives of IRs are interconnected: with each virtually dependent on the other. The provision of sustainable access to digital contents in a repository demands much organization and commitment of huge resources. The purpose behind the creation and maintenance of a digital repository (either as a component in the changing structure of scholarly communication or institution-centric) demands that users gain access to the content beyond the institution's community. Li (2011: 9) noted that:

> *Digital preservation is a significant problem facing libraries. Libraries are struggling with how to preserve the scholarly and cultural record now that this information is increasingly being produced in digital formats. In the age of print, information was relatively simple to preserve since the paper is a durable format when made properly and stored under the proper conditions...Digital information is fragile and faces many threats including technological obsolescence and the deterioration of digital storage media. The ultimate irony… is that, as our capacity to record information has increased exponentially over time, the longevity of the media used to store the information has decreased equivalently. For example, illuminated manuscripts have lasted for over 1000 years, but a CD will degrade in as little as 15 years.*

Teper (2002) further recommended backup systems that prevent interference and lessen the outcome of likely disasters to ensure the sustainability of IR.

Herbert (2002) opined that every IR system must support interoperability for access provision through different kinds of searching platforms and other devices. Herbert maintained an establishment may not require the implementation of indexing and searching capability to meet this mandate: it is possible by just upholding and rendering metadata, permit other platforms to download and explore the materials. This simplified system minimises the limitations to the functionalities of repositories for several organizations as it requires merely a filing system to sustain its contents and the capability to develop and distribute metadata with exterior systems. Swan and Brown (2005) noted that 42% of journal authors that are non-open access are concerned about the preservation of the contents of open access journal, while Karen (2007: 3) reported that:

> *The Census addressed preservation issues. Initially, we asked respondents whether they dealt with preservation issues during the IR needs assessment process and whether they perceive preservation as a benefit of the IR...Finally, we asked respondents about migration of the IR system itself. The responses to these varied questions demonstrate a great deal of uncertainty about preservation in IRs.*

Bailey (2006) discovered capacity to store materials is perceived as one of the three top advantages of IRs. From the standpoint of storage policy, file formats determination with which IRs renders lasting access is extremely crucial; therefore preservation e remains a very important resolution. Jones (2006) suggested that when making decisions on the preservation of file formats, that the personnel managing IR need to answer the following questions: Is the file format such that is open standard/format and widely used? Are the file formats and associated technology likely to be preserved? Are the materials contained in the file understandable by an individual? And is the file format human understandable?" Bailey noted that 74% of the developed IRs in ARL libraries accepted every form of digital file type. He added that just a very few (26%) are committed to functioning the preservation of any file type. Discussions about reliable digital repositories have continued in recent times with the publication of the Trusted Repositories Audit and Certification: Criteria and Checklist (Center for Research Libraries, Trustworthy Repositories Audit, and Certification). The preservation-worthiness of IRs continues to be an issue. Jackson (2011) stated that that information can be rendered unreachable within a decade considering the rate of change in computing technologies. An important question

connected with the preservation of e-prints is: which ones need to be preserved? This is where selection and retention criteria are crucial hence it is important to identify that it is not really an "all or nothing" situation.

Jackson continued that digital content is usually lost whenever it is not maintained as long as software, hardware, and media continue to develop. If there are no interventions, e-prints is likely to be subjected to media deterioration in just a few years. A few more years will ensure that the e-prints have become unreachable with changes in software and hardware, even if the e-print is well backed-up. In the absence of strong institutional commitment, institutional e-print repositories will not be able to preserve their contents, and they are also likely to struggle to convince faculty to upload their work. Currently, the glaring assumption among some of the e-print community is that decisions about preservation can be left until a later period (Harnad, 2001). But this does not augur well with much advice on digital preservation that emphasizes taking action early in the life-cycle of an electronic resource to make it easier and cost-effective to maintain in the future.

Mark Ware Consulting reported that "One of the likely largest costs over the long term will be . . . preservation . . . also by far the least known and indeed least knowable . . . a commitment to an IR amounts to an implicit commitment to an unknown amount of work in the future." (Ware, 2004). Ware argued that currently, IRs are not yet an alternative to reliable digital repositories which has a mandate to provide lasting and dependable access to digital materials to its assigned community, both at present and into the future. This affirms the issue of IR sustenance. According to Fyffe, (2003) The Repository provides three levels of preservation service namely: Level One Service - "No loss" transformation (in this case transformation is every procedure that serves as a guide to creating a new version of a folder). At Level One, the repository monitors the format to identify what constitutes a threat to the object format to becoming outdated. Formats in level-one are regarded as being well-documented and characterised; the level of confidence is quite so high that every data content, functionality, and structure of the original object can be conserved.

Level Two Service is regarded as "Some loss" transformation. In this case, the repository monitors the format at Level Two, to ascertain the risk which makes the object format outdated. Formats in level two are less well-characterised, and fairly friendly to controlled transformations.

In this regard, the conservation directive is to move forward the data content, structure of the original object as well as functionality of the novel object or set of objects.

Level Three Service is regarded as 'No transformation' where the repository sustains the object i.e., conserves only the bits. Repository do monitor Level-three formats to identify obsolescence risk or schedule transformations. The files could be sent to a reliable application at some point in the nearest future, but there is no assurance that the content of data, its structure, or level of functionality will be conserved as well as the ability to open the file.

"E-prints" as defined by Pinfield (2003) are electronic versions of research papers or related research outputs, which can be a draft of such papers prior to the time they are refereed or after such papers are published. E-prints can as well comprise chapters from intellectual books or materials from conference proceedings which are very crucial research outputs but may not have been formally published. The issue then is: should e-print archives perform a unique archival function truly by preserving their contents for the future?

One of the ways to answer the above question is to examine the discussion of Stevan Harnad who is a prominent promoter of e-prints. Harnad (2001) believed that digital preservation of e-prints is highlighted in a number of publications and electronic mail discussion lists. He emphasized that E-prints are the duplicates of the traditionally published papers. This means that they augment rather than replace conventional journal literature. Again, E-prints are all about "immediate access". They make for fast distribution of the literature as against journals with usually prolonged delay between the time a paper is accepted and when it is finally published. E-prints are also free at the user end as against the journal literature often concealed behind a "tollgate" when housed in open-access repositories.

Attention should be focused on the population of the repositories. Every person that has worked in the repository confirms that getting the content is both a major challenge and a major priority. Therefore, preservation need not be a priority, as it can constitute an unnecessary distraction (Ware 2004; Rowlands and Nicholas 2005; Davis and Connolly 2007; Salo 2008 and Okoroma 2018). Emphasizing preservation can even slow down efforts to the population of repositories. This might be caused by the repository personnel delay in making repositories available only when there are preservation policies put in place, or if they add any limitations in the way of authors before the submission of their works: e.g. insisting on particular metadata standards or file formats.

When there are so many materials in IR, this can be "retro-fitted for more rigorous preservation." This will specifically be applied in case e-prints become the main media for scholarly communication. Presently, preservation in IRs is not of immediate importance. This is because the largest e-print repository, arxiv.org, was established in 1991, its contents are to date still accessible. Instead, preservation efforts need to be centered on the traditionally published paper versions instead of on e-print repositories. According to Harnad (2001), the Open Archival Information System (OAIS) should be forgotten presently as the OAI-compliance of the Eprint Archives is more than enough at present. Preservation of e-prints can be likened to a museum curator who preserves a duplicate of an artifact instead of the original artifact.

In contrast, many argued that preservation of digital materials should be a crucial feature of the services rendered by e-print repositories. Peter (2001) while discussing e-prints and other information resources, suggested that every OAI system aligned with the OAIS reference model, and gave an assurance of lasting reliability, accessibility, and integrity, which would be advantageous to learning. According to this author the numerous possible reasons for preserving e-prints cannot be overemphasised.

According to Lawrence (2001), it would not be ideal, if work may be accessed these days other than in ten years if allowed to deteriorate so much that it turns out to be inaccessible. Essential preservation work (including migration to new versions of software) is needed to conserve open access to the contents. The author continued that in a situation where e-prints are usually quoted, uploading an e-print creates a network of users. For some fields, citing e-prints can be the rule and therefore clients could anticipate access to the e-prints to be preserved for the citations to such to continue to be authentic. After the publication of a paper, researchers expect that they should be able to quote the post-print in an e-print repository since it is assumed that accessibility to it may possibly be easier.
If preservation is guaranteed, it may motivate authors to submit papers. It has been proposed that the stimuli that can motivate authors to deposit their papers are making them aware that IRs will preserve their papers.

It should be noted that populating the repositories and digital preservation need to be tackled together. Peter (2001) opined that filling repositories is expedient yet there should not be any reason for preservation work not to be done alongside it. It is a fact that recruiting content for repositories is undoubtedly a key concern, as one cannot talk of preserving e-prints if they

were not available at first. Achieving "buy-in" from researchers which entails culture shift is not an easy task to effect. Authors may need to be compelled to submit their research outputs to institutional or subject repositories which should be without any form of diffficulty. Self-archiving by a proxy policy (in this instance, repository managers perform the depositing procedures on the author's behalf) can be used to encourage authors. Nevertheless, preservation work can as well commence. The work may not be carried on holistically, since it is evident that, whatever is the situation, such work need not be allowed to discourage authors. As part of the depositing process, the demands of authors should not be unrealistic.

Pinfield (2003) opined that populating the IRs and preserving the contents should not be commonly undivided. They are two distinct parts that have similar definitive goals: to provide easy access to literature both now and in the nearest future. The provision of access in the short-term is likely to further the need for preservation. The worldwide use of OAI and Dublin Core as a means to determine the discovery of e-prints again serves to enhance standardised metadata, which is as well used in preservation. File format choices that are restricted help both the reader and repository personnel and will simplify the problem thereby making preservation more feasible.

There are other points of contention, apart from the problem of whether every institution should develop a repository for their communities. Such include: if libraries should pioneer the efforts, if IRs need to be anchored on open source software only and if the success of IRs is dependent on laid down mandates. According to Bulletin of the American Society for Information Science and Technology (2009), the affirmative position was taken by Helen Tibbo (of the School of Information & Library Science at the University of North Carolina Chapel Hill) while the negative position was taken by Kevin L. Smith, (Duke University scholarly communications officer). Varieties of challenges were raised during the discussion. The issues include essential questions on concepts: What do we mean by the term institutional repository? How do areas such as intellectual property, scholarly communication, open-source software, institutional memory, copyright, mandates, leadership, digital libraries, research impact, digital preservation, metadata, and the Open Archives Initiative Protocol for Metadata Harvesting connect to the concept and establishment of an institutional repository?

McDowell, (2007) ascertained that at the institutions, libraries are the pioneers of IRs, hence only a few members of faculty identify with IR and self-archive their materials.

Copyright has exerted much controversy over IR sustenance; this brings about the need to examine closely the issue of copyright management in universities in Nigeria.

2.9 Copyright issues and institutional repository sustenance

An important external factor that is confronting IR initiatives in Nigeria is the issue of copyright. Nkiko, Bolu, and Michael-Onuoha (2014) considered copyright as an important element required for the sustainability of intellectual content into any digital repository. This copyright issue is crucial because the author's intellectual property is protected by law. Muneja and Ndenje-Sichalwe (2016) studied institutional repository initiatives in Tanzania. The researcher specially examined the opportunities for establishing IR and the challenges associated with it. The study showed different levels of perceptions on IR among academics, and also identified inadequate knowledge on Intellectual Property Right (IPR) among other challenges. Similarly, the authors submitted that copyright is very crucial to the development and management of digital repositories in higher academic institutions. The problem of intellectual property and Copyright is a point of concern for faculty.Authors still have fears that they are likely to be infringing on the copyright agreements they signed with their publishers by uploading their work into an IR, although most of the publishers do permit authors to upload their papers and make them accessible through their university's IR.

A research conducted by Foster and Gibbons (2005) where 25 professors at the University of Rochester were interviewed on the reason why faculty members never submit their work to the IR, discovered that worries about violation of copyright and disciplinary work practices constrained their active contribution to the IRs in their institutions of learning. Okoroma and Abioye (2017) corroborated that there are copyright issues in IR, such as plagiarism, Publishers Contract Policy that mandates authors to give away their copyright to publish their works, and lack of enlightenment programmes to educate authors on their intellectual property right.

Musa, Shittu, and Abdulkadir (2014) in their findings ascertained that the responsibilities of university libraries in creating a sustainable institutional repository includethe formulation of rules and policies guiding copyright issues relating to document depository and content accessibility in the repository. The policy for IR sustainability needs to indicate the types of materials needed in the IR, structure, categories of content, departments or individuals,

colleagues, guidelines for submission of content, rights of libraries who collates its contingency plans, rights of academics, etc (Musa, 2014).

According to The Copyright Act Chapter 68, Laws of the Federation of Nigeria 1990, works that should have copyright protection were identified in Section 1 of the Act - literary works, artistic works, musical works, sound recording, cinematography films, and broadcast. It should be noted that Nigeria had a Copyright Council that was upgraded in 1996 to the Nigerian Copyright Commission. According to Okwilagwe (2001), the Nigerian copyright law was managed by the NCC, a corporate body established by the Federal Government under the Ministry of Culture and Social Welfare. The Council was given the mandate for all copyright-related matters in the country such as: enforcement of the copyright law, enlightenment campaign and educating the populace on issues connected to copyright, mandating those who use works of Nigerian authors to pay enough royalties which represents the interests of every Nigerian artistes in the worldwide copyright issues, and keeping records of all Nigerian authors.

Egonwa (2005) reported that the Reproduction Rights organisation of Nigeria (Repronig) is the only government-approved rights management society for the print medium in Nigeria. Repronig was formally established on 3 November 2003. It was mandated by law to collect, negotiate, and share royalties with relevant stakeholders. Repronig's international relationship with a network of associations developed to guard the rights of its stakeholders and members, gives her a voluminous backup to operate locally and internationally. Membership into Repronig is usually a consortium of professional associations in creative arts e.g., the Society of Nigerian Artists (SNA), Association of Nigerian Authors (ANA). It is expected that the Nigerian Guild of Editors (NGE) and the Nigerian Union of Journalists (NUJ) should be members as well. The question that comes to mind is: can the fair practice of licensing the exploitation of reprographic material be attainable in Nigeria?

Ojielo (1997) believed that: The Nigerian Copyright Commission has been very effectively carrying out its responsibilities. The study also revealed that the most successful operational strategies adopted by NCC in fighting copyright infringement are the enlightenment campaign and the enrolment of Nigeria into international Copyright Conventions. Nevertheless, there is a high level of ignorance and different levels of perception on intellectual Property rights by the right owners, including the supportive institutions such as the college authorities, the universities, and the guilds or associations of business centre owners (Muneja and Ndenje-

Sichalwe, 2016). This accounts for the obvious reason the project has not been feasible. The author noted that it was practicable to give license to users of works protected by rights as long as they are brought to the holistic knowledge of the legal, moral, as well as spiritual effects of their current activities. Egonwa (2005) opined that right owners-artists, authors, and performers need to be educated on the positive economic consequences of the act to their well being. Benefits arising from licensing in Nigeria will carry over to the flowing of creativity, the value to be added to arts and culture and the support it will bestow on dependant industries such as eco-tourism and education. Muneja and Ndenje-Sichalwe (2016) coroborate that a policy on the institutional digital repository is essential to guide the management and use of the resources. Equipment levy and users of reprographic rights licensing is not going to be an exception to the rule. Levying all equipment that can be used to infringe works protected by copyright at the source of entry invariably will tend to raise their cost price.

Egonwa (2005) added that a suitable scale should be established for tertiary institutions to pay for the bulk sum licensing fees for the volumes in their libraries to take care of photocopying done by the students and staff. This entails dictating to the institutions of learning to take responsibility for the photocopying by members of staff including students, as applicable in most developed nations of the world. Perhaps, this fact may be useful in persuading these SMEs to comply with plans for licensing the use of copyright-protected works. However, even if these institutions agree on the bulk per-library-holding licensing, how can volumes outside the library holding which are photocopied by the SMEs be checked for charges computation and collection? These are questions that need to be addressed. Literature shows that the rate at which copyright is violated in tertiary institutions in Nigeria is quite a dismay. Reprography is the most common way that the numerous activities which result in copyright infringement such as plagiarism, piracy, and counterfeiting are performed.

Williams, Wu, Choudhury, Khabsa, & Giles (2014) concurred that intellectual property rights and copyright protection serve as limitations to the distribution and usage of resources in the institutional repository. For instance, Igbeneghu (1993) study on copyright infringement and photocopying activities in seven Nigerian Universities found that photocopy centres were up to 173 in the selected Nigerian Universities. From his findings, the following were deduced:
-As much as 81 million pieces of duplicating papers are exposed to photocopying activities every year in the Nigerian universities used for the study.

- Approximately 53 million of the materials involved are published works;

- The Nigerian copyright law is being violated;

-Photocopy is, however, indispensable to the advancement of education in Nigerian Universities; and

-Photocopy is hazardous to the publishing industry.

Studies have shown that developed countries have structures already fixed for levying all photocopies made in the nation (for the authors' benefits) and for the enforcement of copyright laws, such should also be applied in Nigeria.

Literature has revealed previous IRs studies in Nigerian (Christian, 2008; Nwokedi, 2011) and not any of such surveys examined the institutional and external factors as correlates of sustenance of IRs in universities in Nigeria.

2.10   Theoretical framework

This thesis was anchored on the Expectancy theory and Technology Acceptance Model (TAM).

Expectancy Theory

Victor Vroom in 1964 propounded the Expectancy Theory. According to the theory, people will be propelled to act in certain ways with the belief that acting in such a way will bring those compensations they seek out for and value. In the case of institutional repositories sustenance, IR drivers will have to put up publicities and other structures that will help to showcase the values of IRs, to motivate the sponsors and contributors to keep on sustaining the system.

In Vroom's book titled 'Work and Motivation', he defined main problem of motivation as the clarification of choices organisms made among diverse voluntary responses. To comprehend how these choices are made, he defines the three concepts - valences, expectancy and force. Furthermore, he explained the way these work together in determining how people will come to a decision to take action, given probable causes of such behaviours which lead to envisaged outcomes.

Valence refers to preference for one outcome over another. An outcome is assumed to have positive valence when an individual prefers to attain it instead of not attaining it. On the other hand, negative valence is when such individual prefers not to attain an outcome; and when such individual is pessimistic about whether or not an outcome is attained, that is zero valence. For example, in case a manager specifically desires a promotion and thinks that to earn that promotion, he needs the successful completion of a certain project, then he will attach a positive valence in carrying out the project and completing it. Such a manager will be inspired to carry out the task by the perceived worth of the compensation.

An individual's behaviour is also influenced by how probable such an individual believes these outcomes to be. Vroom defined expectancy as "a momentary belief concerning the likelihood that a specific action will be preceded by a particular outcome". Expectancy can be assigned a value from zero to one. A zero value indicates the certainty or belief that the result or outcome will not follow on from the action, while a value of one indicates that with certainty the outcome will definitely follow on from the action. For example, if one wants to have coffee drink, and is aware that in the staff room, there is a machine meant for drinks, such individual walks right away to the place. The act of walking to the staff room as indicated has a high expectancy-value in terms of getting the coffee drink. However, that act of walking to another place, like the post-room indicates a low expectancy-value; this is because the individual is not convinced that he or she will certainly find coffee drink in such a place. Vroom listed force as the third concept. According to him, he is of the opinion that the behaviour of an individual is due to a field of forces, which everyone has in terms of direction and magnitude. Mathematical values which are assigned to valences and expectancies for acts are combined in such a way to generate hypothetical force. The act that generates the maximum force level is assumed to be the one that the individual will desire. Actions with high levels of both valence and expectation will produce the highest levels of force.

Vroom's model is calculated as follows:

M = (E x V)

Where M is regarded as the motivational force as a result of summing up expectancy and valence; E is observed to be the expectancy measure; while V is the valence for the person of a

given outcome. The theory of Vroom can be put into action by granting interviews to people or administering questionnaires to them to evaluate their levels of expectancies and valence. The results are assigned scores, and the expectancy score is multiplied by the valence score. The results for all the outcomes that might be produced by a particular behavioural option are then summed up, and gives the expected value (EV) of that option. Every likely course of behaviour can be assigned an expected value through this process. According to the model, the one with the highest EV will be a subject's most possible choice.

The main implication for the universities (owners) of IRs is that since motivation is closely linked to reward, the aim should be to motivate high sustenance by applying rewards to investment in IRs. Incentives and benefits should be clearly tied to actions that are in agreement with the universities' policy and which will contribute to the success of IRs.

Vroom's expectancy theory was expanded by Porter and Lawler in 1968. Their model stressed that factors other than motivation also influence performance. Research has shown that expectancy models can be used precisely to predict levels of job satisfaction, the choice of occupation, and levels of work effort.

The study of Vroom on the reasons for people to decide to act in certain ways at workplaces continued with his partnership with Philip Yetton. They developed what is known as the Vroom/Yetton model of leadership decision-making (Leadership and Decision-Making, 1973). This is a contingency model that identifies leadership styles that are required for diverse situations. Particularly, it can be applied by managers to assess the degree to which they should encourage individuals to take part in the decision-making process. In the case of this study, IR managers are to see a way they can encourage other stakeholders of IRs to continually participate in the sustenance of IRs.

Technology Acceptance Model (TAM): This model was propounded by Davis in 1985. It is an information systems theory that models the way users accept and use technology. Davis (1985) proposed that "system use is a response that can be explained or predicted by user motivation, which, in turn, is directly influenced by an external stimulus consisting of the actual system's features and capabilities." The model proposed that when users come across new technology, so

many factors contribute to their decision on how and when they will use such technology. Notable among the factors are:

• Perceived usefulness (PU) – This is the degree to which an individual believes that using a particular system would increase his or her job performance,

• Perceived ease-of-use (PEOU) - The degree to which an individual believes that utilising a particular system would be free from effort (Davis, 1989), and

• Attitude toward using the system.

Davis postulated that the attitude of a user towards a system will considerably determine if the user will use the system or not. The attitude of such individual is influenced by the generally recognised usefulness of the system and its' perceived ease-of-use. In this study, the lecturers are the main users or contributors to IRs. They are responsible for populating the IRs. Institutional Repository cannot exist if the content is not there in the first place yet many studies repeatedly reported that getting content from academics is very difficult (Heery and Anderson 2005; Ware 2006; Davis and Connolly 2007; Salo 2008). There is an existing negative attitude of academics towards IRs, and their attitude has been occasioned by certain stimuli or external variables.

According to Davis (1989), there is a variable that controls the two main variables in the theory, which points out the antecedents (i.e. a preceding occurrence) of Perceived Usefulness and Perceived Ease of Use. The variable is referred to as external variables such as self-efficacy, anxiety, age and the degree to which people believe that such variables will increase their adoption and use of technology. External variables in the context of this study are the institutional and external factors: Awareness, lecturers' attitude, infrastructure, digitisation process, funding, technology, and copyright issues which are affecting the actual use of the system.
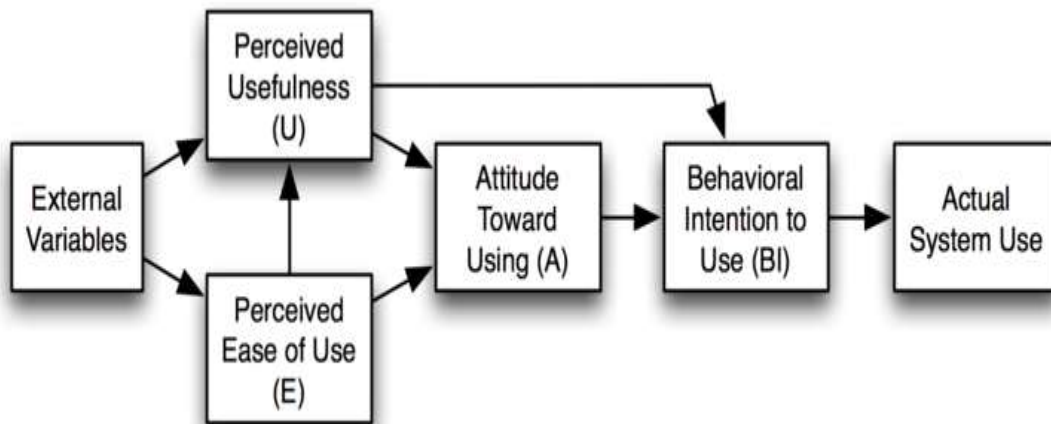
Figure 1: TAM Model (Davis, 1985)

TAM has been repeatedly studied and upgraded from time to time. TAM 2 and the Unified Theory of Acceptance and Use of Technology (UTAUT) are the two main upgrades (Venkatesh and Davis, 2000; Venkatesh, 2000; and Venkatesh et al., 2003). So many scholars have duplicated Davis's initial study to offer scientific evidence on the associations existing between usefulness, ease of use, and system use (Davis 1989; Adams, Nelson & Todd 1992; Hendrickson, Massey & Cronan 1993; Segars & Grover 1993; Subramanian 1994; Szajna 1994). Prominent among them is the study conducted by Adams (1992) which focused on testing the robustness and authenticity of the questionnaire instrument which was used by Davis. It replicated the research by Davis to establish the authenticity and reliability of both his instrument as well as his scales of measurement. Again, when they further applied the research to the various samples and settings, they established the internal consistency and replication reliability of the two scales. Hendrickson *et al*. (1993) reported high reliability and good test-retest reliability of the instrument while Szajna (1994) reported that the instrument had predictive validity for intent to use, self-reported usage, and attitude toward the use of information systems. The summation of these research established that the Davis instrument is valid, and will serve as support to its users with various user populations.

The result of research on the adoption of digital libraries by the user in 2002 firmly supports the utilisation of Technology Acceptance Model (TAM) in the prediction of users' intent to accept digital libraries and display the effects of important external variables on behaviour intent through perceived ease of use and perceived usefulness (Hong, Thong, Wong, and Tam, 2002). Tella (2012) expanded Davis (1989) Technology Acceptance Model to ascertain the success of e-payment at the University of Ilorin, Nigeria. The results exhibited relationship among variables such as perceived enjoyment, perceived benefits, perceived ease of use, speed, service quality, e-payment success, and actual use; the TAM constructs were perceived as good predictors of e-payment system success.

TAM model is used in this study because it explains and predicts information system use such as IR. This study deals with the investigation of the factors affecting the sustainability of IRs, which is linked to the acceptance and use of the system by lecturers. Invariably, the ability of lecturers to adopt and use IRs will be affected by their perceived usefulness or benefits of the system as well as the ease of use of the system.

2.11 Conceptual Model

Fig 2.2 presents the conceptual model for the study. The conceptual model explains the processes by which the study was carried out. The two independent variables (institutional factors and external factors of IR) interact, and impact on the dependent variable (sustenance of IRs in university libraries in Nigeria). The dependent variable describes the expected outcome.

2.10　　　Conceptual model

Institutional factors of IR
❖ Awareness
❖ Lecturers attitude
❖ Infrastructure
❖ Funding

External factors of IR
❖ **Technology**
Digital preservation,
Technological changes
❖ **Copyright issues**
Plagiarism
Ownership

Sustenance of IRS in University Libraries in Nigeria

- Creation
- Maintenance
- Adaptation
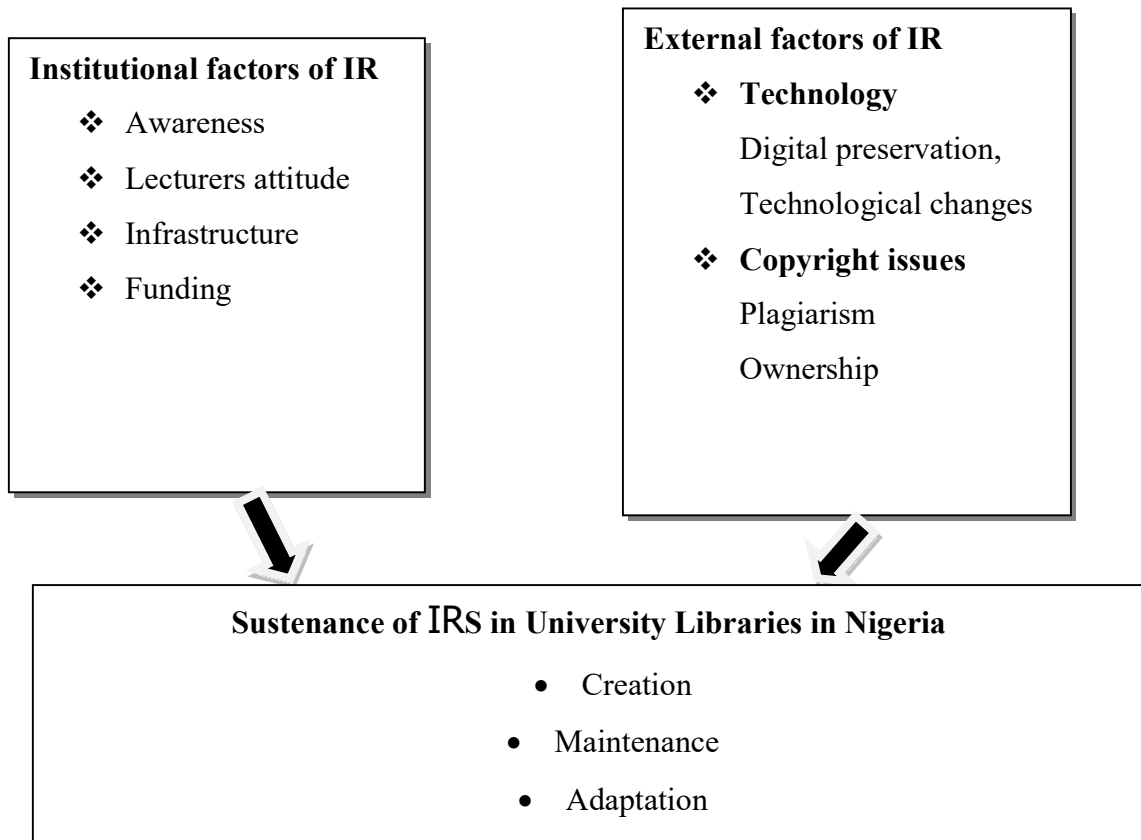
Fig 2.2: Conceptual model

Source: *Self-constructed by the researcher*

The two independent variables are institutional and external factors, while the dependent variable is IR sustenance. Institutional factors are awareness by lecturers, lecturers' attitudes to submitting their work to IR, infrastructure, and funding for the management of IR system. While external factors are technology (digital preservation and technological changes) and copyright issues (plagiarism and ownership). Institutional factors will influence IR sustenance because if the lecturers are aware of the objectives and benefit of IR to them, their universities, and the global academic community, they will have a positive attitude towards IR, and so will be willing to deposit their works for the creation of IR content. Again, if there are adequate infrastructure and technology for IR, the creation, maintenance and adaptation will be made easy as digitization process which is the major feature of an IR is driven by infrastructure and technology including software and hardware devices, and vice versa. On the other hand, if copyright issues such as

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plagiarism and who should own the copyright are strengthened, the lecturers will be ready to support IR since they will be rest assured that every work deposited will be secured.

2.10   Appraisal of the literature review

The relevant literature reviewed shows the issues that cumulated to the birth of IR. It shows that the IR movement originated from the Open Access movement. A survey of literature revealed the various activities on the implementation of an institutional repository, going on across the globe. Example, The Academic Research in the Netherlands Online, California Digital Library eScholarship Repository, University' of Ohio State Knowledge Bank, as well as Covenant University, University of Jos, and Ahmadu Bello University IRs. Many of the information resources highlighted the advantages derived from the development of IRs in universities, such as the preservation and dissemination of the institutions' intellectual content, and also the dire need to ensure IR sustainability by all institutions.

It further revealed a slow rate of adoption of IR in Africa (especially Nigeria), even the number of IRs in European Union countries in the highly developed stage of IR is abysmally low. Previous research further exposed the various challenges associated with the use of institutional repositories in sub-Saharan Africa including Nigeria, and the need to examine and deal with differing issues to ensure the sustenance of institutional repositories.

However, a gap exists in the literature as regards the sustenance of institutional repositories in Nigeria. Despite all the research, none of the studies focused on the institutional and external factors as correlates of IRs sustenance in Universities across Nigeria. This study has set out to fill this gap; to examine the extent to which institutional (awareness, Lecturers' Attitude towards IR, infrastructure, funding, and Digitisation Procedures) and external (Technological Changes and Copyright Issues) factors influence IRs' sustenance in Nigerian university libraries.

CHAPTER THREE

METHODOLOGY

3.1   Introduction

This chapter describes the procedures adopted for the study. The procedures have been discussed under the following sub-headings:

3.2 Research design

3.3 The population of the study

3.4 Sampling technique and sample size

3.5 Instruments

3.6 Validity and reliability of the research instruments

3.7 Data collection procedure

3.8 Method of data analysis

3.2   Research design

The study adopted a survey research design. The design involves qualitative and quantitative methods of data collection. Generally, survey designs studies seek individuals' opinions as separate components of analysis (Babbie, 2001). Therefore, it is a design involving the gathering and analysis of data obtained from individuals in a group or items adopted to serve as a representative of an entire population. Quantitative research design is suitable for this study since it involves a large group of academics in the eight universities that participated in the study, Qualitative method is suitable as well for the few managers of the institutional repositories in the participating libraries in a study since there is need to have details on the activities that led to the establishment and maintenance of such IRs, as well as the problems, encountered and how the problems were (or can be) resolved.The descriptive research design was adopted to determine the relationship between internal as well as external elements capable of affecting the sustainability of IRs in Nigerian university libraries.

3.3 Population of the study

The study population comprised 8,417 academics in eight universities across Nigeria who have adopted institutional repository, 16 digital staff, and 8 university librarians. The universities were selected because they were the only ones, because of experience, that could be able to talk about the sustenance of IRs. The universities' librarians and heads of library system units of the universities were also included in the study. The eight university libraries in Nigeria that have functioning institutional repositories are Ahmadu Bello University (ABU) Zaria, Kaduna State; Covenant University (CU) Ota, Ogun State; FUOYE, FUTA, OAU, UI, UNIJOS, and UNN. Table 3.1 represents the population of the study.

Table 3.1: Population of the study

S/N	Name of university	Acronym	Total number of lecturers	Librarians/ Digitisation Staff selected
1	Ahmadu Bello University	ABU	1577	3
2	Covenant University Ota, Ogun State	CU	430	3
3	Federal University of Technology,-Ondo State	FUTA	683	3
4	Obafemi Awolowo University, Osun State	OAU	1097	3
5	University of Ibadan, Ibadan, Oyo State	UI	1536	3
6	University of Jos	UNIJOS	1058	3
7	University of Nigeria, Nsukka	UNN	1286	3
8	Federal University, Oye Ekiti	FUOYE	750	3
	Total		8,417	24

Source: *Preliminary field survey in May, 2016*

3.4 Sampling technique and sample size

Stratified random sampling technique was employed for the study. The targeted population of the study is eight institutions that have adopted IR in Nigeria. The universities were selected purposively due to the fact that they are some of the schools that have adopted IRs

in the country. Purposive sampling technique was adopted for sampling three faculties common to all the universities under study. The faculties were sciences, social sciences and humanities respectively. Three departments were also selected using random sampling such that each represent each selected faculties for the study. Simple random sampling techniques was employed to select 844 academics (representing 10% of total population) and 24 library heads/digitisation staff giving a total sample of 868. The sample size of 10% was assumed apt for this study built on Nwana (1981) who ascertained that if the population under study is in hundreds, the sample size of 20% will be required. However, if the population is in few thousands, sample size of 10% is required while a population of several thousands, a sample size of 5% or less is needed. According to this recommendation, a sample size of 10% which is 844 is ideal for this research population of 8,417.

Table: 3. 2. The study sample size

S/N	Name of University	Acronym	Total number of lecturers	Total number of lecturers in the faculties	Sample Size	Library heads/Digitisation Staff selected	Total Sample
1	Ahmadu Bello University	ABU	1577	315	158	3	161
2	Covenant University Ota, Ogun State.	CU	430	157	43	3	46
3	Federal University of Technology, Ondo State.	FUTA	683	376	68	3	71
4	ObafemiAwolowo University, Osun State.	OAU	1097	282	110	3	113
5	University of Ibadan, Ibadan, Oyo State	UI	1536	340	154	3	157
6	University of Jos	UNIJOS	1058	293	106	3	109
7	University of Nigeria, Nsukka	UNN	1286	361	130	3	133
8	Federal University, Oye Ekiti	FUOYE	750	186	75	3	78
	Total		8,417	2,310	844	24	868

Source: *Preliminary field survey in May 2016*

3.5   Research instruments

Three instruments were used for data collection, two self-constructed questionnaires (for academics and digitisation staff respectively), and a structured interview for University Librarians/head of digitisation unit.

   a. The Institutional Repository Questionnaire (IRQ) for lecturers measuring the institution's internal as well as external factors that are impacting the sustainability of IR.

   b. The Institutional Repository Questionnaire (for digitisation staff) measuring the activities and challenges involved in the sustenance of Institutional Repositories in the selected institutions and

   c. Structured interview for University Librarians and heads of digitisationunit.

A.   The Institutional Repository Questionnaire (IRQ) for lecturers

The Institutional Repository Questionnaire (IRQ) for lecturers is a personally designed structured questionnaire investigate institutional and external factors influencing the sustainability of IR in the selected universities. The questionnaire had seven sections A, B, C, D, and E. Section A focused on the demographic data respondents. Section-B which contains 21 items elicits information on institutional factors affecting institutional repository, Section C, a 17-item questionnaire sought information on benefits of an institutional repository, Section D which contains 24 items questionnaire sought from the respondents' external factors affecting institutional repository (IR), while Section E, a 7-item questionnaire contained items that seek for suggestions on the solutions to IR sustenance. The IR questionnaire for lecturers was designed in both open-ended and closed-ended response format. The closed-ended questions were designed in a 4-Point Likert format of Strongly Agreed; Agreed; Disagreed and Strongly Disagreed.

(i). Section A: contains the background information of respondents ranging from name of institution, name of faculty/department, gender, age, educational qualification, designation in the university etc.

(ii)   Section B: contains 21 items on institutional factors affecting institutional repository sustenance. Items were presented mainly on a two-response format Yes (2) and No (1).

(iii) Section C: This part contains seventeen (17) items inquiring the benefits of an institutional repository. It is a four Likert-typepointscale instrument by circling or ticking (√) any of these responses, (4 = strongly agree; 3 = Agree; 2 = Disagree; 1 = strongly disagree)

(iv) Section D: The section has 24-items designed to measure the external factors affecting institutional Repository. It is an instrument with four Likert-type scale for ticking (√) responses such as; (4 = Strongly agree; 3 = Agree 2 = Disagree; 1 = Strongly disagree)

(v) Section E: contains information or items measuring recommendations on the sustenance of Institutional Repository (IR), it contains (7) items with 4 formats of responses: four (4) point Likert scale of Strongly Agree, (SA)=4 Agree,(A)=3 Disagree,(D)=2 and Strongly Disagree (SD)=1 respondents.

B. The Institutional Repository Questionnaire (for digitisation staff)

The Institutional Repository Questionnaire was constructed by the researcher, to find out the procedures and level of activities carried out in the institutions that adopted IR in universities in Nigeria. It comprises two major A & B. Section A of the questionnaires consists of 7 items meant to elicit demographic information of the library personnel involved in digitisation. Section B which was made up of 27 items that focused on internal and external institutional factors influencing Institutional Repository sustenance.

C. Structured interviews for University Librarians/heads of digitisation unit.

A structured interview and open-ended questions were employed for the study. The open-ended questions method permitted a greater depth of meaning to talk about the prevailing issues in the different universities on the sustenance of institutional repositories. This is an aspect of qualitative research that focused on how individuals view and understood their IRs, the activities around, and construct meaning out of their experiences. Though some researchers consider the use of the interview when the research goal does not border on estimating statistical parameters rather for the generation of hypotheses for testing quantitatvely. As far as this study is concerned, the aim is to have an understanding in nuances of sustaining institutional repositories. According to Strauss and Corbin (1990), in-depth interview utilize grounded theory approach which underscored the role of humans in the shaping and the according significance to their world, while emphasising the relationships among condition, action and meaning.

The interview guide used for the study was on the issues and solutions in the sustenance of institutional repositories. This was used to obtain responses on one-on-one discussion method from the university librarians/heads of digitisation units. (see Appendix C).

It is an instrument with two sections A and B. Section A of the instrument consisted of items meant to elicit demographic information of the respondents while section B focused on the structures for the sustenance of IR.

3.6   Validity and reliability of the instruments

Face validation of instruments was done by the supervisor as well as two other professionals in the area of test construction at the University of Ibadan's Faculty of Education. Two photocopies of the questionnaires were also administered to lecturers of senior cadre that specialise in ICTs. The verdict of the experts after assessment helped in determining the accuracy of the instrument in measuring the study objectives. Afterward, fifty photocopies of the questionnaire were pretested at Federal University of Agriculture, Abeokuta, Ogun State which was outside the scope of the study (but possess similar characteristics) to determine the questionnaire's content reliability using Cronbach-Coefficient Alpha and three instruments were used; Institutional Factor ($r=0.907$), External factors($r=0.71$) and Sustenance ($r=.82$).

3.7   Data collection procedure

The researcher employed eight (8) research assistants for data collection in the eight selected universities in Nigeria who were duly trained and informed about the process of data collection. The help of academic librarians in the universities was requested for supervision and complementing the effort of the team of researchers.

Data collection was carried out in two phases; the first data was collected with the questionnaires that were administered to provide insights that helped in structuring the interview questions. As for the research tool, the survey offered characteristic advantages that are linked to their structural format. The sequence of questions as well as responses facilitated capacity to ask definite questions on varied number and areas of topics on what happened in the organisation and subsequently carry out detailed analysis of relationships among all the variables.

The researcher had one-on-one interaction with the university Librarians and heads of digitisation units on their IRs experiences and challenges. The researcher focused on hearing the peculiar internal and external factors challenging the sustenance of IR in their universities.

3.8   Method of data analysis

Data were analysed qualitatively and quantitatively in the study. Data collected were analysed descriptively and inferentially. The descriptive statistics which include frequency and percentages were employed to analyse the demographic variables that were selected for this study, while the inferential statistics which involved t-test were employed to test for the null hypotheses at 0.05 level of significance. The qualitative analysis used comprised a description of the conversations held with respondents in the field. The qualitative data were thematically analysed.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

An indepth discussions of the result and analysed data obtained from the respondents who participated in the study are highlighted in this chapter. The results were discussed against the research questions raised in chapter one. Table 4.1 shows respondents' distribution according to the rate of returns of questionnaire copies.

Table 4.1 Response rate based on Questionnaire distribution

Universities	Number Copies administered	Number of Copies returned	Percentage rate of response
UNN	150	141 (94%)	18.8
FUOYE	83	78 (94)	10.4
FUTA	68	43 (63%)	5.7
UNIJOS	130	126 (97%)	16.8
ABU	158	160 (93%)	21.3
OAU	110	56 (51%)	7.5
UI	154	104 (68%)	13.9
CU	43	43 (100%)	5.6
Total	868	751	89%

Table 4.1 indicates the return rate of the instrument of the survey by the sampled Universities. It further indicates 868 questionnaire copies were distributed to respondents in all universities, 751 sufficiently answered questionnaire copies were reverted. This amounted to a reaction rate of 87%. The table demonstrates greater number of respondents were from Ahmadu Bello University which had 168 duplicates of the survey instrument dispersed while 160 were returned. UNN came next having 150 survey duplicates distributed and 141 returned. In the University of Jos, 130 duplicates of the survey were circulated and 122 copies were returned. The University of Ibadan had 154 and 104 copies of instrument distributed and returned respectively. Federal University, Oye-Ekiti saw 83 photocopy of the instrument shared to respondents with 78 copies returned accordingly.

Obafemi University saw 110 duplicates of the research instrument was shared in, Oye-Ekiti Awolowo University retrieved 56 while the FUTA, 68 duplicates of the instrument were disseminated, with just 43 duplicates of the poll returned. Highest return rate was in Covenant University of the questionnaire where all the 43copies given out and all were returned. Table 1 most importantly shows that Covenant University and FUTA had the lowest percentage of respondents as a result of their comparatively low academic staff population. Meanwhile, ABU, UI, Jos, and UNN ranked highest in terms of respondents to the study. The distribution of respondents by Faculty is presented in tables 4.2a and 4.2b.

Table 4.2a Distribution of respondents by Faculty

	Faculties			
	Sciences	**Social Sciences**	**Humanities**	**Total**
UNN	34	40	66	141
FUOYE	37	29	12	78
FUTA	24	14	5	43
UNIJOS	26	55	45	126
ABU	35	66	59	160
O A U	15	19	22	56
UI	38	15	51	104
CU	7	14	21	43
Total	216	252	281	751

Table 4.2b: Distribution of respondents by departments

Universities	Faculties	Departments	Freq.	%	Universities	Faculties	Departments	Freq.	%
UNN	Sciences	Mathematics	10	7.1	ABU	Sciences	Physics	10	6.3
		Computer sci	8	6.0			Microbiology	18	11.3
		Geology	16	11.4			Mathematics	7	4.4
	Social sciences	Psychology	19	15.0		Social sciences	Sociology	31	19.4
		Geography	15	11.0			Economics	14	9.0
		Economics	7	4.3			Mass Comm.	21	13.1
	Humanities	Home Econs.	19	14.0		Humanities	Arabic	21	13.3
		Agric. Edu.	26	19.0			Archaeology	14	9.0
		Business Edu.	21	15.0			French	24	15.0
		Total	**141**				**Total**	**160**	
FUOYE	Sciences	Biochemistry	11	14.1	OAU	Sciences	Biochemistry	5	9.0
		Statistics	18	23.1			Geology	5	9.0
		Microbiology	8	10.3			Zoology	5	9.0
	Social sciences	Sociology	8	10.3		Social sciences	Economics	9	16.1
		Demography	10	13.0			Psychology	6	11.0
		Psychology	11	14.1			Sociology	4	7.1
	Humanities	Theatre Arts	4	5.1		Humanities	Linguistics	7	13.0
		English	4	5.1			English	8	14.3
		Entrepreneurship studies	4	5.1			History	7	13.0
		Total	**78**				**Total**	**56**	
FUTA	Sciences	Physics	8	19.0	UI	Sciences	Zoology	10	9.6
		Biology	12	28.0			Botany	12	11.5
		Mathematics	4	9.3			Statistics	16	15.4
	Social sciences	Estate Mgt	5	12.0		Social sciences	Psychology	4	4.0
		Building tech	6	14.0			Sociology	4	4.0
		Urban and Reg. planning	3	7.0			Pol Sci	7	7.0
	Humanities	Trans. Mgt	2	5.0		Humanities	English	19	18.3
		Entrep Mgt	2	5.0			CLA	21	20.2
		Library Mgt	1	2.3			LARIS	11	11.0
		Total	**43**				**Total**	**104**	
UNIJOS	Sciences	Chemistry	10	8.0	CU	Sciences	Physics	3	7.1
		Zoology	9	7.1			Chemistry	2	5.0
		Geology	7	6.0			Mathematics	3	5.0
	Social sciences	Economics	14	11.1		Social sciences	Accounting	4	10.0
		Psychology	26	20.6			Sociology	7	16.7
		Sociology	15	12.0			Economics	3	7.1
	Humanities	English	12	10.0		Humanities	Psychology	8	19.1
		History	15	12.0			Leadership st.	6	14.3
		Theatre Arts	18	14.3			Pol Sci.	7	17.0
		Total	**126**				**Total**	**43**	

Table 4.2b: Distribution of respondents by departments

Table 4.2a and 4.2b presented the distribution of respondents by faculties/departments in the different Universities used in the study. Table 4.2 expresses that, among the faculties utilized in the investigation, the majority were lecturers from Humanities 281 (37.4%) trailed by the Social Sciences lecturers 253(33.7%) and afterward Sciences 217(28.9%). Humanities which were 281(37.4%) has more responses in the survey response, 66 reponses were received from

University of Nigeria Nnsuka, 59 from Ahmadu Bello University, 45 from University of Jos, 45 from University of Ibadan, 12 from Federal University, Oye-Ekiti, 22 from OAU, Federal University of Technology, Akure, 5 and a total of 21 from Covenant University. In the Social Sciences Faculty, 66 respondents responded and returned in ABU; 55 respondents in University of Jos and the University of Nigeria has 40 respondents. While for Sciences, UI has 37 respondents, FUOYE 37, ABU has 35 respondents; University of Nigeria has 34 respondents and 26 respondents were from FUTA in Ondo State. Accordingly, staff from Humanities formed the majority of respondents that took part in the investigation, trailed by respondents from Social Science as well as respondents from the Sciences.

The genders of lecturers involved in the study are highlighted in Figure 4.1.
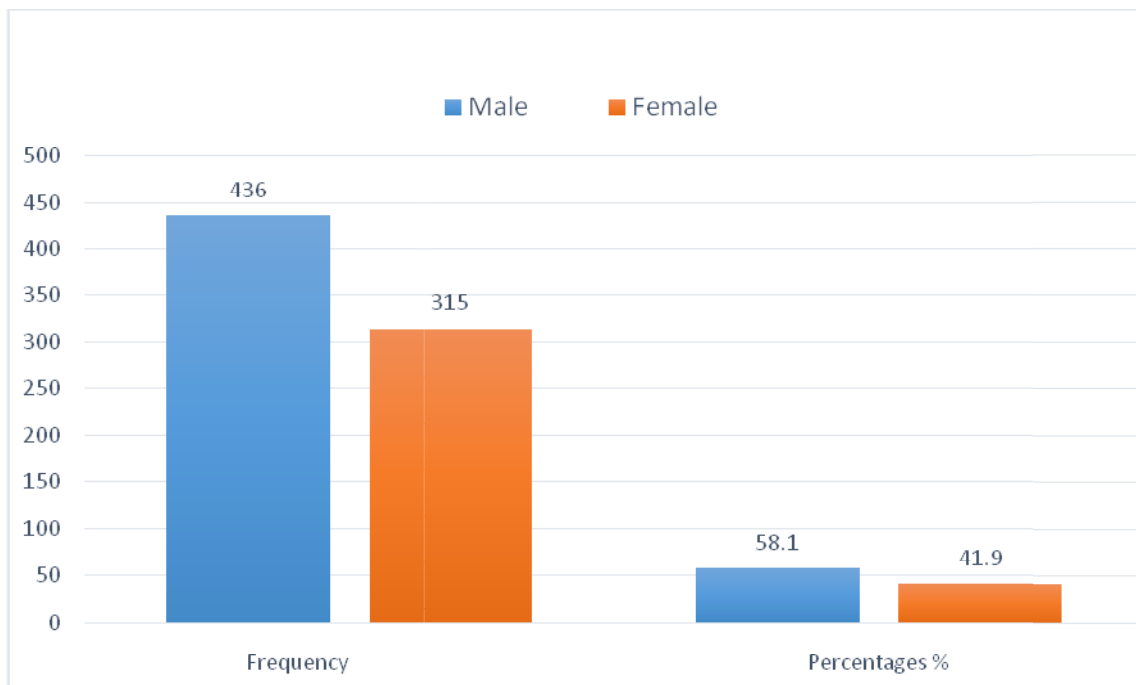
Figure 4.1: Distribution of respondents by gender

As far as the outcome of the investigation in Figure 4.1, the result indicates that 436(58.1%) were male while 315(41.9%) were female. This implies the sexes (female and male) were well represented in the survey. Male respondents were more than the females in the study. It was inferred that the majority universities lecturers in Nigeria are male. The appropriation of respondents by Age is shown in Figure 4. 2.
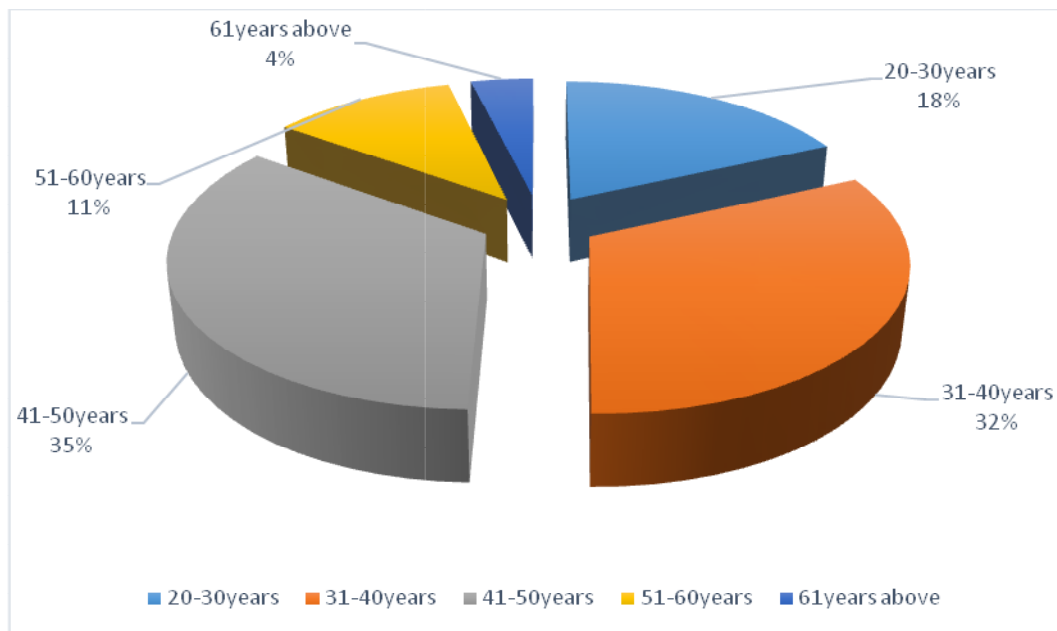
Figure 4. 2: Distribution of respondents by age

Figure 4. 2 reveals that respondents within the age of 41-50 years (34.5%) are the most involved in the study, followed by those within 31-40years (32.1%), 20-30 years (18.2%), 51-60years (11.3%), and those within 60years and above had (3.9%). This implies that Nigerian universities are mainly populated by academic staff within the age bracket of 31 to 50 years. Figure 4.4 highlights the academic qualification of the respondents.
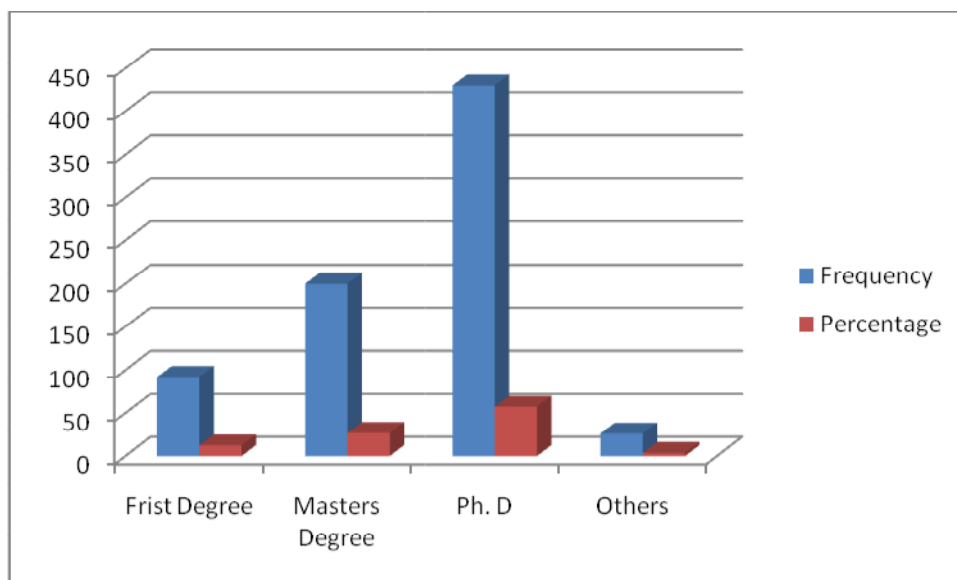
Figure 4.3: Educational qualification of respondents

The information showed in Figure 4.3 revealed that majority had PhD. 430(57.5%), followed by master's degree 200 (26.7%), and first degree 92(12.3%). Indeed, it has been made mandatory for all academics in Nigerian universities to possess a PhD degree. The implication of this is that most universities prefer employing doctoral and master's degree holders for lectureship positions rather than bachelor's degree holders.

Table 4.3: Distribution of respondents by designation

| University | Designation of respondents | | | | Total |
	Lecturer II	Lecturer I	Senior Lecturer	Professor	
UNN	59	42	27	12	140
FUOYE	28	27	10	13	78
FUTA	13	15	8	7	43
UNIJOS	47	38	26	15	126
ABU	73	52	18	17	160
OAU	21	14	16	5	56
UI	53	24	19	8	104
CU	16	12	9	5	42
Total	310	224	133	82	749

Table 4.3 demonstrates the appropriation of the respondents by cadre, the outcome indicates as follows: 310 (41.5%) were Lecturer II, 224 (29.9%) Lecturer I, 133 (17.7%) senior Lecturers while 82 (10.9%) were on Professorial assignment. Lecturer II are the largest

respondents. Professors who represented were lowest in number. Among the entire 310 respondents, 73 respondents were Lecturer II from Ahmadu-Bello University, University of Nigeria had 59, while University of Jos had 47. UI had 53 respondents, FUOYE had 28, 21 from OAU, 13 from FUTA and 16 from the CU.

4.5 Answers to research questions

Research question 1: What is the level of awareness and knowledge of institutional repository by lecturers in Nigerian Universities?

Data of the awareness and knowledge of IR by academics in Nigeria are shown in Tables 4.4 to 4.7**.**

Table 4.4a: Awareness of institutional repository by lecturers in universities in Nigeria

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	$\bar{x}$	S.D
I'm aware of the availability of IR in my university	190 (25.3%)	337 (44.9%)	135 (18.0%)	89 (11.9%)	2.84	0.93
I'm aware of the benefits of IR	165 (22.0%)	338 (45.0%)	159 (21.2%)	89 (11.9%)	2.77	0.92
I am aware of my university's IR content	135 (18.0%)	264 (35.2%)	227 (30.2%)	125 (16.6%)	2.54	0.97
I'm aware of my university's IR policy	132 (17.6%)	238 (31.7%)	242 (32.2%)	139 (18.5%)	2.48	0.98
I understand the publishers' policy on open access	116 (15.4%)	257 (34.2%)	245 (32.6%)	133 (17.7%)	2.47	0.95
How did you learn about institutional repository						
I have read about institutional repository	121 (16.1%)	250 (33.3%)	199 (26.5%)	181 (24.1%)	2.41	1.02
I learned of IR via information from other institutions	111 (14.8%)	236 (31.4%)	231 (30.8%)	173 (23.0%)	2.38	0.99
I became aware of IR through my colleagues	117 (15.6%)	237 (31.6%)	234 (31.2%)	163 (21.7%)	2.41	0.99
I became aware via programmes on mass media	90 (12.0%)	186 (24.8%)	264 (35.2%)	211 (28.1%)	2.21	0.98
Departmental meetings consistently reminded me	89 (11.9%)	179 (23.8%)	262 (34.9%)	221 (29.4%)	2.18	0.98
I became aware via expositions on IR by the Library	125 (16.6%)	224 (29.8%)	223 (29.7%)	179 (23.8%)	2.39	1.02
The university workshops on the importance of IR in scholarly communication	137 (18.2%)	183 (24.4%)	235 (31.3%)	196 (26.1%)	2.35	1.05
Librarians in my institution brought to my attention Institutional Repository publishing initiatives	164 (21.8%)	209 (27.8%)	191 (25.4%)	187 (24.9%)	2.47	1.08
I have not heard about it	122 (16.2%)	129 (17.2%)	230 (30.6%)	270 (36.0%)	2.14	1.07
Weighted Mean = 2.43						

Awareness level of the respondents about IRs was determined using descriptive statistics as results indicate a total of 71% of the respondents reported to be aware of schools' IRs, 67.3% claimed to be knowledgable of benefits of of having IR in their school, while 54.1% claimed

awareness of contents of their universities' IR. Likewise, 50.2% are conversant of the IR policy of the universities and 51.4% are aware of open access policies.

Table 4.4a shows how respondents became aware institutional repository. The result reveals 52% of respondents became aware of IR through reading, 50% got information from their colleagues, 54.9% indicated that they became aware as a result of workshops organized by universities to teach importance of IR in scholarly communication, while 52.5% became aware through their librarians in their various citadel of learning publishing initiatives and 64.7% claimed total ignorance of IR. 50.9% heared about IR through information from other higher institutions, 61.4% of the respondents became aware through mass media, however 62.2% and 51.1% stated their awareness of IR was through meetings in the department and presentations by university library staff on IR respectively. This result implies the country's IRs awareness remains high since six items were rated above the weighted mean score (2.43) and the test of norm also showed the level of awareness of IR is high.

Table 4.4b   Test of norm showing the level of awareness of institutional repository

Interval	Mean index	Level of awareness	Frequency	Percentage
1-28		Low	190	25.3
29-56	**34.04**	High	561	74.7

Table 4.4b shows the percentage level of awareness of IR. 25.3% (n=190) exhibited awareness level of IR that is low, and 74.7% (n=561) showed a high awareness level of IRs. Therefore, the level of awareness of the IRs in the study is high.

The knowledge level of IR by teaching staff is presented below in Table 4.5.

Table 4.5 Awareness and knowledge of institutional repository by lecturers across universities

Universities in Nigeria	Awareness and knowledge of IR by Academic					
	Completely unfamiliar	I have come across this concept but know nothing about it	I have come across this concept but known little about it	I have come across it and know quite a bit about it	I am very knowledgeable about IR	Total
UNN	26	18	51	25	20	140
FUOYE	5	6	12	26	29	78
FUTA	8	6	8	12	9	43
UNIJOS	6	18	43	42	17	126
ABU	29	59	26	27	19	160
O A U	4	15	14	8	15	56
UI	12	20	31	12	29	104
CU	1	7	16	13	5	42
Total	91	149	201	165	143	747

Table 4.5 shows the level of respondents' awareness and knowledge of IR. The result reveals that 201(27.1%) of the respondents agreed to be aware of the concept. However, they confessed to have vague knowledge of it. Such include: Universityof Nigeria 51, University of Ibadan 31, University of Jos 43, and Ahmadu Bello University 26. 165(21.8%) agreed they have come across and know quite a bit about IR, such universities are University of Jos 42, University of Nigeria 25, Federal University Oye-Ekiti 26, and Ahmadu-Bello niversity 27. Furthermore, 149(19.9%) of the respondents agreed to having knowledge of the concept of IR but know nothing about it, most of such universities include, Ahmadu Bello University 59, University of Ibadan 20, University of Jos, and University of Nigeria Nsukka 18. While 91(12.1%) agreed that they are absolutely ignorant of IR as a term, the respondent of such institution of learning includes UNN 26 and ABU 29. Only 143(19.1%) affirmed being knowledgeable of IR. These universities are the University of Ibadan and Federal University of Oye-Ekiti 29, UNN 20, ABU 19 as well as University of Jos. The study shows that the majority of 584(78.2%) respondents though informed to have previously heard of the term IRs, they have insignificant or no knowledge of the subject. The implication of this means majority of academics are yet to have full knowledge and awareness of IR in Nigeria. For example, Table 4.7 demonstrates that 20(14%) out of a total of 140 respondents in UNN have prior knowledge regarding IRs, for Federal University Oye-Ekiti just 29(37%) of the total 78 respondents. Federal University of

Technology, Akure, Ondo recorded just 9(21%) scholars out of 41 who are proficient in IR. UNIJOS has just 17(13%) of the total 126 respondents, 19(12%) are from ABU with a total of 160 respondent, OAU has 15(27%) from a total of 56 respondents, UI has a mere 29(27%) from an overall 104 respondents educated on the nuances of IR as Covenant University boasts of only 5(12%) people out of 42 respondents. The respondents' mindfulness of institutional archiving is introduced in Table 4.6.

Table 4.6: Respondents' awareness of the objectives of IR in Nigerian universities

	Awareness and the objectives of IR by lecturers					Total
	Completely unfamiliar with the objectives	I have come across this concept and know nothing about it	I have come across this concept but known little ab out	I have come across this concept and known quite a bit about it	I am very knowledgeable about IR	
UNN	44	38	32	21	5	140
F U OY E	7	17	23	31	0	78
F U TA	8	11	11	11	2	43
UNIJOS	13	52	45	1	15	126
ABU	47	50	32	1	30	160
O A U	4	17	32	0	3	56
UI	44	21	21	14	4	104
C U	2	23	4	0	13	42
Total	169	229	200	79	72	749

Table 4.6 depicts the awareness level of lecturers on the aims and objectives of IR. The result shows that 229(30.6%) respondents knewnothing about the objectives of IR, such institutions are the University of Jos 45, University of Nigeria 32, Federal University, Oye-Ekiti OAU and ABU 23, and University of Ibadan. 201(26.9%) know a little of the objectives of IR, such incorporates UNN 21, Federal College Oye-Ekiti 31. Additionally, 170(22.7%) of the respondents concurred that they are new to the usefulness of IR, such respondents include UI, UNN (44), and ABU (47). This submits a few university teachers in Nigeria may have had little understanding of IR and are not yet acquainted with the advantages and usefulness of its

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activities in the institutions. Besides, 79(10.6%) have come in contact with the usefulness of IR, however, possess a vague understanding of the concept. These are UNN 38, University of Jos 52, ABU 50, University of Ibadan 21 and Covenant University 23, while just 72(9.2%) out of 746 people consented to have adequate knowledge about the technical know-how of IR in the University libraries. These are more observable at Covenant University, University of Jos, and Ahmadu Bello University. Therefore, the result suggests majority of lecturers in universities remain unfamiliar with IR and its aims. Based on the study, 677 lecturers out of 746 who answered the question claimed total ignorance on the subject matter. This is unexpected as most of the universities sampled for the research have adopted IR already. If the awareness and advocacy remain significantly low in institutions that claimed adoption of IR, the situation in institutions that have not adopted IR can best be imagined. The rating of lectureres' awareness level on IR is indicated below in Table 4. 7.

Table 4.7: Rating of the level of awareness about IR by lecturers in universities in Nigeria

	Frequency	Percentages
Very Low	158	21.5
Low	198	27.0
Moderate	250	34.1
High	128	17.4
Total	734	100.0

The result on Table 4.7 indicates the awareness on IR by the respondents in Nigerian universities: moderate 250(34.1%), followed by those who agreed to be somewhat low 198(27.0%), very low158(21.5%) and highly adequate is only 128(17.4%). This suggests that among the Nigerian universities' teachers, the rate of IR awareness is moderate.
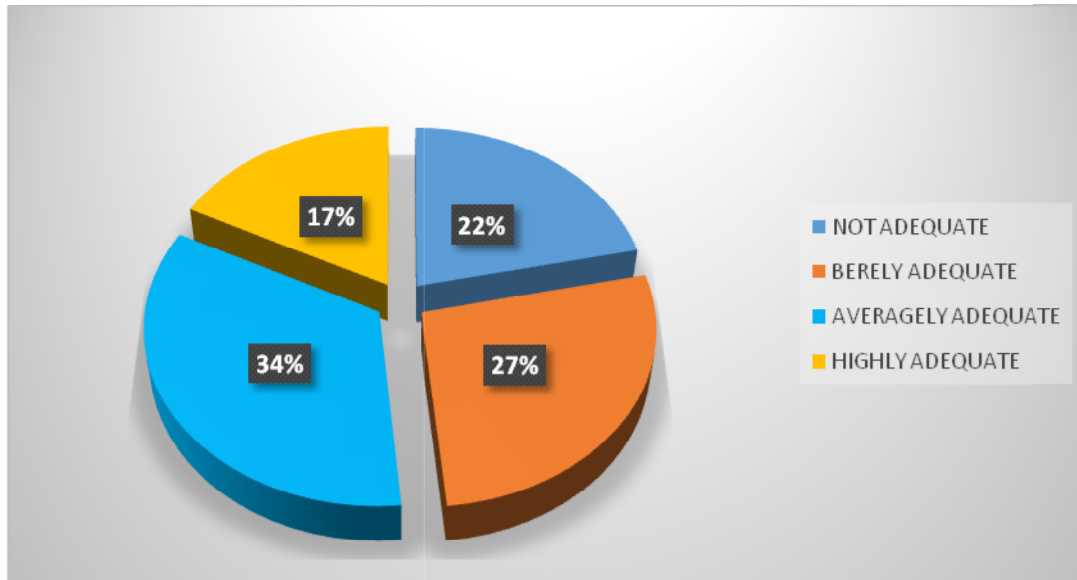
Figure 4.4: Distribution of respondents by their level of awareness

Research questions 2: What is the attitude of lecturers on the submission of their academic works into the institutional repositories?

The interview and research question on attitude of academics was described by both the lecturers and repository managers.

Table 4.8: The lecturers' attitude towards submission of their scholarly works to the institutional repositories in Nigerian universities

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	$\overline{x}$	S.D
Lecturers are yet to come to a full agreement concerning the sustenance of institutional repository.	215 (28.6%)	376 (50.1%)	117 (15.6%)	43 (5.7%)	3.02	0.82
Lecturers are often reluctant to surrender their research for upload	214 (28.5%)	374 (49.8%)	111 (14.8%)	52 (6.9%)	3.00	0.84
Submission process is not certain	205 (27.3%)	301 (40.1%)	152 (20.2%)	93 (12.4%)	2.82	0.97
Weighted Mean = 2.95						

A descriptive analysis of internal factors of university libraries affecting IRs in Nigeria is shown in Table 4.8. It reveals 591(80%) of the total respondents the failure majority lecturers to reach a consensus as far as the establishment of IRs is concerned. While 588 (79.7%) of respondents opined that lecturers feel reluctant in submitting their research for IR, 606 (83.9%) agreed that the submission process is not clear.

Questions posed to lecturers and interview conducted on the attitude of academics in submitting their research work for upload on the IRs (with the Librarians) showed there exist challenges in persuading them to submit their papers in IRs. The major constraints in getting lecturers on board are pessimism on issues relating to IR and the stress in submitting their work to the system. Some blamed uncertainty of the benefits derivable from uploading their scholarly works into the IRs. This makes them indifferent and nonchalant. Some of them commented: "what will be my benefit for the academic rigour? Do you want me to giveaway my work just like that? "People will copy my work freely". Some others expressed concern for the publication of works that have not been peer-reviewed. This finding agrees with Mark and Shearer (2006) and Earwage (2008) that reported members of faculties' reluctance in contributing to intellectual repositories. The arguments of the respondents agree with Gibbons (2005) that identified that the reluctance and low participation to IR by researchers is that they are uncomfortable about adhering to copyright infringement as well as disciplinary measures (versioning, co-authoring and so on) when their work submitted for upload into the IRs. Against this background, university authorities need to introduce incentives to motivate academics and a team of reviewers to facilitate uploading of scholarly works. This will aid the faculty to achieve

compliance and eagerness to submit scholarly works. It is worthy to note that dissertations and theses may not require further scrutiny since faculty supervisors would have subjected such through rigorous and intensive validity tests before approval.

Research question 3: What are the infrastructural factors affecting the sustenance of institutional repositories in university libraries in Nigeria?

The question was addressed mainly with the interview that highlighted the opinion of the University Librarians on the infrastructural factors influencing the sustenance of IRs in their libraries.

The structured interview revealed that: obsolescence of computer hardware and rusty equipment, poor internet-connectivity constraints, coupled with irregular power, remain serious infrastructural issues militating the sustenance of IRs in Nigeria. The required hardware and sysyem configurations for active IR identified during the survey are: scanner HP N9120 and HP ScanJet 55090, 2 HP Desktop, Intel Pentium CPU Dual Core, 2.00GHz, 1.0 Gig Ram, Window7, Hard-disk 250 Gig. However, a large proportion of universities sampled, save Covenant University, are challenged by inadequate workstations to effectively digitise research materials coupled with the fact that their hardwares are mostly outdated. For example, the current operating systems used are windows 10, regrettably, most of Nigerian universities still operating on their IR on the XP operating system. This obviously creates a wide technological gap fromWindows XP to Vista, to Windows 7 to Windows 8 to Windows 10. Against this background, the entire gamut of hardware as well as the archaic operating software. Obafemi Awolowo University complained of the existing server being incapable of hosting the school's IR. Therefore, the institution had to host her IRs via a third-party for its operation. They also have issues with their scanners apart from the inadequacy of the hardware. Federal University Oye-Ekiti and the University of Jos also whined of epileptic supply of electricity, outdated configuration of the computer as well as systems networking are mainly due to insufficient funding.

As far as internet connectivity is concerned, the digitisation unit head of the universities' libraries complained of extremely low bandwith as against the bandwith for full access by the schools' libraries.This culminated in incessant failure and glitches during digitisation processes. For instance, Kenneth Dike Library requires at least 20 MB bandwidth to

run the system efficiently, a paltry and irregular 10MB is available for the university library to work with. The ICT and not the university library holds the mandate to oversee the sharing of bandwidth among the university's faculties, department and units, In order to reverse the ugly trend as far as infrastructural issues are concerned, respondents averred adequate importance must be accorded to the libraries in the sharing of bandwidths within campus. Also, respondents advised computer hardwares with adequate configuration with plans for update regularly, uninterrupted power supply by procuring inverters or solar panel system.

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Research question 4: What are the sources of funding for institutional repositories in Ngerian university libraries?

The Head of the university libraries answered this question through interviews; hence they are the only ones incharge and have the information on the flow of funds for IR sustenance.

Based on the responses elicited from the heads of the libraries/digitisation unit heads of the eight schools, surveyed on sources of funding for the operation of IR, it was revealed sources of funding for IRs operations in university accross Nigeria are mainly: in-house library fund allocation, the government infrastructural fund, and philanthropic organizations. Covenant University reported that though the cost of IR sustenance is high, the university granted the library grant for the system establishment. The availability of adequate funds enabled them to procure the necessary infrastructure and skilled manpower for IR. So it is not surprising that the IR in Covenant University is well populated and running efficiently. ABU and UNN also reported that their universities' institutional repository funding was mainly handled by the university and TetFund intervention. According to the interview respondents from Covenant University and ABU, the parent institutions help in the funding and sustenance of their IRs. Other universities can borrow a leaf from Covenant University and ABU to invest handsomely towards procuring adequate and appropriate facilities and competent personnel with proficient ICT skills, to ensure a sustainable IR.

The in-house is the main funding source for institutional repository sustenance in the university libraries surveyed. It is certain from the findings that IR in Nigeria is mainly sponsored with the limited library fund allocation which has never been adequate, this has resulted in the instability of some of the IRs in Nigeria and slow pace of IR spread.

Research question 5: What constitutes the content of institutional repositories in university libraries in Nigeria? Data on the material content of IRs in university libraries in Nigeria is shown in Figure 4.5.
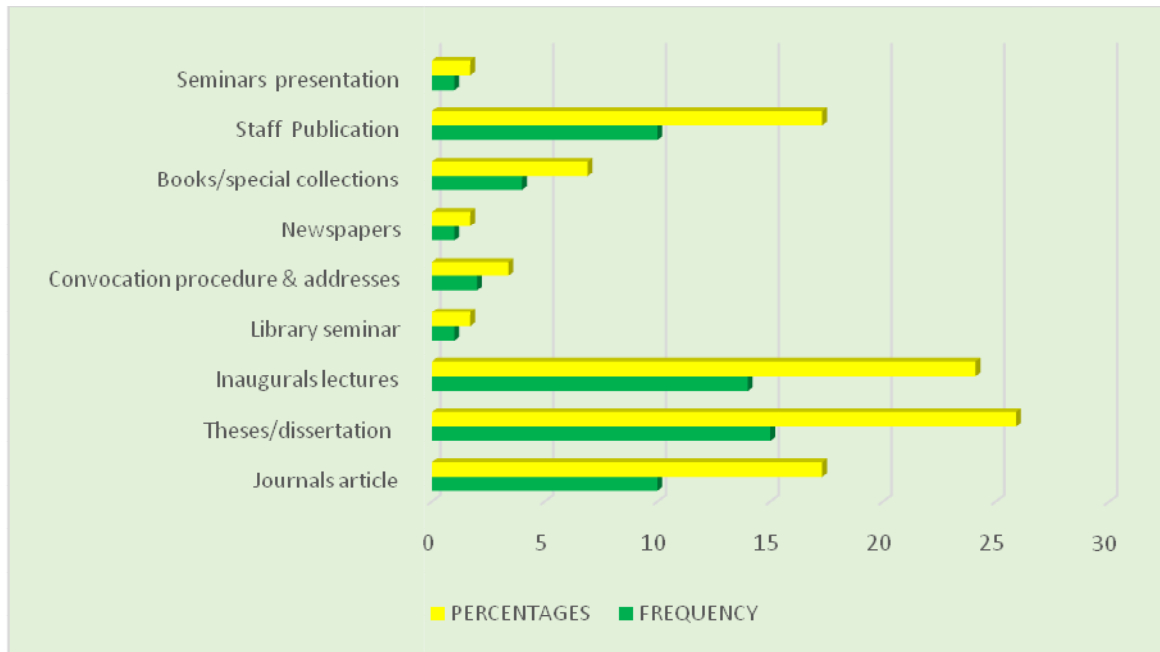
Figure 4.5: Distribution based on the content of institutional repositories in university libraries in Nigeria

Figure 4.5 displays a summary of the materials that constitute the content of IRs in higher institutions in Nigeria, as found in the interview. The result reveals that half of the material content of institutional repositories in university libraries in Nigeria is theses/dissertation, 24.1% inaugural lectures, while journaling articles and staff publications rate 17.3%. On the other hand, convocation procedures and addresses rate 3.4% respectively, whereas library seminars, Newspapers, and seminar presentations 1.7%, while seminar presentations and newspapers are the least stocked in the institutional repositories in universities. The responses to the interview held with heads of the digitization units shows that theses/dissertation, journal articles, inaugural lectures, library seminar reports, convocation procedures & addresses, newspapers, books/special collections, and staff publication seminars presentation constitute the content of IRs in Nigeria.The result further revealed that among all, Ph.D. theses and dissertations were the predominant materials stocked in IRs in universities in Nigeria, followed by others such as

inaugural lectures, journal articles, staff publications, convocation procedures, and addresses, as well as library seminars, newspapers and seminar presentations. This study shows that there is a diversity of information materials in the IRs in universities across Nigeria, but the repositories major on local materials like theses/dissertations, inaugural lectures, and other forms of grey literature.

The respondents' criteria for the selection of the materials for digitisation, are based on:

(a)   The academic importance of the intellectual property

(b)   The need to preserve the intellectual property

(c)   The need to save space

(d)   Historical value

(e)   Cultural values of the intellectual property

(f)   The need for increased access to the intellectual property

(g)   The need to provide document delivery services and

(h)   Research into digital processes

Research question 6:   What are the digitisation procedures for the implementation of institutional repositories?

Here is a typical work procedure in the digitisation of materials for IR in universities in Nigeria, as identified by the heads of digitisation units during the interview sections:

Table 4.9: Work procedure in the digitisation of materials for IR in universities in Nigeria

Stages	Work procedure
Stage 1	Materials are moved to the digitisation chamber
Stage 2	Materials are scanned
Stage 3	Image editing
Stage 4	Generation of metadata
Stage 5	Converting image to searchable text
Stage 6	Converting to PDF
Stage 7	Verification of the previous processes
Stage 8	Storage: a. offline- Terabyte Storage Disk (TSD) b. Digital Asset Repository (DAR)
Stage 9	Materials are checked out of the chamber

The digitisation process identified by respondents are presented in Table 4.9 are the gathering of the materials from the various departments, and checking the level of plagiarism before scanning and uploading into the system. The next stage is an image editing and generation of metadata. This is followed by the conversion of the images to searchable text and to PDF. Furthermore, verification of the previous processes commences before storage is done. Finally, the materials are checked out of the chamber.

All the universities surveyed adopted Dspace software for the digitisation process except ABU which is using Abbyy Finereader 8.0, Professional edition. The reasons given were that both are FOSS, they are in usage worldwide, as well as meet the global standards. This aligns with Dabholkar's (2008) findings that DSpace is in the primary position among the different programming utilized in the institutional stores.

The result of the interviews further reveals that in-house is the most preferred and effective approach that was deployed in the implementation of institutional repositories. The in-house approach is a system whereby the library management trains some of the library staff to digitise and manage their IR. The reason being that if the staff are not involved and competent in the management of the system, right from the onset of the project, there will be a problem of sustenance of the system when issues arise. The input and advice of external contractors can be source for at the initial take-off of the project, but professionals within the system have to be trained to have a mastery of the different aspects of IR system. The universities adopted a "Mediated Deposit" approach i.e.the digitisation staff helping authors to upload their works, instead of allowing the author to do the uploading. Furthermore, planning and deliberation on the type of software to use are done. This is followed by seeking and obtaining management approval and then sourcing for the vendors needed.

Research question 7: What are the technological factors affecting the sustenance of institutional repositories in university libraries in Nigeria?

Technological constraints against the sustenance of IRs in schools libraries in Nigeria are represented in Table 4.10 (which confirmed the existence of technological issues by lecturers),Table4.11 (that listed the constraints to the sustenance of IRs by the digitisation personnel) and structured interview responses by the heads of digitisation unit of the schools' libraries.

Table 4.10: Technological factors influencing the sustenance of institutional repositories in university libraries in Nigeria

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	$\overline{x}$	S.D
Copyright and intellectual property is concern for researchers.	360 (49.2%)	281 (37.4%)	63 (8.4%)	27 (3.7%)	3.33	0.79
Technological changes is a problem	229 (30.5%)	337 (44.9%)	120 (16.0%)	42 (5.6%)	3.03	0.84
Software adoption is an issue	250 (33.3%)	288 (38.3%)	143 (19.0%)	70 (9.3%)	2.96	0.94
There is infrastructural problem.	241 (32.1%)	325 (43.3%)	121 (16.1%)	64 (8.5%)	2.99	0.90
There is a great deal of uncertainty about preserving e-prints in IRs.	211 (28.1%)	322 (42.9%)	137 (18.2%)	81 (10.8%)	2.88	0.93
Technical support is a major challenge	242 (32.2%)	339 (45.1%)	108 (14.4%)	62 (8.3%)	3.01	0.89
There is security issue	206 (27.4%)	345 (45.9%)	122 (16.2%)	78 (10.4%)	2.90	0.91
Content management is a problem.	188 (25.0%)	337 (44.9%)	152 (20.2%)	74 (9.9%)	2.85	0.90
Deposit and Withdrawal Services are issues.	187 (24.9%)	327 (43.5%)	160 (21.3%)	77 (10.3%)	2.83	0.94
Access Control and Rights Management: to restrict access to the information when open access is premature or not desirable is not certain.	187 (24.9%)	324 (43.1%)	165 (22.0%)	75 (10.1%)	2.85	0.90
Policy development specific to IRs is yet to be established.	163 (21.7%)	315 (41.9%)	171 (22.8%)	102 (13.6%)	2.72	0.95
Who should lead (Libraries or faculties) in the establishment of IR is an i ssue	189 (25.2%)	281 (37.4%)	154 (20.5%)	127 (16.9%)	2.71	1.02
Weighed Mean = 2.91						

Table 4.10 showed technology remains a key factor influencing the smooth operation of IRs in universities across Nigeria. The descriptive statistics such as frequencies and percentages of external factors responsible are underscored. Among the respondents, 87.6% claimed copyright and intellectual property issues remain serious concern for researchers

while 78% argued technological dynamics constitutes a major problem. A total of 74% claimed software issue as constraint, 78% saw infrastructure as a problem, 73.1% agreed unavailability of technical support is a serious problem, and 73.1% argued that a lot of ambiguity hangs over preservation of e-prints in IRs. Furthermore, the results indicated 76% claimed security constraints was an issue as 72.5% fingered IRs' content management is problematic, 71.3% also indicated concerns over the deposit, withdrawal of services as well as Access Control and Rights Management: to restrict access to the information when open access is premature or not desirable is not certain.

The result in Table 4.10 were derived using mean and standard deviation ranging from 2.71 to 3.33, as the cut-off point is 2.91. The result shows that only seven items had a mean value below 2.91 out of the total 12. Every other factors below 2.91 that influence the sustainability of IRs in the libraries are: nonexistent established policies on IRs, choice of who to lead between the Libraries and faculties in the creation of IR (mean= 2.72, S.D= 0.95), deposit and withdrawal services (mean=2.83, S.D=.0.91), access control, contempt and management of rights; that is, the restriction of accessibility to only when open access is premature or when the desirable is not certain (mean=2.85, S.D=.90), Countless uncertainties fraught the preservation of e-prints in IRs, (mean=2.88, S.D=.93) and security issues (mean-2.90, S.D=.91). Furthermore, Table 4.10 also shows that five items with scores above the decision point of 2.1, influenced the sustenability of IRs in the University. These are, copyright and intellectual property of researchers, technological changes for Software adoption, infrastructural problem and technical support. Summarily, it shows that external factors impact IRs operations in university in Nigeria.

In further highlighting technological constraints impacting the IRs sustainability in university libraries in Nigeria, copies of questionnaires were designed for digitisation staff and structured interviews scheduled for the managers of IRs to collect data. Technological issues hampering the smooth IRs across Nigerian universities libraries as explained by staff saddled with the responsibility of digitisation across the eight universities selected for the survey are shown below in Table 4.11.

Table 4.11: Technological challenges to the sustenance of institutional repositories in university libraries in Nigeria by digitisation personnel

Technological challenges affecting the Sustenance of Institutional Repositories in University libraries in Nigeria	Frequency	Percentages %
Bandwidth	8	5.4
Erratic power supply	5	14.3
Poor submission process	4	3.6
Poor network system	3	8.9
Low server configuration	2	7.1
Inadequate technical knowhow	1	1.7
Total	56	100

The opinions of digitisation employees across the eight institutions sampled during the study underscored in Table 4.11: Three employees ascertained that there is a poor network system for the management of IRs in Nigeria. All the staff saddled with digitisation in the universities sampled confirmed the major constraints of inadequate bandwidth is responsible for the irregular internet accessibility. However, one staff stated technical know-how constraint, two indicated very low configuration of server in use and differences in the output of publication centres across Nigeria. This simply indicated experts are used to manage IRs across the universities' libraries. Other technological issues uncovered by respondents in Table 4.11 are erratic power supply as well as a problematic process of submitting academic material for upload on IR.

On a different note from the susceptibility to technological constraints influencing the institutional repositories in university across Nigeria by the digitisation workers, the structured interview respondents (the heads of digitisation section of the libraries) further averred that obsolescence systems, low bandwidth, faculty, and researchers' reluctance to submit a manuscript, poor submission process and network system, an inadequate funding of the management and sustenance of IRs, coupled with server configuration low , unpredictable and insufficient centers for publication, lack of finance for updating, erratic power supply, and inadequate expertise in handling the system are significant issues contending with the IRs sustainability in Nigeria.

The technological level available support the operations of institutional repositories in the universities is highlighted in Table 4.12.

Table 4.14: Adequacy of technological availability for the sustenance of institutional repositories according to universities

Institution	Technological Availability	
	Adequately available	**Inadequately available**
UNN	33(23.6%)	107(76.4%)
FUOYE	16(20.5%)	62(79.5%)
FUTA	11(25.6%)	32(74.4%)
UNIJOS	24(19.1%)	102(80.9%)
ABU	36(22.5%)	124(77.5%)
OAU	12(21.4%)	44(78.6%)
UI	46(44.3%)	58(55.7%)
CU	27(64.3%)	15(35.7%)
Total	**205(27.4%)**	**544(72.6%)**

The table 4.12 revealed that 107 respondents which represent 76.4% from UNN noted that technological equipment is inadequate for institutional repositories while 79.5% at FUOYE, 74.4% at FUTA, 80.9% at UNIJOS, 77.5% from ABU, 78.6% from OAU, and 55.7% from UI respectively noted that there was inadequate availability of technological support towards the development of IRs in their respective institutions. The table showed that only CU with a total response of 35.7% were able to record adequate availability of technological support for the institutional repository.

Research question 8: What are the copyright-related issues affecting the sustenance of institutional repositories in university libraries in Nigeria?

Lecturers addressed the question in Table 4.13 where they acknowledged copyright issues in the institutionalisation of IRs and the report on open-ended questions for the lecturers.

Table 4.13 Copyright related issues influencing the sustenance of institutional repositories in university libraries in Nigeria by lecturers

Statement	Strongly A gree	Agree	Disagree	Strongly Disagree
Copyright and intellectual property is a concern for researchers.	359 (47.8%)	281 (37.4%)	63 (8.4%)	48 (6.4%)
There is security issue (plagiarism, piracy)	206 (27.4%)	345 (45.9%)	122 (16.2%)	78 (10.4%)
Policy development specific to IR sustenance is not yet established.	163 (21.7%)	315 (41.9%)	171 (22.8%)	102 (13.6%)

Table 4.13 ascertained that copyright issues are negatively impacting sustenance of IRs in universities. A total of 87.6% confirmed that copyright and intellectual property issues are major concerns for researchers, while 76% agreed on security issues.Whereas 67.1% believed that policy specifically formulated to address the seamless running of IRs is yet established.

The responses of lecturers to open-ended questions recognized copyright-related issues militating against the running of IRs in universities:

- Copyright of scholars' works are regularly violated through plagiarism, counterfeiting, piracy and photocopying in Nigeria. Academics have fears about plagiarism and piracy, even the copyright laws are not very clear and enforced in Nigeria like in advanced countries. Scholars do many dubious stuff with other intellectual properties of other scholars without getting caught or facing any consequences in Nigeria.

  The government needs to checkmate such through national policy so as to discourage and eliminate the practices to enhance IR sustenance. It should be noted that developed countries have structures in place to enforcecopyright law coupled with a levying system where all photocopied materials published across the country ensures certain benefits are accruable to the authors. This system needs to be adopted in Nigeria.

- There exists a non-practicable policy addressing copyright issues as well as implementations across Nigeria coupled with an inadequate legal framework on copyright matters.

- There is the non-existence of copyright information resource management systems within the universities in Nigeria who monitor and regulate copyright matters. Also, the

Publishers Contract Policy that makes authors to give out the copyright of the work to publishers to get published constitutes an hindrance to enhancing the acceptability of IRs in Nigeria.

The breakdown of copyright-related issues contending with the sustenance of IR by universities is highlighted in table 4.14

Table 4.14 Copyright issues influencing the sustenance of IR in Nigerian university libraries

Institution	Copyright Issues	
	Much concern	Less concern
UNN	93(66.4%)	47(33.6%)
FUOYE	56(71.8%)	22(28.2%)
FUTA	27(62.8%)	16(37.2%)
UNIJOS	78(61.9%)	48(38.1%)
ABU	109(68.1%)	51(31.9%)
OAU	25(44.6%)	31(55.4%)
UI	29(27.9%)	75(72.1%)
CU	12(28.6%)	30(71.4%)
Total	429(57.3%)	320(42.7%)

Based on issues associated with copyright, much concern was raised by the respondents. A total of 66.4%, 71.8%, 62.8%, 61.9%, 68.1% of respondents from UNN, FUOYE, FUTA, UNIJOS, and ABU respectively raised many concerns about copyright of their document being uploaded to the institutional repository while less concern over copyright was raised by respondents from OAU(55.4%), UI(72.1%) and CU(71.4%).

Research question 9: What are the structures put in place for the sustenance of IRs in university libraries in Nigeria?

During the interviews, the university librarians ascertained that though there are besetting constrains in their attempt to sustain their IRs, however, some structures have been put in place

for the creation, maintenance, and adaptation of their IRs. The synopsis of the responses is given in Table 4.15:

Table 4.15: Structures for the sustenance of institutional repositories in university libraries in Nigeria

Creation structures	Maintenance structures	Adaptation structures
1.Strategic planning and management approval	A set of highly specialised skilled personnel are recruited to manage the institutional repositories	Demonstrations at faculties on how IRs work.
2.Deployed in house approach to the digitisation and management of IR (preferred because staff will always be available to sustain the system than contractors)	Good and efficient server	Registration with the Registry of Open Access databases
3.Good and efficient vendors	Digitisation of staff trainings to keep up with the maintenance of IR	Efficient vendors and spelt out modalitities for continuity in transactions
3.The selection of the materials for digitisation, are based on certain criteria (not all materials in the library are digitised)	Good internet connectivity	University staff sensitisation
4.Procurement of equipment for digitisation e.g. scanner, desktops, digital camera, printer, CD-Rom, UPS and adobe professionale	D-space FOSS which is cheap and easy to maintain.	Skilled professional staff for IR management
	Tetfund and university funding intervention.	Alternative power supply through inverters and solar energy
	Sourcing of more funds through grants and collaborations with foreign partners	

Some of the structures put in place for the smooth operation of IRs in university in Nigeria as acknowledged by the libraries staff heads are listed in Table 4.15. The creation

structures are strategic planning and getting the universities' management approval; the deployment of in- house approach to the digitisation and management of IRs which is more sustainable than using contractors; good and efficient vendors to ensure quality; the selection of the materials for digitisation based on certain criteria, in addition to procurement of certain equipment for digitisation processes, such as scanners, desktops, digital cameras, printers, CD-Rom, UPS and adobe professional. The maintenance structures include a set of highly specialised skilled personnel, recruited to manage the institutional repositories; good and efficient server and internet connectivity; digitisation staff training to keep up with trends in the maintenance of IR; D-space FOSS which is cheap and easy to maintain; sourcing of more funds through grants and collaborations with foreign partners to argument the Tetfund and university funding interventions. Finally, the adaptation structures itemised by the respondents are: efficient vendors\ spelt out modalities with the vendors to ensure the continuity of transactions; registration with the Registry of Open Access databases; demonstrations at faculties on how IRs work, university staff sensitisation, and alternative power supply through inverters and solar energy. The data on Table 4.18 presents the opinion of lecturers on how to battle the components negatively affecting archiving and protection of intellectual property in schools across Nigeria.

Table 4.16: Lecturers' opinion on the structures for the sustenance of institutional repositories in universities in Nigeria

Structures for the sustenance of institutional repositories in Universities in Nigeria	Strongly Disagree	Disagree	Agree	Strongly Agree	$\bar{x}$	S.D
Creation structures (Weighted Mean = 3.16)						
Strategic planning is inevitable for a successful implementation and sustenance of IR	25 (3.5%)	54 (7.5%)	300 (41.7%)	340 (47.3%)	3.32	0.94
The development of a policy specific to IRs is necessary.	34 (4.7%)	104 (14.4%)	297 (39.5%)	287 (41.1%)	3.12	0.95
Maintenance structures (Weighted Mean = 3.05)						
Institutional repositories should be built on FOSS.	51 (7.4%)	114 (15.2%)	284 (37.8%)	241 (32.1%)	2.87	1.02
Institutional repository sustenance is dependents largely on the obligation on researchers to give up their works	46 (6.4%)	105 (14.0%)	290 (38.6%)	279 (37.2%)	3.03	0.96
There should be specific revenue allocation for IR	32 (4.4%)	71 (9.5%)	300 (39.9%)	314 (41.8%)	3.15	0.91
IR presentations at the faculties	22 (3.0%)	88 (11.7%)	320 (42.6%)	297 (39.5%)	3.16	0.85
Adaptation structures (Weighted Mean = 3.12)						
Institution-specific participation incentives for contributors.	51 (17.0.5%)	81 (10.8%)	305 (40.6%)	286 (38.1%)	3.06	0.95
As far as copyright is concerned, authors must be enlightened on their rights on their intellectual output.	42 (5.8%)	81 (10.8%)	286 (38.1%)	315 (41.9%)	3.13	0.93
Libraries newsletters	29 (4.0%)	103 (13.7%)	283 (37.7%)	313 (41.7%)	3.14	0.90
Publicity on Universities' websites	38 (5.2%)	79 (10.5%)	298 (39.7%)	312 (41.5%)	3.15	0.91

The structures for the sustenance of IRs in universities in Nigeria are itemised in Table 4.16. The majority of the lecturers (80.9%) ascertains that there should be the development of a policy specific to IRs, when it comes to copyright problems, 83% of the academic staff advised authors must be made to understand and know their rights over intellectual work belonging to them. Likewise, 82.6% of the respondents concurred that advocacy via short courses (emphasizing benefits) as well as setup advocacies using interpersonal medium communication as very imperative. Also, 81.6% recommended institution-specific participation and incentives to scholars who contribute to IRs. This will go a long way in encouraging the absolute

cooperation of authors and 79.1% of the scholars averred that institutional repository success is dependent upon directives given to the faculty and researchers in such universities towards the submission of their scholarly works. While 76.4% and 89% of the respondents believe IRs is built software with open-source and strategic planning respectively to ensure sustainability.

The open-ended questions fielded by the academics proposed the following solutions to solving the issues confronting the sustenance of institutional repositories in universities across Nigeria:

- The universities' management system and all the stakeholders need to be interested in and fully persuaded of the need to have working IRs for their universities.
- Everybody needs to be targeted when designing publicity for IRs promotions from academics to the business people, the young, old, students, administrators and policymakers
- IR sustenance should be backed up with a national policy on education to encourage and mandate the authors and the universities to fully participate.
- Universities should incorporate IR into their curriculum
- Universities policies should include that all publications submitted for promotion each year should be included in the universities' IRs
- More incentives such as grants, financial support, conferences and so on must be designed for scholars to boost their willingness to contribute to universities' IRs.
- The school management needs to do more in the area of policies and access to research research awards in their institutions.
- There should be good maintenance culture e.g. good structures for repairs and alternative power supply using an inverter and solar energy.
- There is need to increase impetus via reward systems, contributors to IRs should be compensated and awarded for their works and achievement of the authors.

Open-ended enquiries thrown to the academics on copyright challenges elicited the following responses:

- Formulation of workable policies on copyright difficulties and their executions in Nigeria.
- Adequate legal frameworks is required to be setup with the mandate to monitor as well as regulate issues bordering on copyright difficulties within the universities and without.

- Sanctions need to be set the violation of copyright regulations, such copyright laws must be strictly observed and enforced.
- Academics and authors' copyright must be retained even after the submission of their works to the IRs of the schools.
- Authors are to ensure at the early stage of publishing, permission is obtained from publishers enroll their scholarly works on IRs of their institution.
- Moves must be made by the federal government to allay fears of piracy and plagiarism through policies and acts of parliament.
- Only the abstract must be uploaded along with CVs of authors to avert piracy as well as plagiarism to ensure the authors are contacted when full text of the work are required.
- Security of scholarly works uploaded on IRs should be ensured by the institutions.
- A comprehensive plagiarism check should be carried out on materials before uploading into the IR
- The setup of a unit or department be commissioned in the institution with the solely to handle copyright and documenting matters.

The response excerpts from the digitisation unit heads in the school further revealed as a measure of resolving the copyright constraints that: the institutions must refrain from taking up the ownership of scholarly works, authors maintain sole ownership of their outputs. Though, certain journals require permission to be presented formally others have given permissions to writers to upload materials on IRs of their institutions. Incase of those journals requiring permissions, such cases need to be arranged with the library by urging members of the faculties to seek permission formally from the journals given the copyright prior uploading. When these steps are taken it prevents breach of contract as well as sanctions due to violation of extant copyright regulations. It is generally advised that authors should avoid releasing to journal publishers their work's copyright.

The result from the interview further revealed that the structures for the sustenance of IRs in Nigerian universities must involve faculty fellowships, availability and adequate network of system, regular electricity supply through backups such as solar, generators, well planned server backup for the schools' IRs, provision of state of the art computer systems university units and departments, regular upgrade of systems, sufficient bandwidth, training and retraining of staff to know trends in the management of IRs and ensure its deployment is consistent with

global standard in Nigeria. Recommendations of the respondents on strategies to resolve the challenges of sustaining of IRs in universities in Nigeria are shown in Figure 4.6.
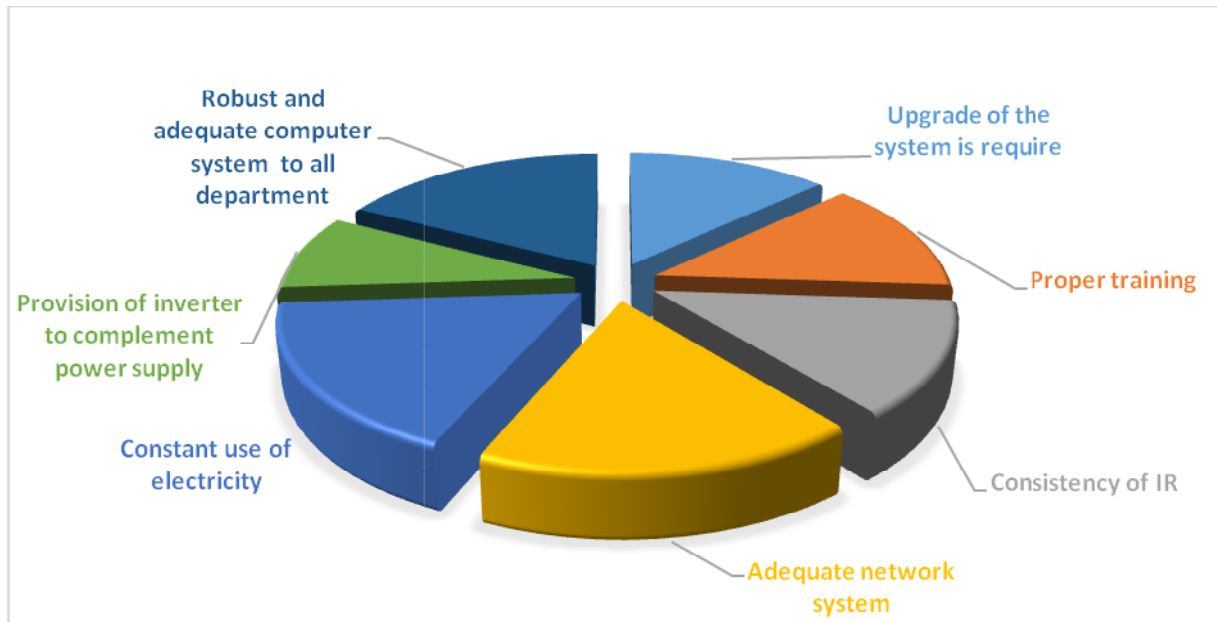
Figure 4.6 Distribution of the respondent's recommendations for the sustenance of institutional repositories in university libraries in Nigeria

4.3: Test of hypotheses

The section highlights results of test of the null hypotheses of the study. Four hypotheses were tested at a 0.05 level of significance. The test's results are indicated.

HO$_1$: There is no significant relationship between institutional factors and the sustenance of institutional repositories in university libraries in Nigeria.

Table 4.17 reveals that relationship between internal factors and the sustenance of IRs' in universities campuses in Nigeria.

Table 4.17: Correlation matrix of institutional factors and the sustenance of institutional repository in universities libraries in Nigerian

Correlations

		Institutional Factors	Institutional Repository
Institutional Factors	Pearson Correlation	1	.414[**]
	Sig. (2-tailed)		.000
	N	751	751
Institutional Repository	Pearson Correlation	.414[**]	1
	Sig. (2-tailed)	.000	
	N	751	751

**. Correlation is significant at the 0.05 level.

The result in Table 4.17 reveals that the institutional factors have a relationship with the sustainability of IRs in Nigeria, N = 751, r = .414, p<.05. As such, the null hypothesis is rejected implying a positive correlation exists between institutional factors and the sustenance of institutional repositories in Nigerian universities. Hence, an improvement in the institutional factors leads to a corresponding increase in the sustainability of IRs in Nigeria.

HO$_2$: There is no significant relationship between external factors and the sustenance of institutional repositories in university libraries in Nigeria.

The relationship existing between the external factors affecting IRs and the sustenance of institutional repositories in Nigeria is displayed in Table 4.18.

Table 4.18: Correlation Matrix of external factors and sustenance of institutional repositories in universities libraries in Nigeria

		External factors	Institutional Repository
External Factors	Pearson correlation	1	.528**
	Sig. (2 - tailed)		.000
	N	751	751
Institutional Repository	Pearson correlation	.528**	1
	Sig. (2 - tailed)	.000	
	N	751	751

**Significant at the 0.05 level of significance

   The result in Table 4.18shows that the external factors have a significant positive relationship with the sustenance of institutional repositories in university libraries in Nigeria (N = 751, r = .528, p< .05). The null hypothesis is rejected, indicating that external factors affect the sustenance of institutional repositories in Nigerian universities. Therefore improvement in the external factors will result in a higher level of the sustenance of IR.

H$_O$3: **There is no significant relationship between institutional factors and external factors on the sustenance of institutional repositories in university libraries in Nigeria**

This hypothesis was examined with Pearson Product Moment Correlation (PPMC) (Pearson r) and the result is presented in Table 4.19.

Table 4.19: Relationship between institutional factors, and external factors of institutional repositories sustenance in university libraries in Nigeria

Correlations

		Institutional Factors	External Factors
Institutional Factors	Pearson Correlation	1	.566**
	Sig. (2-tailed)		.000
	N	751	751
External Factors	Pearson Correlation	.566**	1
	Sig. (2-tailed)	.000	
	N	751	751

**. Correlation is significant at the 0.05level.

Table 4.19 reveals that there is a significant relationship between institutional factors and external factors of an institutional repository in university libraries in Nigeria N=751, r = .566**, p<.005.The null hypothesis is therefore rejected. The table further reveals that the institutional factor has a moderate and positive significant relationship with external factors in the universities in Nigeria. This implies that institutional factors increase the tendency for external factors among the universities and vice versa.

HO$_4$: There is no significant joint effect of institutional factors and external factors affecting institutional repositories on the sustenance of IR in university libraries in Nigeria.

The relationship existing between institutional factors, external factors, and the sustenance of IRs in Nigeria is highlighted in Table 4.20.

Table 4.20: **Summary of multiple regression analysis of institutional factor, external factors and the sustenance of institutional repositories in university libraries in Nigeria**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.547[a]	.299	.297	12.17436

Model Summary

    a. Predictors: (Constant), Institutional Factors, External Factors

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	47217.858	2	23608.929	159.288	.000[a]
	Residual	110864.789	748	148.215		
	Total	158082.647	750			

a. Predictors: (Constant), Institutional Factors, External Factors

b. Dependent Variable: Sustenance of Institutional Repositories

Using regression analysis, the result in Table 4.20 reveals that institutional factor and external factors when taken together have a significant effect on the sustenance of institutional repositories in university libraries in Nigeria ($F_{(2;748)}$= 159.288, R =.547, R^2 = 0.299, Adjusted R Square = .297). The table reveals that 29.7% of the variation accounted for the linear combination of independent variables. In other words, both institutional and external factors jointly influence the sustenance of institutional repositories, so the null hypothesis is rejected.

Table 4.21 Relative contribution of independent variables on the dependent variable, the sustenance of institutional repository of the universities libraries in Nigeria

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	19.607	1.485		13.206	.000
External Factors	.795	.068	.432	11.638	.000
Institutional Factors	.212	.046	.170	4.572	.000

a. Dependent Variable: Sustenance of institutional repositories

Table 4.21: shows that the two predictor variables (institutional factors and external factors) are potent predictors of sustenance of institutional repository in the university libraries. The two factors significantly predicted the sustenance of institutional repositories in universities libraries in Nigeria, external factors (Beta = ß .432, t = 11.638, P<0.05), institutional factors ß = .170, t = 4.572, p <.05. External factors(Beta = ß .432, t = 11.638, P<0.05) had a higher influence on the sustenance of institutional repositories. Meaning that enhancement on both institutional and external factors will influence the sustenance of institutional repositories in universities' libraries.

Table 4.22: Summary of Correlation Matrix showing the Relationship between the Independent and Dependent variable among Respondents

Variable	1	2	3	4	5	6	7	8
IR	1.000							
Awareness	0.267**	1.000						
LAtIR	0.465**	0.383**	1.000					
Infrastructure	0.208	-.209**	-.207**	1.000				
Funding	0.312**	-.126**	0.005	0.521**	1.000			
DP	0.148**	-.157**	-0.018	0.392**	0.427**	1.000		
TC	0.175**	-0.062	0.037	0.395**	0.500**	0.505**	1.000	
CI	0.205	-.126**	0.015	0.387**	0.339**	0.542**	0.458**	1.000
Mean	41.91	20.03	26.16	42.61	45.43	28.71	23.91	31.90
Std Deviation	9.80	4.06	6.54	18.17	12.23	8.86	6.53	10.02

N.B: ** Significant at $p<0.01$ *Significant at $p<0.05$

Where:

LAtIR = Awareness, Academics' Attitude towards IR,

DP   = Digitisation Procedures,

TC   = Technological Changes

CI   = Copyright Issues

Table 4.22 shows the result implying that there is a significant relationship between the institutional factors and the external constraints militating against the sustainability of IRs in in Nigerian universities. Awareness ($r = 0.267$, $p< 0.05$), LAtIR ($r = 0.465$, $p< 0.05$), infrastructure ($r = 208$, $p< 0.05$), funding ($r = 0.312$, $p <0.05$), DP ($r = 0.148$, $p<0.05$), TC ($r = 0.175$, $p< 0.05$) and CI($r = 0.205$, $p < 0.05$). This implies that for adequate sustenance of repositories in various Nigeria academic institutions, proper funding, sufficient and adequate infrastructures are needed to be put in place; contributors to the repository must be aware of the facilities and be rest assured of copyrights infringement protection. Above all, both institutional and external factors are essential for the sustenance of institutional repositories in Nigeria.

Table 4.23: The prediction of all the seven independent variables to the dependent variable

R	R Square		Adjusted R Square		Std Error of the Estimate
0.583	0.340		0.334		
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	24461.726	7	3494.532	54.661	.000[b]
Residual	47500.935	743	63.931		
Total	71962.660	750			

Table 4.23 demonstrated that the expectation of all the seven autonomous factors to the reliant variable. That is institutional repositories associated decidedly with the seven indicator factors. The table likewise demonstrates a coefficient of multiple correlations (R) of 0.583 and a multiple R squares of 0.340. This implies 34% of the change in the institutional storehouses is represented by all the seven indicator factors when taken together.

The composite influence is significant and tested at p<0.05 with F- ratio at the degree of freedom (df = 7/743). The table indicated the analysis of variance for the regression yielded an F-ratio of 54.661 (significant at 0.05 level). This implies a joint contribution of the independent with dependent variables as other unincluded variables in the model might have led to the residual variance.

H$_O$5: **There is no significant relative contribution of institutional factors and external factors on the sustenance of institutional repositories in university libraries in Nigeria**

Table 4.24: The relative contribution of the seven independent variables to the dependent variable, expressed as beta weights

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7.080	2.231		3.173	.002
Awareness	.366	.079	.152	4.615	.000
LAtIR	.598	.050	.399	12.026	.000
Infrastr	-.020	.020	-.037	-.987	.324
Funding	.267	.031	.333	8.680	.000
DP	.104	.043	.094	2.430	.015
TC	.016	.057	.011	.280	.779
CI	-.087	.037	-.089	-2.388	.017

Table 4.24 shows the comparative contribution of seven independent variables to the dependent variable, expressed as beta weights. The partial correlation coefficients of institutional factors and external factors have positive relationship with the sustenance of institutional repositories in university libraries in Nigeria. The positive value of the effects of institutional factors and external factors is caused by positive underpinning of the seven variables. Using the standardized regression coefficient to determine the relative contributions of the independent variables to the explanation of the dependent variable LAtIR(B= 0.598, t = 12.026, p < 0.05) remains the major contributor to the prediction and trailed by awareness (β = 0.366, t= 4.615, p < 0.05) funding (β = 0.267, t = 8.680, p < 0.05) followed by DP (β = 0.104, t = 2.430, p < 0.05) followed by TC (β = 0.016, t= 0.280, p>0.05) followed by CI (β = -0.087, t= -2.388, p < 0.05) and finally followed by infrastructure (β = -0.020, t= 0.987, p>0.05) in that order.

4.4   Discussion of the findings

4.4.1   Awareness and knowledge of institutional repositories in universities in Nigeria

Despite a moderate level of awareness, the level of knowledge of IR displayed by lecturers remain very low. Many of the lecturers claimed to be aware of IR, but majority of them displayed very minute IRs' knowledge level. The research findings show that vast majority of academics in Nigeria have vague understanding of the subject-matter, benefits accruable as well as the overarching aim of IRs.

For instance Table 4.5 shows only 20 of a total 140 respondents from UNN display knowledgeability on IR. Only 29 respondent of the entire 78 academics opined that they are knowledgeable on the subject matter. Federal University of Technology, Akure has only 9 out of 41 academics who claimed to be conversant with IR. Only 17 respondents from UNIJOS from 126 lecturers, while 19 lecturers from a total of 160 and 15 of 56 respondents from OAU`. On the other hand, out of 104 respondents in UI, only 29 have knowledge about IR and Covenant University boast of 5 academics out of 42 served copies of the instrument. In total, 677 out of 746 lecturers served the copies and responded claim ignorance of the topic. As a matter of fact, several lecturers who were administered copies of the questionnaire demanded an explanation on the concept (IR) before they attempted answering the questions in the questionnaire. These respondents are staff of universities already having IR established within their campuses. What bothers one is the awareness level of schools that have not even commenced the process of establishing IRs on their campuses? It will be very dismal. This calls for massive enlightenment and advocacy on the subject of the institutional repository within the university communities in Nigeria. This is in agreement with Nwokedi (2011) who studied the knowledge of lecturers on the existence of IRs coupled with their willingness to submit their academic works for upload. The result revealed (79%) of all respondents do not have any knowledge of Open Access IR while 21% of the total lecturers sampled were aware of IRs existence in the institution. Against Nwokedi's results however, 71% of all academics affirmed their awareness of existing IRs on the campus, nevertheless, majority are ignorant of the subject matter. In conclusion, it could be inferred that only 69(9.2%) of lecturers are knowledgeable on the overarching aim and objectives of IRs while 90% are not.

4.4.2 The attitude of lecturers towards the submission of their works to the institutional repositories

The staff of the digitization unit complained about poor and nonchallant approach of academics to submission of research materials to the unit for upload. Majority of the respondents constituting 80% of academic staff confirmed their unwillingness and inability to reach a consensus as far as IRs is concerned. This is in agreement with the findings of many authors. Earwage (2008) who noted faculty staff reluctance in cooperating to support institutional repository. Mark and Shearer (2006) also opined some faculty staff failed to reach a consensus on the establishment of IRs. Again Casey (2012) observed that academic institutions often confront hesitancy among academics to add their works to IRs. A survey conducted among executives of the Association of Research Libraries (ARL), two-thirds of the Directors answered that most researchers in the institutions withdraw from contributing to the IRs (Association of Research Libraries, 2006. Schonfeld and Houseright (2010) discovered below 30 percent of academics in colleges and universities in the US were contributing their research works to IRs.This can be partially blamed on inadequate in-depth knowledge of IR, especially as far as values and objectives of IR is concerned. Therefore, they cannot be blamed as it is impossible for an individual to support a cause he or she has little knowledge or understanding of.

As stated earlier, faculties in tertiary institutions need to urgently engage and fashion out ways to establish and sustain IR. This is with a view to clear every doubt and shed light on shady areas. For instance, the responses from the open-ended questions for lecturers highlighted some of the faculty members' fears about IR e.g. plagiarism, who owns the copyright? What will be my gain for the academic rigour, what about the quality as there is no peer review? Academics are not sure of the security of the work that is fully accessible to the general public, the benefits derivable from the investments made as well as the copyright ownership status of the work. Foster and Gibbons (2005) corroborate this finding by identifying factors leading to non submission of research papers by faculty members like worrying about infringement of their copyright and lack of systems to ensure disciplinary practices. This is also in agreement with the Davis (1985) who states that a user's attitude to a particular system is largely dependent on the attitude of such users as influenced by perception of the system's usefulness. This also invariably determines whether the user will use such system or not.

Therefore, publicity and emphasis on the advantages of an active IR is increased in universities, lecturers' attitudes will be affected positively, they will become major drivers of IRs on their campuses and establishment. It is believed that with the faculty enlightenment through the questionnaire that bears the definition and benefits of IR, there will be a positive change towards lecturers' awareness and support towards IRs in their institutions.

4.4.3 The infrastructural factors influencing the sustenance of IRs in Nigerian university libraries

The structured interview findings revealed outdated and poorly configured of computer systems as well as irregular connectivity as well as erratic supply of electricity ranked high among the factors hindering the successful operation of IRs in university libraries across the country. Apart from Covenant University, all the universities surveyed have limited work stations for digitising research materials submitted. In order to have fully functional IRs, hardware requirements are as follows: scanner HP N9120 and HP ScanJet 55090, 2 HP Desktop, Intel Pentium CPU Dual-Core, 2.00GZ, 1.0 Gig Ram, Window7, Hard disk 250gig. The Infrastructure and ICT facilities currently found in Nigeria universities for IRs need to be upgraded to the level required by the amount of work stations deployed for the digitisation processes and not obsolete computer systems. As regard version of operating systems in use, Windows 10 is the latest, meanwhile most schools are running Windows XP. This leaves a wide gap between XP to Vista to Windows 7 to Windows 8 and the required Window 10. The hardware as well as the software in use are totally outdated.

This finding is in agreement with Christian (2008) who remarked that ICT infrastructure represents a key issue impeding the establishment of IRs within Nigeria's tertiary institutions.

4.4.4 Sources of funding for institutional repositories in Nigerian university libraries

The funding of institutional repository in Nigerian universities as identified in the study are mainly in-house: the use of library fund allocation, followed by infrastructure development fund by the government, financial assistance by philanthropist, and nongovernmental organisations like the MacArthur Institution and Library Management Fund. This funding system is highly insufficient. This is due to the high cost of the establishment and maintenance of an IR, coupled with the fact that the fund allocations for libraries have never been enough for the

general library management, what more now there is library fund allocation cut down as a result of economic recession. Eye witness account confirmed that the digitisation chambers were poorly equipped with both human resources and facilities e.g. hardware and connectivity materials, low and poor electricity power supply due to limited funding.

In agreement with this, Nwosu (2010) and Christian (2008) ascertained that funding remains a critical obstacle to the establishment of IRs in many of Nigeria's higher institutions. The inadequate fund is a major barrier not just peculiar to Africa but constitutes a global issue with the worldwide economic meltdown.

4.4.5   The material contents of IRs in university libraries in Nigeria

The material content of IRs in universities in Nigeria are varied. They are mainly theses/dissertations, inaugural lectures, journal articles, and staff publications. Other contents are convocation proceedings, addresses, library seminars, newspapers, and seminars presentations. This collaborates with Adebayo (2009) who noted that IRs bring all research materials of an organisation together; to preserve them for research and posterity, as well as provide the bases to see at a glance and appreciate an organisation's research output. Seminar presentations, special works, staff publications, and other forms of grey literature need to be well captured in IRs in Nigeria as they are among the least stocked.

This result is partly in agreement with the finding of Manjunatha (2011) that noticed that IR may hold different sorts of contents, for example, pre and post prints of diary articles, meeting papers, reports, postulations, expositions, programming projects, datasets, recordings, sounds, and other insightful items. Along these lines, scholarly commitments of the universities' researchers are made accessible to the entire information network far and wide. Pennock (2007) indicated that the range of computerized works made by an organization and its local individuals is exceedingly different. Institutional repositories for instance might incorporate pre or post-prints of distributed articles, meeting communiques, educative and materials for e-learning, e-proposals, essential research information and datasets, electronic records, mixed media, or picture materials to give some examples. Institutional vaults that contain a blend of these materials are ordinarily alluded to as hybrid repositories. Contrary to the findings of Manjunatha and Pennock, Nigerian IRs are yet to incorporate electronic recordings, mixed media, datasets, and e-learning materials.

4.4.6   The digitisation processes in the implementation of institutional repositories

The most effective approach to the implementation of institutional repository as noted in the study is in-house. Most of the universities deployed an in-house approach except for FUTA and University of Jos that contracted out their digitisation process. The in-house approach is a system whereby the library management deploys and trains some of the library staff to implement and manage their IR. According to the respondents, the in house approach is the most preferred and effective approach to the maintenance of institutional repository activities in universities in Nigeria, the reason being that if the staff is not involved right from the onset of the project, and knowledgeable on the system, there will be a problem of sustenance of the system especially when issues arise. Although the input and advice of external contractors can be source for at the initial take-off of the project, professionals within the system have to be trained to have a mastery of the different aspects of IR system. An in-house approach to institutional repository implementation and sustenance is indeed a wise decision as the communication gap may arise in the future between the contractors and the IR system personnel. In such a situation, redundancy can set in the management of IR.

There are various activities involved in the management of IR system as identified in the study. The activities start with strategic planning and deliberation on the type of software to use, followed by seeking and obtaining management approval, and then sourcing for the vendors needed. The digitisation processes as revealed in the findings include the gathering of materials from the various departments, checking the level of plagiarism before scanning and uploading. It was ascertained by one of the interview respondents that each document has to go through software called Sherpa Rom to determine the archiving policy of the journal involved to resolve copyright issues.

The universities surveyed used mainly Dspace software for their digitisation processes except for ABU that used Abbyy Finereader 8.0, Professional edition. The reasons advanced was that Dspace is an open-source software, robust, flexible and globally in use, therefore, it ensures standardisation. This is in line with research by Renwick (2011) who proposed that to promote sustainability in institutions of higher learning, there is a need for the adoption of open source technologies that reflect organization's readiness to grow, adapt to changes and develop. Armstrong (2012), Awre (2012), and Arnoldus et al. (2011) also emphasized the use of standard and simple technologies to improve the sustainability of institutional repositories.

The result further collaborates with the view of Jones (2009) who observed that "if one must use any software in the implementation of IR, there must be open-source programming for your institutional files". Some other decisions are likely to be unrealistic and unsustainable over time. Since Dspace has been proved to be reliable over the years and adopted by many libraries across the globe, there seems to be no need to adopt any other software that the reliability is not known or proven. For instance, among the 242 BRICS repositories surveyed, DSpace software was the highest in use, 177(73.14%) of the IRs use DSpace software. This comprises 63 (26.03%) IRs made in Brazil, 39(16.11%) from China, 42 (17.35%) from India, 14 (5.78%) from Russia, and 19 (7.85%) from South Africa. Eprints was the second position with 24 (9.91%) repositories. To create an IRs in TIFR, the organization was advised to settle on DSpace for the accompanying reasons, such astotally adaptability, usefulness and can be kept up with a few staff.

Additionally, DSpace is being utilized by numerous libraries. It is safer to use widely in use and accepted software to ensure uniformity especially now that libraries IRs are going into consortium both regionally and globally.

4.4.7 Technological challenges inhibiting the sustenance of institutional repositories in universities in Nigeria

The technological challenges affecting the sustenance of institutional repositories in Nigerian universities as found out in the research are: inadequate bandwidth, poor network system, lack of expertise, and poor funding to procure and manage IR infrastructure etc. Respondents emphasised an urgent need to ensure regular and efficient internet facilities for personnel managing the IR usage so as to make digitisation process more efficient in universities across Nigeria. Majority of respondents register their displeasure with inadequate bandwidth for the daily activities in the libraries. For instance, the respondents from Kenneth Dike Library (KDL) reported that not less than 20 megabytes of bandwidth is needed to efficiently run an IR system however, only a paltry10 megabytes is available. This low bandwidth is also irregular. The respondents further explained that KDL has no autonomy in the sharing of bandwidth on campus; instead, the ICT centre holds such mandate. To resolve the issue, the interviewed respondent indicated that it is imperative for the library to be given adequate priority bandwidth distribution and to also ensure internet accessibility is constant. A functional and fully

configured Systems, scanners, regularly updated, as well as uninterrupted electricity supply backed up with inverters or solar systems.

The study also corroborates Teper and Kraemer (2002), averred that the administration and sustainability remains a critical constraint in the establishment of IRs. Hirwade (2006) and Eke (2011), other issues constituting barriers to the sustenance of institutional repositories are inadequate technical know-how in every organisation to encourage the establishment of organisational archives and advise academics to upload their papers on them, inadequate infrastructure and other facilities such as computer hardware as well as the adequate broadband connectivity.

4.4.8 Copyright issues influencing the sustenance of IRs in university libraries in Nigeria

The copyright issues hindering sustenance of institutional repositories in Nigerian university libraries are photocopying, plagiarism, piracy and counterfeiting. The copyright laws are not very clear and enforced in Nigeria like in advanced countries. A lot of scholars engage in dubious activities with other peoples' scholarly work without any form of concequence in Nigeria. Literature affirms the abysmal level of copyright violations in tertiary institutions in Nigeria. Reprography or what is usually referred to as photocopying remains one of the majorways copyrights are violated and scholarly works plagiarised, counterfeited and pirated (Egonwa, 2005). Musa (2014) pointed out that the responsibilities of university libraries in creating a sustainable institutional repository cover formulation of rules and policies guiding copyright issues relating to document depository and content accessibility in the repository. Such policy should spell out how academic publications, research reports, theses and dissertations, new bulletins, inaugural lectures should be uploaded into the system. Corroborating this assertion, Okoro (2017) maintained that general principles, standards, and guidelines must be formulated before the establishment of institutional repository in any university. This becomes necessary to be able to attain the long term goals of the repository. Musa (2014) added that the nature of materials, structure, submission guidelines, rights of academics, rights of libraries, etc should all be indicated in the IR policy to ensure IR sustainability.

It should be noted that across more developed countries, there are structures and laws towards the enforcement of copyright regulations. Also, there are systems to levy/royalties whenever photocopies of scholarly works are made. This is a route Nigeria needs to adopt also.

A payment scale need to be designed for institutions for th amount of work held in their library to atone the photocopies made by academics and learners on campus. This suggests that tertiary institutions must charge for photocopying by staff and students as obtainable in other climes around the world.There is also uncertainty on who should own the copyright (the author or the university), and the absence of national policies to regulate copyright issues and protect academics' intellectual works.

4.4.9 Structures put in place for the sustenance of institutional repositories in Nigerian university libraries

The universities surveyed have identified certain structures to ensure the sustenance of their institutional repositories. Some of the IR sustenance structures are; strategic planning; the deployment of in house approach to the digitisation and management of IRs; good and efficient vendors, the selection of the materials for digitisation based on certain criteria, in addition to the recruitment of highly specialised skilled personnel, to manage the institutional repositories; good and efficient server and internet connectivity; digitisation staff training to keep up with trends in the maintenance of IR; D-space FOSS which is cheap and easy to maintain; sourcing of more funds through grants and collaborations with foreign partners to augment the Tedfund and university funding interventions amongst others. Again the adaptation of widely used software makes it easier for IR system personnel to share ideas and knowledge to ensure the sustenance of the system, in case software issues arise, they can interact and resolve them speedily with their counterparts abroad.

This finding is in unison with Eschenfelder (2019) described sustainability in the context of a digital repository as the organisation of academics and research practices in order to sustain digital projects and services in the face of prevailing challenge. This implies that a digital repository can only be sustained where there is a designed workflow and pattern that supports the management and use of the digital repository.

4.4.10 Recommendations on structures for the sustenance of institutional repositories in Nigerian university libraries

The starting point to the resolution of the myriad challenges preventing the sustainability of institutional intellectual property archives in libraries in Nigeria as uncovered in the study is strategic planning and policy drafting. This is inevitable for successful implementation and

sustenance of the system. There is a saying that failure to plan is planning to fail. Institutional repositories in Nigeria that are at the advanced stage, like in the case of the Covenant University were reported to have been built on a strategic plan, and a written policy document that helped to ensure standards. Whereas most of the libraries surveyed did not have any policy document backup or the blueprint for their IRs management. Furthermore, it was identified that proper maintenance, backups, and repairs culture, as well as alternative power supply using inverters, should be imbibedin the running of the system to ensure the continual and smooth workings of the facilities and other aspects of IR systems.

The findings from the interview also identified expertise, fund, the cooperation of the faculty members, and readiness of the heads of university libraries to drive the system as being paramount in the sustenance of IR. This aligns with Okoro (2016) advocacy that there is a need for the creation of an administrative policy advisory group which comprises libraries, university managers, faculty members, legal adviser, database administrators, systems experts and analysts, programmers in the management of IR.

Also, IR processes and management are highly specialised tasks, this calls for a lot of finance and expertise to drive the system. The universities' management system and all the stakeholders need to be interested and fully persuaded of the need to have a working IRs for their universities. IRs will only be sustained when the stakeholders are fully involved and driving their success. How can a system survive when the stakeholders are not in harmonious agreement? And how can the faculty members cooperate, without an exhaustive comprehension of the significance of IR?

The respondents ascertained that IRs should be backed up with a national policy on education to encourage and mandate the authors and the university administrators to fully participate. Universities should incorporate IR into their curriculum, and their policy needs to include that all publications submitted for promotion each year should be included in the universities' IRs. In this way the system will continually be populated.

Furthermore, the lecturer-respondents of the open-ended questionsforlecturers opined that motivation/reward system such asimpetuses as research supports, workshop supports, compensations, and awards should be given to academics as part of their benefits for their intellectual achievements to encourage them to keep contributing to the IR system, and because much resources are used by the academics to deliver a quality research output. They added that

the university system need to set aside certain funds to support IR as a policy so as to access research grants in the universities, as this will mandate the faculty members to upload their works.

The findings noted that if IRs in Nigeria were to be sustained, it should be backed up with a satisfactory lawful system and a feasible arrangement controlling copyright matters and its implementation. Plagiarism and piracy which are the fears of scholars in the deposition of their works to IRs should be fought against and eliminated by the government and the universities. Nobody might want to through his accomplishment to the general public without sufficient security.

Additionally, all stakehoders need to be abreast of trends on IR. These include: students, businessmen, and lecturers, both old and youths. Enlightenment programmes such as workshops, publicity on universities' websites and fliers must be deployed to keep stakehoders abreast so as to motivate contribution and regular usage of IR. There is urgent need for workshops on IRs in the faculties;   likewise, authors ought to be taught their rights on their scholarly literature. Accessibility of sufficient system network, data transfer capacity, and a steady supply of power backed up with specific revenue allocation for IR management and maintenances will in no small measure alleviate the challenges influencing the sustenance of IRs in libraries in universities in Nigeria. The findings are in harmony with Liew (2016) that reported that the social sustainability of the repository was related to strategy and policy, advocacy and community participation, equity, cultural sensitivity, and literacy, as well as periodic assessment and evaluation.

4.4.11 Relationship between institutional factors and the sustenance of Institutional repositories in university libraries in Nigeria

The study revealed a significant impact of institutional factors on the sustenance of IRs in universities in Nigeria N = 751, r = .414, p<.05. This indicates that improving the institutional factors will culminate into an increased sustenance level of IRs. For instance, if awareness of IR is intensified, more funds made available for facilities and other resources for the system, coupled with a change of attitude among academics, the rate of adoption and sustenance of IRs will increase.

4.4.12 Relationship between external actors and the sustenance of Institutional repositories in university libraries in Nigeria

The result of the hypothesis also revealed that there is a significant effect of external factors on the sustenance of IRs in universities in Nigeria N = 751, r = .528, p< .05. External factors have an impact on the sustenance of IRs in Nigerian Universities as well. Therefore improvement in the external factors will result in a greater level of IRs sustenance. If technological challenges are resolved and plagiarism is eliminated with other copyright issues, more IRs will be established and sustained.

4.4.13 Relationship between institutional factors and external factors of institutional repositories sustenance in university libraries in Nigeria

The research showed a significant relationship between internal and external factors of an IRs in Nigeria N=751, r = .566**, p<.005. The table further revealed that institutional factors have a moderate and positive significant relationship with external factors in Nigerian universities. This implies that institutional factors increase the tendency for external factors among the universities and visa vice.

4.4.14 Combined influence of institutional factors and external factors on the institutional repositories sustenance in university libraries in Nigeria

The analysis of the two independent variables on the dependent variable revealed that institutional factors and external factors when taken together have a significant effect on the sustenance of institutional repositories in universities in Nigeria. This means that both the institutional and external factors have an impact on the sustenance of institutional repositories in university libraries in Nigeria. If both the institutional factors and external factors are improved upon, IR sustenance will be enhanced. The results of this study showed a significant relationship between the institutional factors and the external factors on the sustenance of institutional repositories in university libraries in Nigeria. This implies that for adequate sustenance of repositories in various Nigeria academic institutions, proper funding, sufficient and adequate infrastructures are needed to be put in place; contributors to the repository must be aware of the facilities and be rest assured of copyrights infringement protection.

Above all, both institutional and external factors are essential for the sustenance of institutional repositories in Nigeria. While this study observed that copyright is essential for

the sustenance of IR, Macklin (2013) noted that applying copyright law to content in IRs is a major challenge for depositors of contents into the repositories, as well as for the librarians who manage them. The challenge of librarians is not only limited to the process of making the depositors of contents be aware of the need to do so but also the facilities and infrastructure needed to adequately and efficiently achieve the content in the open access.

Although, some journals in the open-access have only encouraged authors to hold on to the copyright authority while their work is published under the Creative Commons license. As stated by Macklin (2013) managers of IR are naturally faced with the questions of copyrights for contents deposited. The author averred that the copyrights issues and re-use of deposited contents must be given needed clearance and priority in other for the sustenance of IRs. According to Rieh, Markey, Yakel, Jean, and Kim (2007), Institutional repositories require a regular updates of infrastructural development. Based on the observation of Rieh, Markey, Yakel, Jean, and Kim (2007), Eke (2011) highlighted the constraints associated with the sustainability of institutional repositories in Nigeria include inadequate awareness, poor attitude of academics, inadequate legal framework on copyright, inadequate funding, inadequate technological infrastructure, and policy development (e.g. digitisation process/procedure, content), etc. These divergent issues influence the sustenance of IRs.

Gideon (2008) identified inadequate knowledge as well as awareness on what open access institutional repository represents, poor state of ICT in Africa, little or no advocacy for open access repositories, poor funding, copyright and intellectual property rights. In today's world, an institutional repository is data largely supported by data and thus, it requires technology for the conversion of academic outputs which are yet to be digitalized as part of an integral process of record and discourse of scholarship (Lynch, 2003). Hence, the findings of this study are in tandem with that of Lynch (2003) and Routhier (2014) the advent of ICT has immensely impacted on the management of scholarly outputs and its management in various higher institutions of learning while it has constituted to the collaboration among academics as well as awareness of the need for digitalization of scholarships. According to Routhier (2014), digitization is rapidly becoming one of the standard forms of preservation for libraries, archives, and information centres' analog.materials.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter is the summary of the findings, conclusion, and recommendations as well as the implication of the study, contribution of the study to knowledge, and suggestions for further studies.

5.1 Summary of the findings

Eight research questions were answered and four null hypotheses were tested in the study. The findings of this study are summarised as follows:

1. There was a moderate level of awareness and the level of knowledge of institutional repositories in Nigerian universities was low. Majority of lecturers in Nigerian universities remain unfamiliar with the term institutional repository.

2. Lecturers'attitude toward the submission of their intellectual research outputs into the IR was indifferent. The digitisation unit staff reported absolute difficulties in compelling and getting academics to populate institutional repositories with their intellectual outputs. Most lecturers remain pessimistic as far as IR is concerned.

3. Infrastructural issues that militating against the sustainability of institutional repositories in Nigerian universities' libraries were: an insufficient and poor arrangement of PC frameworks and updates combined with issues related to web offices/networks and unreliable power supply.

4. The sources of funding for sustainability of IRs in Nigerian university libraries in Nigeria are in-house library fund allocation, the government infrastructural fund, university grant, TetFund interventions, and philanthropic organisations.

5. The materials that constitute the content of IRs in universities in Nigeria were: mainly theses/dissertations and inaugural lectures. Others are journal articles, staff publications, convocation proceedings, library seminars, newspapers, and seminars/ presentations.

6. The digitisation procedure involved in IR is the gathering of the materials from the various departments, and checking the level of plagiarism before scanning and uploading into the system. This is followed by image editing, generation of metadata, the conversion of the images to searchable text, and the verification of the previous

processes before storage and checking out of materials from the chamber. Most of the libraries adopted D-space software and an In-house approach in the implementation of their institutional repositories.

7. The technological issues affecting the sustainability of IRs in Nigerian universities are insufficient bandwidth, poor network system, poor submission process, technological obsolescence, insufficient reserve for the administration of institutional repositories, stumpy server design, adequate and incoherent publication centres, coupled with poor power supply and inadequate know-how in handling the system amongst others.

8. The copyright-related issues militating against the sustainability of IRs in Nigerian universities are plagiarism, counterfeiting, and piracy; unclear and unenforced copyright laws in Nigeria; unworkable policy directing copyright-related matters and its usage in the country; lack of lawful system on copyright matters; non-functioning commission to screen and control copyright issues and lack of copyright information resource management systems within the universities in Nigeria, as well as the publishing firms' agreement approach that orders authors to give away their copyrights to publishing firms so as to get their intellectual outputs distributed.

9. The structures put in place for the sustainability of IRs in Nigerian university libraries are strategic planning; the deployment of in-house approach to the digitisation and management of IRs; good and efficient vendors, the selection of the materials for digitisation based on certain criteria, in addition to a set of highly specialised skilled personnel, recruited to manage the institutional repositories. Others are good and efficient server and internet connectivity; staff training to keep up with trends in the maintenance of IR; sourcing of more funds through grants and collaborations with foreign partners to augment the Tedfund and university funding interventions and the adaptation of widely used software (D-space) which makes it easier for IR system personnel to exchange knowledge and ideas to ensure the sustenance of the system.

The proffered suggestions on the solutions to the challenges of the sustenance of institutional stores in Nigerian universities' libraries by lecturers are:

- The universities' management system and all the stakeholders need to be interested in IRs for their universities.
- Intensive awareness and advocacy especially on the aims and benefits of institutional repositories are urgently needed.
- Institutional repositories in Nigeria should be backed up with a national policy on education (to encourage and mandate the authors to participate) and also good maintenance culture, e.g., good structures for repairs.
- Universities should incorporate institutional repository into their curriculum.
- Strategic planning, documentation of IR policy statement and specific revenue allocation are very necessary for IR, coupled with appropriate and adequate facilities and Incentives/ motivation (through reward system) to encourage academics to keep contributing to their institutions' repositories.

10. There is a significant influence of the institutional factors on the sustainability of IRs in Nigerian university libraries.

11. There is a significant influence of external factors on the sustainability of IRs in Nigerian university libraries.

12. Institutional factors do influence external factors of an IR in Nigerian universities' libraries and vice versa.

13. Institutional factors and external factors when taken together have a significant relationship on IRs in Nigerian university libraries.

5.2 Conclusion

The rate at which IR is developing and sustained in university libraries across Nigeria remains quite slow and unsynchronised as a result of several challenges such inadequate knowledge and awareness of IR, negative attitude of lecturers, coupled with copyright issues and poor funding. Institutional and external factors have awareness and major effect on the sustainability of IRs in universities awareness and in Nigeria. Therefore, improving on these factors will result in improved level of sustainability of institutional repositories. For instance, if awareness of IR is intensified, more fund made available for the needed infrastructure and other resources for the system, coupled with a change of attitude among lecturers, the rate of adoption

and sustenance of IRs will increase. This calls for a high level of cooperation and intervention from the universities' management, lecturers, library management system, and the government.

5.3 Recommendations

Premised on the findings of this research work, the study recommended the following:

1. Due to low level of knowledge of IR in Nigerian universities, enlightenment programmes and advocacy emphasising benefits of IR via diverse media is unavoidable. Institutional repositories in the country must be sustained so as to ensure general awareness and publicity campaign by the university and library management. Intensive advocacy especially on the aims of IR; through fliers, seminars, and advertisement on the websites of universities. Also, IR presentations at the faculties are urgently needed. All stakeholders such as the students, academics, investors, the old and the young must be carried along and sensitised about IR.

2. The universities' library management needs to set up a committee, have a blueprint on their IRs, and a policy to guide the personnel in the affairs of the system.

3. The policy statement should be documented by the library management and should be such that spells out what to pick as content, tasks to be accomplished and how to go about them, as well as time frame. Most of the universities studied did not have a written policy, and that can be the reason for the dragging of the project.

4. For universities in Nigeria to keep pace with their counterparts across the globe in the sustenance of the IRs, the universities need to improve on the resources allocation to libraries. There should be specific revenue allocation for IR sustenance by the university management.

5. The expertise and technical ability of personnel of the IR system should be enhanced through timely and appropriate training by the management of the university.

6. There should be a structure put in place for authors to be compensated for their contributions to IRs. In this vein, authorities of the university may wish to introduce incentives for staff and introduce a team to review acaemic materials before being uploaded into the system in order to facilitate compliance and motivate academics to submit their works to IRs.

7. Copyright issues are to be regulated and monitored by inaugurating a functional commission to be set up by the Nigerian government and with branches within the university campuses.

8. Adequate and accessible network systems, constant electricity supply by procuring solar systems or generators where possible, coupled with adequate supply of computer hardware and software to every department are to be guaranteed for a working IR by the university management.

9. Furthermore, regular systems upgrade, bandwidth availability, and institutional repositories consistency are to be ensured by the drivers of IRs to achieve sustainability of IR in our citadel of learning across the country.

5.4 Implications of the findings

The findings of this research has direct implications on the expansion and sustainability of IRs in the country and globally. The study identified a low level of knowledge of IR in Nigerian universities, no wonder the pessimistic attitude towards contribution to the healthy growth of IRs in Nigeria by faculty members and other stakeholders which has resulted in a slow spread of IRs in Nigeria. The awareness and advocacy created through this study, through the questionnaires, and when the work is published will help to enrich the knowledge and advancement of IRs in Nigeria and across the nations. The institutional repository issues that have been dealt with in the study will help to resolve the challenges that are inhibiting the sustenance of IRs as well as act as an encouragement and motivation for Nigerian universities and other institutions thinking of establishing IRs to do so. When universities have functioning institutional repositories, it will lead to the formation of regional and global IR consortia that will help to showcase and optimally harness institutional intellectual output, for education, research, and national development. This is due to the advancement of any nation is dependent on the research output and use of scholarly research data in decision making.

According to Vroom expectancy theory, the main implication of the study for the universities (owners) of IRs is that, since it is assumed that motivation is directly linked to reward, the aim should be directed at motivating high sustenance by applying rewards to investment in IRs. Incentives as well as benefits should as a matter of fact be unequivocally

tied to actions that are in agreement with the universities' IR strategies and which in the long-term contribute to the success of IRs.

5.5   Contributions of the study to knowledge

The study contributed to knowledge in various ways.

i.   This study unraveled the challenges encountered in the day to day management and sustainability of institutional archives in Nigerian universities' libraries.

ii.   The solutions identified in the study are a form of discovery on how to eliminate the besetting issues in the sustenance of institutional repositories, not only in Nigeria but in other parts of the world.

iii.   The study will help to bridge the research gap on the topic specifically to Nigeria as identified in the literature. It has equally added to the existing literature on IR globally.

iv.   The work has increased the awareness and advocacy ofinstitutional repositories, thereby increasing the knowledge of institutional repository within the universities in Nigeria. This is because not only was the questionnaire questions a form of publicity on the topic but the definitions and benefits of IR highlighted therein, brought with it a higher level of knowledge on the subject matter. When the work is published, it will help to enlighten the world on the sustenance of institutional repository.

v.   The conceptual model and questionnaire designed by the researcher are contributions to knowledge.

vi.   The application of the Vroom expectancy theory to the sustenance of IR is also a contribution to knowledge.

vii.   The study ascertained that institutional and external factors are correlated with the sustainability of IRs in libraries in Nigerian universities, and this is a contribution to knowledge.

5.6   Suggestions for further research

Based on the results of the study, the following areas are hereby suggested for further research.

1.   A related study could also be carried out in the area of case studies, understudying the institutional repositories of each of the universities in Nigeria that are already successful

in the sustenance of their IRs. This will bring in a deeper review of the why and how of a sustainable IR. E.g. "The case story of Kenneth Dike institutional repository"

2. The study covered only eight universities that are at various levels of IR implementation. Similar studies on IR can be tailored to include the universities in Nigeria that have not started the implementation of IR. (e.g.: IR awareness in Nigerian universities).

3. Lecturers are the main respondents covered in the study; further studies should embrace students, universities' management representatives, and other stakeholders of IR.

4. Further studies need to focus on "IR policies in Nigerian Universities", with the view to establishing standards especially in terms of contents.

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APPENDIX A

RESEARCH QUESTIONNAIRE FOR LECTURERS ON INSTITUTIONAL AND EXTERNAL FACTORS AFFECTING THE SUSTENANCE OF INSTITUTIONAL EPOSITORIES

Dear Respondent,

I am a Doctoral student in the Department of Library, Archival and Information Studies (LARIS), University of Ibadan, please this questionnaire is designed to elicit information that is purely for research purpose.

Kindly assist in answering the questions objectively. Your confidentiality will be ensured.

Thank you.

Mrs. Okoroma, F. N.

A.   **DEMOGRAPHIC INFORMATION**
    Please complete the spaces where necessary and tick (√) where applicable.

1. Name of Institution:

2. Name of Faculty:

3. Sex: Male ( )   Female ( )

4. Age: Age of Respondent: 20-30 years ( ) 31-40 years ( ) 41-50years ( ) 51-60years ( )

61years andabove ( ) 5. Highest Educational Qualification: (a)First degree

(b) Master degree ( )   (c) Ph.D in view (   )   (d) Ph.D   (   )

(e) Others (Please specify)   …….

6. What is your designation in your university?

a. Lecturer II

b. Lecturer I

c. Senior lecturer

d. Professor

e. Others (Please specify) _____

B. Institutional factors affecting the sustenance of IRs:

i. Awareness and knowledge of IRs by lecturers

1. Are you familiar with the term "Institutional Repository"?

a. Completely unfamiliar—I have never heard of this term before .

b. I have come across this concept but know nothing about it .

c. I have come across this concept and know a little about it.

d. I have come across this concept and know quite a bit about it.

e. I am very knowledgeable about institutional repository.

2. Are you aware of the aims of IR?

     a. Completely unfamiliar

     b. I know little about it.

     c. I know quite a bit about it.

     e. I am very knowledgeable about the aims of institutional repository

3.   Do you know the advantages of IR?

     a. Completely unfamiliar

     b. I know little about it.

     c. I know quite a bit about it.

     e. I am very knowledgeable about the aims of institutional repository

4. Please indicate your level of awareness on IRs on the statement below

	Statement	SA		A	D	SD
	I am aware of the existence of my university IRs					
	I am aware of the benefits of IRs					
	I am aware of the content of my university IRs					
	I am aware of my university IRs policy					
	I am aware of the publishers' policy on open access					
	How did you originally learn about IRs?					
	I read about institutional repository					
	From information provided by other institutions					
	Information about IR through my colleagues influenced my awareness					
	The IRs awareness programmes on mass media					
	My Departmental meetings consistently remind me					
	Our university library presentations on IRs					
	The university's workshops on the importance of IR in scholarly communication.					
	Librarians in my institution brought to my attention Institutional Repository publishing initiatives					
	I have not heard about it					

Others (please specify) …………

5. How can you rate your level of awareness about IR? Please tick the appropriate
   (i)   Not adequate   [ ]
   (ii) Barely adequate   [ ]
   (iii) Averagely adequate   [ ]
   (iv) Highly adequate   [ ]

ii. Lecturers attitude towards IR

6. Bearing in mind that institutional repository is a system that engages in the capturing, management, preservation and dissemination of an institution's intellectual outputs (including pre-print: thesis and dissertations and post print e.g published articles), in an electronic format,

A. Would you consider having a copy of your article(s) previously published in a subscription-based journal deposited in the IR?

 a. Yes, I will   b. Not sure/maybe

c. No, that will breach the copyright of the journal's publisher

7. Would you like to have your pre-published research outputs (e.g thesis)

or articles deposited in the repository for free access by internet users?

a. Yes, I will

b. Not sure/maybe.

c. No

Give reason for your answer…..

8. If the establishment develops an IR and mandates you to deposit copies of your articles in it to be made freely accessible to internet users via Open Access, what would be your reaction?

a. I will comply willingly b. I will reluctantly comply   c. I will not comply

Kindly give reason(s) for your answer …..

9. Have you ever uploaded your academic work in your university's IR? a. Yes b. No

10. In the past 3 years how many times have you deposited full copies of your research work in IR? _____

11.   Do you think   there   should be   a   national policy explicitly directing/supporting the development of IRs in universities across Nigeria?

a. Yes b. No c. Don't know

12. When you deposit a research work in an IRs, who do you think should retain its copyright?

a. Myself

b. The institutions that owns the repository

c. Don't know

Please rate the extent to which you agree with each issue statement ticking (√)   whichever applies: (Strongly   agreed = SA; Agreed = A ; Disagreed = D; Strongly Disagreed = SD)

Statement	SA	A	D	SD
a. Lecturers are yet to come to full consensus regarding the establishment of IR.				
b. Lecturers are reluctant to submit their work in IR				
c.There is lack of awareness of institutional repositories among researchers and lecturers.				
d.There is lack of advocacy on IRs.				
e. There is infrastructural problem.				
f.Technical Support is a challenge				
i.There is security issue				
j.Technophobia is a limitation.				
k. There is limited bandwidth.				
l. Ther is difficulty in digitising some of the materials.				
m.There is inadequate users' education.				
Inadequate funding is affecting IR sustenance.				
o.The cost for the IRs program cannot be reliably estimated.				
p.Cataloging (Metadata Creation) is sometimes uncertain.				
q.Submission process is not certain				
r. Withdrawal services are issues.				
s. Access Control and Rights Management: to restrict access to the information when open access is premature or not desirable, is not certain.				

Statement				
t. Administrative services e.g. workflow is challenging,				

Please specify other issues related to IRs in your university which could be of interest to share with others :…………………..

b. Benefits of institutional repository

Please indicate the extent to which you agree or disagree with the following statements by ticking (√) whichever applies:
(Strongly agreed = SA; Agreed = A ; Disagreed = D; Strongly Disagreed = SD)

Statement	SA	A	D	SD
The establishment of an IRs for my university is very important				
The establishment of an IR by my university will				
a. enhance the global reputation of my university				
b. enhance my reputation as a member of the university community				
c.make research publications more visible and widely accessible				
d.motivate me to publish more research work to be deposited at the repository.				
e. benefit researchers and academics in Nigeria immensely				
f. bring about better services to my university learning community				
g. bring about better services to contributors.				
h. bring about new services to learning communities beyond my institution.				
i.ensure preservation and maintenance control over my institution's intellectual property.				
j. capture the intellectual capital of my university.				
k. contribute to the reform of the entire enterprise of scholarly communication and publishing				
l. bring a reduction in the amount of time between discovery and dissemination of research findings to scholarly communities.				
m. creates marketing opportunities.				

Statement				
n. expose my university's intellectual output to researchers around the world, who would not otherwise have access to it through traditional channels.				
o. bring about societal development				

Please specify other benefits of institutional repository…..

C. External factors affecting institutional repository

There are external challenges associated with institutional repository (IR)establishment that need to be addressed. Please rate the extent to which you agree with each issue statement by circling whichever applies:
 (Strongly agreed = SA; Agreed = A ; Disagreed = D; Strongly Disagreed = SD)

Statement	SA	A	D	SD
Copyright and intellectual property are concern for researchers.				
Technological changes is a problem				
Software adoption is an issue				
There is infrastructural problem.				
There is a great deal of uncertainty about preserving e-prints in IRs.				
Technical support is a challenge				
There is security issue				
Content management is a problem.				
Deposit and withdrawal services are issues.				
Access Control and Rights Management to restrict access to the information when open access is premature or not desirable is not certain.				
Policy development specific to IRs is yet to be established.				
Who should lead (Libraries or facaulties) in the establishment of IR is an issue				

Please specify other issues related to IRs in your university which could be of interest to share with others…

D. **The sustenance of Institutional Repository (IR)**

Which of the following structures do you agree should be adoptedfor the sustenance of Institutional Repositories in your University? Please rate the extent to which you agree with each statement. (Strongly agreed = SA; Agreed = A; Disagreed = D; Strongly Disagreed = SD)

Statement	SA	A	D	SD
Creation structures				
1. The management in our university has a strategic plan for running a successful IR.				
2. The management of our library formulated and executed policy for sustaining the IR.				
3. The lecturers are given periodic/regular training on the use of IR in our university.				
4. The stakeholders are given periodic workshops/training on the need and use of IR in our university.				
5. The management of our library creates regular awareness of IR through Flyers and brochures.				
6. The management of our library creates regular awareness of IR through the social media.				
Maintenance structures				
7. The management in our university has a budget for IR				
8. The management in our university has a specific revenue allocation for IR				
9. The management of our library built the IR on open source software.				
10. The management in our university has given lecturers a mandate to submit their works to the IR.				
11. The management of our library regularly present issues in the running of IR at the faculty.				
Adaptation structures				
12. The lecturers are given periodic/regular training on their rights in relation to their intellectual output.				
13. The lecturers are well informed on the subject of IR on Universities' websites				
14. The lecturers are given institution-specific participation incentives for contributors.				
15. The lecturers are well informed on the benefit of IR				

E. Suggestions to resolve issues in the sustenance of Institutional Repository (IR)
Which of the following ways do you agree should be used to resolveissues in the sustenance of Institutional Repositories in your University? Please rate the extent to which you agree with each statement. (Strongly agreed = SA; Agreed = A; Disagreed = D; Strongly Disagreed = SD)

Statement	SA	A	D	SD
Awareness through seminar.				
Awareness through workshops/training for stakeholders.				
Awareness through Flyers and brochures.				
Awareness through mass media.				
Advocacy through interpersonal communication				
Advocacy through brief lectures,(emphasizing benefits).				
IR presentations at facaulties				
Libraries newsletters				
Publicity on Universities' websites				
Institution-specific participation incentives for contributors.				
As regards copyright issues, authors should be educated on their rights in relation to their intellectual output.				
The development of a policy specific to IRs is necessary.				
Institutional repository success is dependent upon mandates (given to researchers to submit their works).				
Institutional repositories should be built on open source software.				
Institutional repositories should be built on alternatives available e.g proprietary software.				
Libraries to lead in IR				
There should be specific revenue allocation for IR				
Strategic planning is inevitable for a successful implementation of IR				

Please specify other ways to resolve issues inthe sustenance of IRs.

Thank you for filling this questionnaire.

QUESTIONNAIRE FOR DIGITISATION STAFF ON INSTITUTIONAL REPOSITORY ACTIVITES

Dear Respondent,

I am a PhD student in the Department of Library, Archival and Information Studies (LARIS), University of Ibadan.

This questionnaire is designed to elicit information that is purely for research purpose.

Kindly assist in answering the questions objectively. Your confidentiality will be ensured.

Thank you.

Mrs. Okoroma, F. N.

(A.)   DEMOGRAPHIC INFORMATION
Please complete the spaces where necessary an tick (√) where applicable.

1. Name of University:_____

2. Name of Faculty:

3. Gender: Male ( )   Female   ( )

4. Sex: Male ( ) Female ( )

5. Age: a.20-30 ( ) 31-40 ( ) b.41-50 ( ) c.51-60 ( ) d. 61 and above ( )

6. Highest Educational Qualification:

(a) HND ( ) (b) First Degree ( ) (c) Master degree( ) (d) PhD ( )

(e) Others (Please specify) …….

7. What is your designation in your university? ……………………………..

(B.)Institutional Repository activities/challenges

1. Which year did your University start the process of Institutional Repository ------------
2. Have you completed the process? A. yes b. no

3. If yes to question 2, when did your institution eventually accomplished the process of Institutional Repository? ---
4. What is the total number of the collection already digitised? ----------
5. What is the total number of your university collection? ----------
6.   Is the repository accessible to users? A yes b no

7. How are you funding the project, tick as many as applicable?
   (a) Government (b) Philanthropic Organisations (c) in-house

(b) others please specify…..

8. Do you have a policy for digitising your collections? a.Yes b. No

9. If "no" to question 8, do you plan to develop such a policy? a. Yes b. No

10. If "yes" to question 8, what is the timescale for the digitisation programme?

11. What are the criteria for selection of materials for digitisation? (Please tick as many as apply).

(a) The academic importance of the intellectual property

(b) The need to preserve the intellectual property

(c) The need to save space

(d) historical value

(e) Cultural values of the intellectual property

(f) The need for increased access to the intellectual property

(g) Provide document delivery services

(h) Research into digital processes

Others (please specify)

12. What constitutes the material content in your IR? (e.g thesis, inaugural, lectures etc)

Could you please identify the challenges you faced or is facing in the digitisation process? Please tick as many as applicable.

A. awareness

B. faculty and researchers reluctance to submit manuscript

C. submission process

C copyright issues

D. Erratic power supply

E Bandwidth

D software used

E inadequate fund for the implementation/management of IRs

F Preservation issue

G advocacy

H contents issue

13.What other factors do you think are affecting the sustenance of IRs in Nigeria and globally?

14. Digitisation activities: process and procedure

Equipment for digitisation

What are the equipments used for your digitisation? (Please tick as many as apply)

(a) Scanner
(b) Desktop Computer (Server and storage)
(c) Digital Camera
(d) Printer
(e) CD-Rom
(f) UPS
(g) Others (please specify)

15. Format of digitised materials

1. Which resolutions are used for digitisation
2. Digital image formats used   a. black and white   b. grey level   c. colour
3. File format obtained TIFF   GIF   PAL   other (specify)
4. Which compression methods are used. Specify
5. File size obtained for compression   Kbytes/Mbytes
6. Average compression rate by mage types: black/white grey colour
7. Image.processing software used
8. Others (please specify)

16. Standards on digitisation preservation

What are your guiding standards in digitisation? Please tick all that apply

(a) Digital documents generation (word processing)
(b) Database management
(c) Electronic communication
(d) Imaging software
(e) Audio recording software
(f) Web development language
(g) Web site development software
(h) Others (please specify)

17. Cost of digitisation

How would you consider the cost of your University's Institutional Repository?

 (a) Low   (   ) (b) moderate (   ) (c) High (   ) (d) very high (   )

Thank you for filling this questionnaire.

APPENDIX C

INTERVIEW GUIDE ON INSTITUTIONAL REPOSITORIES SUSTENANCEAND ISSUES, FOR UNIVERSITY LIBRARIANS / HEADS OF DIGITISATION UNITS

A. DEMOGRAPHIC INFORMATION

1. What is the name of your University?

2. What is your designation in your university?

B. Institutional Repository activities/ structures for IR sustenance

1. When was your University's IR set up?
2. Do you have IR planning/ implementation committee?
3. Which method did you adopt for the implementation of your IR? (in-house, contractors, or both)
4. Do you have a policy for digitizing your collections? a.Yes   b. No
5. If "no" to question 2, do you plan to develop such a policy? a. Yes   b. No
6. If "yes" to question 2, what is your IR policy?
   E.g., concerning: submission (mandatory, academics personal archival or by digital staff), content, data type, and preservation
7. What is the attitude of academics towards the depositing of their publications into your university IR?
8. Is depositing of publicationsby academics mandatory?
9. Do librarians/ staff assist the academics in archiving their scholarly works?
10. What type of materials is deposited in your IR?

11. What are the major challenges you encounter in recruiting content for your IR?

12. What was your first consideration in the implementation process?
13. Please list other considerations:

14. What are the steps/strategies taken in the implementation of your institution's IR?
15. Digitisation is a core aspect of IR, what was your approach in the digitisation process (eg in-house or contracted)

16. Which type of software are you using:
17. Please give reasons for your choice of software:
18. Briefly describe your digitisation process/procedure
19. Briefly narrate the digitisation workflow
20. Please highlight the technological challenging that are or can hinder IR sustenance
21. Could you please identify the challenges you faced or is facing in the digitisation process?
22. What other factors do you think are affecting the establishment and sustenance of IRs in Nigeria and globally?
23. What do you consider are the necessary requirements for the sustenance of IRs?
24. How are you or your plans to achieve a sustainable IR? e.g. adaptation to: technological changes, dynamic users, maintenance and ever increasing literature for the IR.

25. From your experience, what are the cost implications of IR? a. high b. low, c. moderate. Please give reasons for your answer.
26. How do you raise fund for your IR sustenance?
27. Do you have adequate funding of your IR?
28. If no please how do you intend to raise more fund?
29. Which type/quantity of human resources is needed for the implementation?
30. How were you able to get that quality/ quantity of staff
31. Please kindly identify what it takes in terms of infrastructure (Including IT facilities) to achieve a successful working IR.
32. What is the faculty/researchers' attitude towards submitting their works?

33. Please highlight how you were able to deal with the following issues:
    A awareness/advocacy issue
    B Academic/researchers reluctance to submit manuscript
    C submission process
    D copyright
    E electricity power supply
    F bandwidth
    G software used
    H hardware requirement
    I fund for implementation/management of IR
    J preservation
    K contents
    Ldigitisation policy

34. What constitute the material content of your IR?
35. What services are core to the repository program,

36. who may contribute to the repository;

37. How do you handle the issue of:

-preservation and migration/rights management

- cataloging (Metadata Creation)?

38. What are the criteria for the selection of materials for digitisation?
(a) The academic importance of the intellectual property
(b) The need to preserve the intellectual property of the university
(c) The need to save space
(d) The historical value
(e) Cultural values of the intellectual property
(f) The need for increased access to the intellectual property
(g) Provide document delivery services
(h) Research into digital processes

Others (please specify)

39. How would you consider the cost of your University's Institutional Repository?
40. What do you estimate is the cost of your University's Institutional Repository implementation? (consider cost of equipment, personnel, training and administrative expenses)
41. Any problem encountered during digitisation planning and processed?
42. How do you handle copyright issues?

43. How were the problems resolved?

General Comment: please feel free to give any suggestion.

Thank you very much.

APPENDIX D

OBSERVATION CHECK LIST FOR IR APPRAISAL

To appraise each university IR sampled in this research, the following will be observed.

1. Functionality of IR

2. Material content of the IR

3. Size of the content

4. Software used

5. IR Policy – submission process/ procedure, type of content and other related issues