Empirical Evidence of the Practice of Institutional Repository in Nigeria

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ABSTRACT

Institutional Repositories (IRs) are deployed mainly to create global visibility for scholarly output of institution which in return increase the recognition and prestige of the institution. The objectives of this paper are; to provide statistical indicators and identify technical challenges face by practice of IRs in Nigeria. The paper used quantitative exploratory research design to analyse and describe the practice of IRs in Nigeria. It highlighted the number of IRs registered with Directory of Open Access Repository (OpenDOAR) and Registry of Open Access Repositories (ROAR) in Nigeria. Statistical analysis of the content of each repository, types and the currency of the information resources were also provided. Functionality of the IRs was assessed through an investigatory study of the identified IRs web sites (URLs). The implications of the findings were assessed according to the web performance of the universities. Findings indicated that there are twenty-five (25) IRs online from Nigeria. Twenty-three (23) IRs were registered on both OpenDOAR and ROAR. Sixteen (16) IRs out of the twenty-five (25) were found active. Theses and dissertations, journal articles, conference and seminar papers formed the major types of information resources deposited on the repositories. University of Nigeria Nsukka, Covenant University and Ahmadu Bello University have the highest deposit. The web performance of the universities was found below expectation. Implementation of policy mandate, retraining and advocacy of IRs were among the main recommendations.

Keywords: IRs practice; Intellectual output; Open Access; IRs in Nigeria.

INTRODUCTION

This Open Access Movement (OAM) is a deliberate plan to curtail the high-cost of publication in the global research community. To achieve this target, OAM developed two main strategies; Green (OA) and Golden (OA) which means self-archiving of the research findings and open access publishing of the journal articles respectively. Institutional Repository (IR) is one of the common platforms used for green (OA) (J. Zhong & Jian, 2016). IR is part of the innovative method of knowledge management that focuses on preserving, disseminating and providing free access to intellectual output produced by faculty, research staff and students of a specific institution (Leila & Mina, 2018).

IR become part of the technical infrastructure of the research institutions, libraries and information centers in developed counties since 2002(Abrizah, Noorhidawati, & Kiran, 2010). With software like Dspace, ePrint, Greenstone, Fedora etc. IRs Provide web-based platform for sharing and facilitating free access to scholarly information (Shoeb, 2009).

As time goes on, IRs became more sophisticated and complex, the content of IR was revived to include different types of formats and accommodate wide range of information resources such as; theses and dissertations, journal articles, conference proceedings, books chapters, technical reports, seminar and conference presentations, working papers, data sets, software, archived documents, open courseware, course contents, multimedia, original arts, radio and TV interviews, gray literature, posters and other learning and teaching resources(Cho, 2018; Crow, 2002; Genoni, 2004; Genoni & Liauw, 2017; Leila & Mina, 2018;McDowell, 2007; Oguche, 2018; Repanovici, 2011; Sittek & Bertelmann, 2014; J. Zhong & Jiang, 2016) .

Nowadays, IRs have become a new paradigm shift in scholarly communication that increases the visibility and add more prestige to the institution as well as curtail the barriers of access to scholarly information. In addition, the driven benefits of IRs can be summarized in two categories; open access to scholarly publication and long-term preservation of the scholarly content (Leila & Mina, 2018).

Despite the promising potential of IRs for improving scholarly communication and increasing the visibility of institution, the innovation is not yet widely spread, accepted and practiced in developing counties (Abrizah etal., 2010) especially in Africa (Oladokun, 2015). The statistics on growth of IRs can be clearly track on project like the "Directory of Open Access Repositories (OpenDOAR)". Presently, Europe is having the highest proportion of the repositories by region 47% with 1,769 established repositories, followed by Americas 27 % with 1016 repositories. Asia 19% with 722 repositories Africa 4% with 165 repositories Oceania 3% with 104 repositories, making total number of 3,776 repositories on OpenDOAR (OpenDOAR, 2018). In comparison with Europe, America and Asia, the practice of IRs is very low in Africa.
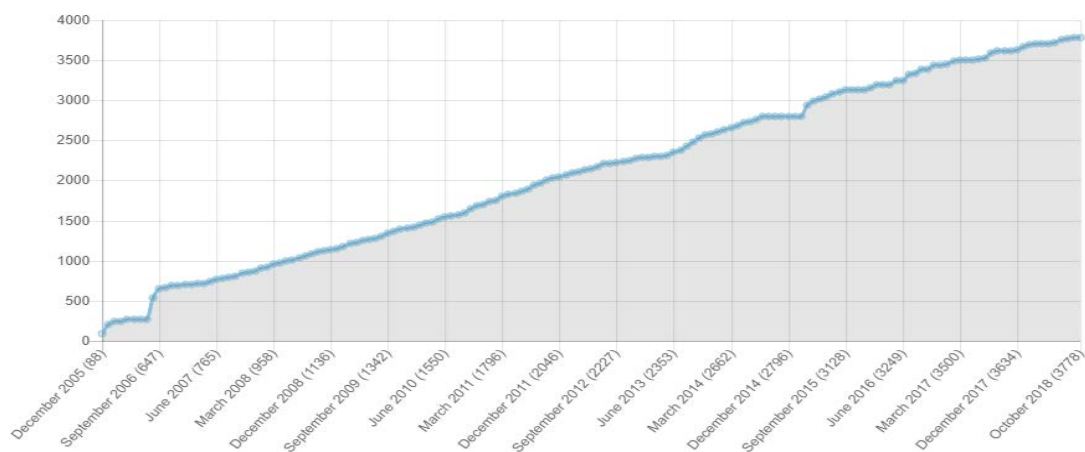
Figure 1: Growth of IRs World Wide. Source: OpenDOAR, 2018

In Nigeria, the practice of IRs started with a call from International Workshop titled Open Access Repositories: New Model for Scholarly Communications held in Ahmadu Bello University Zaria, 2008. Scholars were enlightened on the driven benefits of IRs and were motivated toward implementation of IRs for managing, sharing and preserving the scholarly output of their institutions (Bozimo, 2008). University of Jos led the trend by deploying IR as a pioneer in 2009. Although, researches on IRs in Nigeria confirmed that IRs are not commonly known by number of scholars and practice of IRs was hindered by many obstacles since inception (Eke, 2011; Ezema, 2010, 2013; Ifijeh, Adebayo, Izuagbe, & Olawoyin, 2018; Mohammed, 2013; Ogbomo & Mukebe, 2015; Oguche, 2018; Oye, Oyeniyi, &Mahan, 2017) , but from 2009 to date, Nigeria has accumulative number of twenty-one (21) registered IRs practice by sixteen (16) organizations as the statistics shown on Directory of Open Access Repositories site, 4th October, 2018.
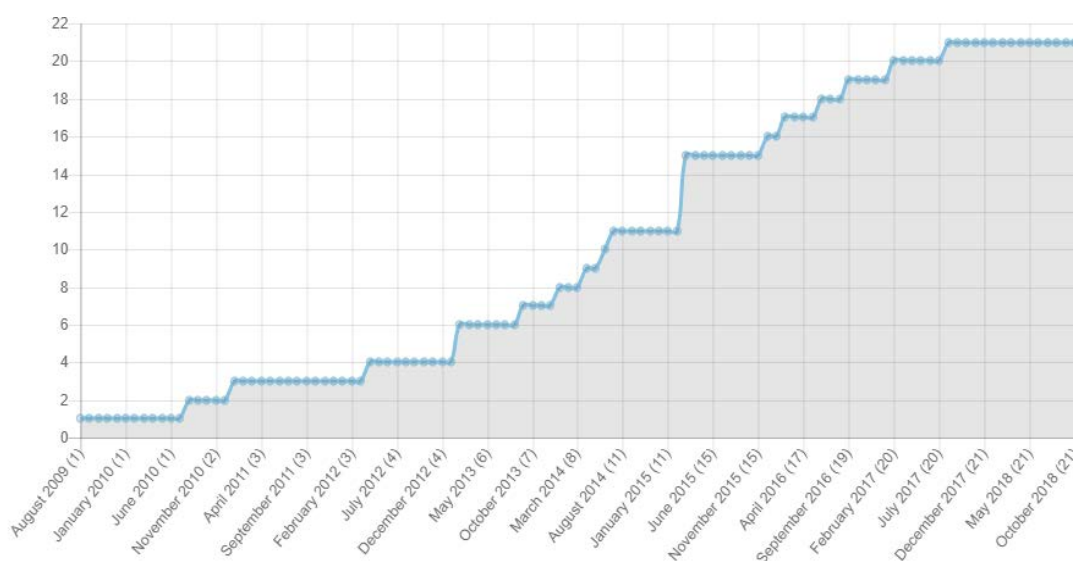

Figure 2: Growth of IRs in Nigeria. Source: OpenDOAR, 2018

After almost ten years of development, it is time to have a closer view of the performance indicators and impact of IRs in Nigeria. Although there are studies published on the state of IRs in Nigeria (Ifijeh et al., 2018; Ogbomo & Muokebe, 2015; Oguche, 2018; Oye et al., 2017) , accessibility, preservation and challenges of IRs in Nigeria(Ezema, 2013; Gbaje & Mohammed, 2017; Mohammed, 2013) . But this study is an attempt to provide comprehensive analysis on repository systems and performance, statistical indicators of deposit on the repository and relate all these to the provision of impact on the university ranking on the ranking web of universities.

Authoritative Web Sites Used for the Study

➢ Directory of Open Access Repositories (Open DOAR) is a worldwide authoritative directory of open access repositories hosted by the University of Nottingham in United Kingdom in the year 2006 (OpenDOAR 2018).

➢ Registry of Open Access Repositories (ROAR) is "a searchable international database indexing the creation, location and growth of open access institutional repositories and their contents. ROAR was created by EPrints at University of Southampton, UK, in 2003. It began as the Institutional Archives Registry and was renamed Registry of Open Access Repositories in 2006".

➢ Registry of Open Access Repository Mandates and Policies (ROARMAP) "is a searchable international registry charting the growth of open access mandates and policies adopted by universities, research institutions and research funders that require or request their researchers to provide open access to their peer-reviewed research article output by depositing it in an open access repository" (ROARMAP, 2018).

➢ Webometrics Ranking of World Universities (WRWU) is "an initiative of Cybermetrics Lab; a research group belonging to the Consejo Superior de Investigaciones Científicas (CSIC), the largest public research body in Spain. CSIC is also among the first basic research organizations in Europe.
The Cybermetrics Lab, part of the CSIC, is devoted to the quantitative analysis of the Internet and Web contents specially those related to the processes of generation and scholarly communication of scientific knowledge." (WRWU, 2018). .

LITERATURE REVIEW

The emergence of IRs has grabbed the attention of literature worldwide, both from developed and developing nations.

Institutional Repositories in Europe, America, Australia and Canada

Reported that 40% of the universities in the United States have started the practice of IRs, and 88% of those that have not yet started are in the ongoing planning for the practice and predicted that IRs will presume as an essential infrastructure for scholarship in the modern world. In another study Van Westrienen and Lynch (2005) reported the state of the deployment of IRs in Australia, Canada, the United States and ten European countries namely; Belgium, France, the United Kingdom, Denmark, Norway, Sweden, Finland, Germany, Italy and the Netherlands. Despite fact that the study was at initial face of the adoption of IRs in the developed world, they discovered that Germany, Norway and Netherlands have 100% deployment of IRs by universities, with average number of 12,500 objects per IRs across humanities and social sciences, life sciences, natural sciences, engineering, performing arts disciplines. They also find Dspace, ePrint, OPUS, Vergina, Fedora, DIVA and other locally developed content management software in use. Chantavaridou (2009) reported that many institutions created IR using two major software namely; DSpace and CDS Invenio. The study also reported that copyright issue is one of the major challenges in the success of IR in Greece at as 2009.

From Central Europe, Koler-Povh, Mokoš and Turk (2014) described the stages conceded while developing IR in view of technical infrastructure, personnel, collaboration among librarian, expert, academics and management.   They further found out that, these are the major information resources deposited on Digital Repository of the University of Ljubljana, Slovenia. Another result from the study of 137 IRs in Latin America showed index ratio of IRs from Latin America is very low in google and apparently missing in Google Scholar (Orduña-Malea & Delgado López-Cózar, 2015).   In his article titled: "Repositories at master's institutions: A census and analysis", Henry and Neville (2017) of University of South Florida St Petersburg, USA stated about 20 % of the colleges and universities have academic research, student scholarly output and other university records as main types of digital objects in their repositories.

Serrano-Vicente, Melero, and Abadal (2018)   conducted survey on 66 institutions in Spain, the researchers selected repositories' managers as respondent from each institution. The findings of the survey were among others; 65 % of repositories allowed import and export of data and large-scale metadata from other universities, use of altimetric is widely spread, deposit is being done by authors and librarians regularly, more than 80% of the content are full text, individual training, manuals and page help formed the major promotion tools and concluded that, management of the institutions encourage open access among researchers.

Institutional Repositories in Asia

Although studies on IRs in Asian state that IRs are not very common in some countries from the initial stage (Chen & Hsiang, 2009), but Lee (2008); Murakami and Adachi (2006) reported that number of IRs in Japan and Korean universities are increasing very fast. Fernandez (2006) related lack of infrastructure to the slow growth of IRs in India. C. Zhong (2009) also acknowledged the lack of awareness among potential contributors and lack of government policies on institutional repository implementation in China. From other perspectives, Kiran and Chia (2009) reported that the content of IRs in Malaysia is low even within the top ranked institutions and concluded that "Malaysia has a long way to go, although the beginning is promising, and it is hoped by that the user perspective may be a contributing factor to the establishment of open access initiatives".

In their article titled; "the landscape of open access institutional repositories in the Asian continent: a 2010 census" Abrizah et al. (2010) presented a comprehensive study on the state of IRs in Asian. Their findings revealed that only "48 out of 400 of Asian IRs are visible and incorporate good practices in their web". They concluded with the expression of discouragement over the growth of IR in Asia. However, Lee-Hwa, Abrizah, and Noorhidawati (2013) Employed web analysis to report the status of IRs in the "Association of South East Asian Nations (ASEAN)" in terms of content, types, subject and language. The study used OpenDOAR / ROAR to describe the contents and "Ranking Web of World Repositories (RWWR)" to reports the web performance and analyse the availability and worldwide visibility of the repositories. The Findings show that, there are total number of 61 IRs in ASEAN. Indonesia, Malaysia and Thailand have the highest deposit respectively. Only 33 IRs are visible worldwide. The study recommends that,

effort should be intensified to enhance the visibility and embrace good practices in web publication.

From other hand, scholars identified technical difficulties as an obstacle in the practice of IRs and call for personnel training in building IRs across Asia (Jiagui, 2013; C. Zhong, 2009; J. Zhong & Jiang, 2016). Cho (2017) examined the establishment of open access in Asian countries. the author used investigative analysis to study the functionality of IRs and their influence on the web through OpenDOAR and bibliometric ranking of web of repositories. The result showed that; even though government support the implementation, but functionality of IRs is very low in many Asian countries. The study also revealed that, the prospect of open access through IRs in "Japan, Korea, India, Taiwan, Indonesia, China, Turkey, and Malaysia" seemed to be relatively more feasible than in other countries in Asia.

Seo (2018) use Directory of Open Access Journal (DOAJ) and Directories of Open Access Repositories (OpenDOAR) to investigate the "open access journal services platforms in Asian countries". The investigation reported that, Indonesia has the highest number of open access journals while Japan come as third country with the highest number of IRs. XML services is widespread in Korea than any other Asian Country. The study suggest collaboration between Asian countries as a way forward for the development of effective infrastructure for good practice of open access.

Institutional Repositories in Africa

Despite having number of challenges, literature has recorded evidences of progress in the deployment of IRs in Africa. From the early stage, ENREF 5 a study by Christian (2008) indicated the presence of twenty (20) IRs in Africa. A year later Kakai (2009) reported that there are twenty- three (23) IRs visible from eight countries in the African continent. While acknowledging the impact of IRs on research output from African universities Chisenga (2006) anticipated a lot of opportunities for universities in Africa from IRs projects. Research output from African universities become visible in the global research community with much appreciation to the practice of IRs (Baro, Tralagba, & Ebiagbe, 2018).

In terms of implementation of IRs in Africa, the literature traced the history back to 2000 where the first IR developed by The University of Pretoria, South Africa (Abrahams, Burke, & Mouton, 2010; Bangani, 2018; Van Wyk & Mostert, 2014). Nyambi and Maynard (2012) reported that Solusi University established the first IR in Zimbabwe in year 2001. Namaganda (2012) acknowledged the establishment of IR in 2006 and confirmed the existence of IRs at Martyrs University, Aga Khan University and Makerere University, Uganda.

Nowadays, librarians in African universities are fully aware and use IRs for self-shelving of their publication. Recently, study on "Knowledge and use of self-archiving options among academic librarians working in universities in Africa" by Baro et al. (2018) investigated 455 academic librarians in 52 universities in Africa. The study revealed that more than half of librarians working in African universities use IRs for self-archiving while others indicated that there is dedicated librarian for uploading papers in their

libraries. The study further discovered that a big number of librarians show interest to use self-archive option if is mandated by the institution.

Just like from the Asian continent, several studies lamented reason behind the low implementation of IRs in Africa (Chisenga, 2006; Nyambi & Maynard, 2012; Van Wyk & Mostert, 2014). Moahi (2010) identified policy issues, skills and resources part of the challenges of IRs in Africa. Dlamini and Snyman (2017) identified inadequate funding, lack of support from institutional management and lack of awareness of IRs at institutional management level as main obstacles facing the practice of IRs in Africa.

Institutional Repositories in Nigeria

Even though there is notable progress in the practice of IRs but literature on IRs in Nigeria is always related to restating challenges or enunciating problems. The process of digitizing theses and dissertations started years before the adoption of IRs in Nigeria. Musa, Musa, and Aliyu (2014) reported that the project of digitization of theses and dissertations started July 2005 at Ahmadu Bello University, Zaria, Nigeria using Database of African Theses and dissertations (DATAD) to upload abstracts online for archival purposes. In 2009 first IR was established by the University of Jos. From then the flows of the trend continue.

Several studies acknowledged the adoption of IRs in Nigeria. (Eke, 2011; Ezema, 2011; Mohammed, 2013; Musa et al., 2014; Ogbomo & Muokebe, 2015a; Ridwan, 2015). Universities adopting IRs to increase their visibility, reduce the cost of publication, facilitate access, preserve and showcase their intellectual out to the global community. (Abbas, 2016; Gbaje & Mohammed, 2017; Oye et al., 2017; Ukwoma & Dike, 2017). Okojie (2008), and Okoye and Ejikeme (2011) recognize the role of IRs in disseminating research findings in Nigerian universities.

Scholars attribute slow in the practice of IRs in Nigeria to various issues; Chiware, Okoye and Ejikeme (2011) observed that despite the numerous benefits of IRs researchers are not publishing their findings on IRs in Nigerian due to "lack of awareness and skills required in the use of the repository". This is also the problem that discourages many institutions to establish their IRs. According to Harnad (2009) the issue of mandate from the authorities of the institutions involved is very crucial for the success of IR in Nigeria. "This is because it has been observed that many authors are often reluctant in publishing their works in institutional repositories because of fear of breaching copyrights laws" (Oguche, 2018). Christian (2008) relate the low adoption of IRs to inadequate knowledge among the major stakeholders of IR in Nigeria including faculty, research staff, librarians and students. Mohammed (2013) sees the issue from internet connection stating that; despite the high cost of internet connectivity in Nigeria, internet bandwidth remains inadequate for running IRs in Nigerian universities. Studies incessantly identified lack of funding from government and institutions as stumbling block to the implementation of IRs in Nigeria (Christian, 2008; Oguche, 2018; Ridwan, 2015) another impediment is power supply; universities are beset by unstable power supply which hinders not only the practice of IRs but development of ICT in Nigeria (Fatunde, 2008; Oguche, 2018).

OBJECTIVES

After almost ten years of the practice of IRs in Nigeria. It is necessary to know the empirical evidence of the practice, performance, impact and implications of this practice. IRs are deployed mainly to create global visibility for scholarly output of institution which in return increase the recognition and prestige of the institution. Therefore, it is expected that the practice of IRs in Nigerian universities will have reach to some extent and have impact and implications on their institutions.

This study is posed to analyse the current statistical indicators for the practice of IRs in Nigeria and describe their performance. In a specific term the study has following objectives:
a)   To provide the current statistical indicators for the practice of IRs in Nigeria.
The statistical indicators here include; number of registered repositories, deposit by each repository and total deposit by all repositories.
b)   To provide content analysis of the IRs in Nigeria.
Content analysis include; types, number and currency of content.
c)   To explore the technical and operational challenges as well as policy adopted by IRs in Nigeria. These include types of software uses by the repositories, functionality of the links, IRs web design and the status of the policy.

METHODS

The study adopted quantitative exploratory research design to analyse and describe the practice of IRs in Nigeria. Data for this study were collected from the followings;
- Analysis of registered repositories on the "Directory of Open Access Repository (OpenDOAR)" Database from Nigeria.
- Search enquiry for registered repositories on Registry of Open Access Repositories (ROAR) and The Registry of Open Access Repository Mandates and Policies (ROARMAP) database from Nigeria.
- An investigatory study into the identified IRs web sites; monitoring the functionality of the URLs. The evaluation of the usability and the design of the site was carried out using; 1. Functionality test; 2. Content Analysis; 3. Identification of mode of access and policy adopted; 4. Evaluation of usability and design of the site criteria. These criteria help to give us a more complete picture of the status of IR in Nigeria.
- Enquiry on the list of universities on Webometrics Ranking of World Universities (WRWU) site.

The data collected were verified to ensure they are still relevant. The data also validated through literature and contact to some of librarians working on IRs in the identified libraries. The URLS were thoroughly checked, tested and individually monitored to testify their functionality. The processes of data collection, test and analysis were conducted in three months (August, September & October 2018).

FINDINGS

The findings of this study were treated under the aforementioned objectives:

The current statistical indicators for the practice of IRs in Nigeria

Table 1: Number of registered repositories on OpenDOAR and their status

SN	Organization	University Web (URL)	SN	Name of the Repository	Repository Web (URL)	Remarks
1	Afe Babalola University	http://abuad.edu.ng/	1	Afe Babalola University Repository	http://eprints.abuad.edu.ng/	Working not 24hrs service
2	Ahmadu Bello University	http://www.abu.edu.ng/	2	ABU Zaria Research Publications	http://www.abu.edu.ng/pages/researchworks.php?pageNum_rsPaperSearch=422&totalRows_rsPaperSearch=8449/	Not Functioning
			3	Ahmadu Bello University Institutional Digital Repository (OpenAIR@ABU)	http://kubanni.abu.edu.ng/jspui/	Working Not 24 hrs Service
3	American University of Nigeria	http://www.aun.edu.ng/	4	American University of Nigeria (AUN) Digital Repository	http://digitallibrary.aun.edu.ng:8080/xmlui/	Working 24 hrs Service
4	Covenant University	http://www.covenantuniversity.edu.ng/	5	Covenant University Electronic Theses and Dissertation Repository	http://www.covenantuniversity.edu.ng/~/clr_cu/library/readonline/docsExplorer/#	Working 24 hrs Service 10 PhD Dissertations
			6	Covenant University Repository	http://eprints.covenantuniversity.edu.ng/	Working 24 hrs Service
			7	Theses & Dissertations	http://theses.covenantuniversity.edu.ng/	Not Functioning
5	Ebonyi State University, Abakaliki	https://ebsu.edu.ng/	8	Ebonyi State University Institutional Repository	http://ir.ebsu.edu.ng:8080/	Not Functioning
6	Federal University Lokoja	http://www.fulokoja.edu.ng/	9	Federal University Lokoja Institutional Repository	http://repository.fulokoja.edu.ng/	Not Functioning
7	Federal University Ndufu-Alike Ikwo	http://www.funai.edu.ng/	10	dspace.funai.edu.ng	http://dspace.funai.edu.ng/	duplicate
			11	Federal University Ndufu-Alike Ikwo Repository Archive	http://dspace.funai.edu.ng/xmlui/	Not Functioning
8	Federal University of Technology, Minna	http://www.futminna.edu.ng/	12	Federal University of Technology, Minna Institutional Repository	http://dspace.futminna.edu.ng/jspui/	Working 24 hrs Service
9	Federal University of Technology, Akure	http://futa.edu.ng/futacms/	13	Institutional Repository of the Federal University of Technology	http://dspace.futa.edu.ng:8080/jspui/	Not Functioning
10	Federal University Oye Ekiti	http://loadedmovies.com/	14	Federal University Oye Ekiti Repository	http://www.repository.fuoye.edu.ng/	duplicate

11	Federal University Oye Ekiti -	http://fuoye.edu.ng/	15	Federal University Oye-Ekiti Institutional Repository	http://repository.fuoye.edu.ng/	Working 24 hrs Service
12	Landmark University	http://lmu.edu.ng/	16	Landmark University Repository	http://eprints.lmu.edu.ng/	Working 24 hrs Service
13	University of Jos	http://www.unijos.edu.ng/	17	University of Jos Institutional Repository	http://irepos.unijos.edu.ng/jspui	Working 24 hrs Service
14	University of Lagos	http://unilag.edu.ng/	18	University of Lagos Institutional Repository	http://repository.unilag.edu.ng:8080/xmlui/	Working 24 hrs Service
15	University of Ilorin	http://www.unilorin.edu.ng/	19	UILSPACE	http://uilspace.unilorin.edu.ng:8080/jspui/	Working Not 24hrs Service
16	University of Nigeria Nsukka	http://www.unn.edu.ng/	20	Open Resources	http://unn.edu.ng/chart/repo	Not Functioning
			21	University of Nigeria Nsukka Institutional Repository	http://repository.unn.edu.ng/ working link http://www.unn.edu.ng/internals/repository/show	Working Not 24hrs Service Working 24 hrs Service
16	Total registered Organizations		21	Total registered Repositories	Total functioning repositories	13

On studying the name of the registered organizations and repositories on OpenDOAR database, it has been discovered that, there are twenty-one (21) registered repositories by sixteen (16) organizations and all the twenty-one (21) repositories were registered as institutional repository by type.

Table 2: Records of IRs registered on Registry of Open Access Repositories from Nigeria

SN	University	Repository	Date of Establishment	Other Registries
1	Covenant University Repository	Covenant University Repository	24 November, 2010	OpenDOAR Celestial ROARMAP
		Theses & Dissertations	27 January 2014	OpenDOAR
2	Federal University Lokoja	Federal University Lokoja Institutional Repository	14 July 2016	Celestial OpenDOAR
3	Federal University of Technology, Minna	Federal University of Technology, Minna Institutional Repository	21 July 2016	OpenDOAR
4	Afe Babalola University	Afe Babalola University Repository	21 December 2014	OpenDOAR
5	University of Nigeria, NSUKKA	University of Nigeria Institutional Repository	13 June 2017	OpenDOAR Celestial
6	University of Jos	University of Jos Institutional Repository	25 June 2014	OpenDOAR Celestial
7	University of Ibadan	University of Ibadan Institutional Repository	25 April 2017	Celestial
8	Federal University Oye-Ekiti	Research Online at Federal University Oye-Ekiti	23 February 2013	Celestial OpenDOAR
9	Landmark University	Landmark University Repository	7 June 2014	OpenDOAR Celestial
10	Federal University of Technology, Akure, Nigeria	Institutional Repository of the Federal University of Technology	22 April 2012	OpenDOAR
11	Federal University Ndufu Alike Ikwo (FUNAI)	FURA: Federal University Research Archive	17 June 2015	OpenDOAR Celestial
12	Michael Okpara University of Agriculture	DSpace at MOUAU	25 July 2013	Celestial

Going through the Records of ROAR it was found out that there are thirteen (13) intuitional repositories registered under twelve (12) organizations from Nigeria. On comparison with the records of OpenDOAR it was also found that there two (2) more additional repositories registered by University of Ibadan and Michael Okpara University of Agriculture making 23 as total number of registered repositories from Nigeria.

Literature has confirmed the existence the twenty-one (21) repositories registered on OpenDOAR in Nigeria (Oguche, 2018) . However, in their article; "Promotional Strategies for Open Access Resources Discovery and Access" Anunobi and Ape (2018) stated that:

> "Universities including Federal University of Technology Owerri, African University of Science and Technology, Federal Universities of Agriculture Abeokuta and Makurdi were not listed in OpenDOAR. The explanation was that their repositories were locally hosted as the case with Federal University of Technology Owerri or that they have not registered to be harvested in the OpenDOAR".

After enquiry into the web site of the aforementioned universities, it was discovered that, Federal University of Technology Owerri has repository online using Dspace hosted by ATMIRE. African University of Science and Technology also has repository using Dpace hosted locally by the university library. Neither Federal Universities of Agriculture, Abeokuta no Federal Universities of Agriculture, Makurdi has repository on their main web site.

Therefore, there are twenty-five (25) institutional repositories online from Nigeria. Twenty-three 23 repositories were registered with OpenDOAR and ROAR by 17 Nigerian Universities as of 5th October 2018. The issues of functionality of the twenty-five (25) repositories is treated under 5.3 Technical and operational issues as well as policy adopted.

Deposit by each repository and total deposit by all repositories.

The following table display the summary of the total contributions of IRs in Nigeria and deposit by each repository and their statistical deposit by the type of information resources as extracted from their respective platforms on 29th September 2018.

Table 3: Summary of total deposit and statistic of the type of information resources deposited

Repository	Thesis/Dessirtation	Article	Book	Seminar and Conference Paper	Others	Videos	Image	Total
Afe Babalola University Repository	2	991	2	49	4	24	1	1,073
Ahmadu Bello University Institutional Digital Repository	8,351	166	10	49	-	-	-	8,576
American University of Nigeria (AUN) Digital Repository	4	31	3	25	81	-	-	144
Covenant University Repository	9,241						-	9,241
Federal University Oye-Ekiti Institutional Repository	111	360	46	24	631	-	-	1,172
The contents of Landmark University Repository	5	587	19	12	125	-	-	748
University of Jos Institutional Repository	119	1676		13	44	-	-	1,852
University of Ilorin Institutional Repository	1,178	-	-	-	-	-	-	1,178
University of Ibadan Institutional Repository			-	-	-	-	-	418
Federal University of Technology, Minna Institutional Repository	3885	359		86	145	-	-	4,457
Federal University of Technology Owerri (FUTOSpace) Repository	374	191	79	68	500	-	-	1,212
African University of Science and Technology Repository	297	8	-	26	-	-	-	331
University of Nigeria Nsukka UNN Repository 2 repositories	6,293	14,940	-	-	392	-	-	21,607
Covenant University Electronic Theses and Dissertation Repository	10							10
University of Lagos Institutional Repository	1,009	916	77	399	170	-	-	2,571
Total	21,642	20,256	239	776	2,152	45	1	54,590

After thorough investigation into the platform of the identified IR repositories, it was found that IRs in Nigeria contributed with sum of 54,590 information resources. University of Nigeria, NSUKKA has the highest deposit, while American University of Nigeria (AUN) Digital Repository has the lowest deposit.
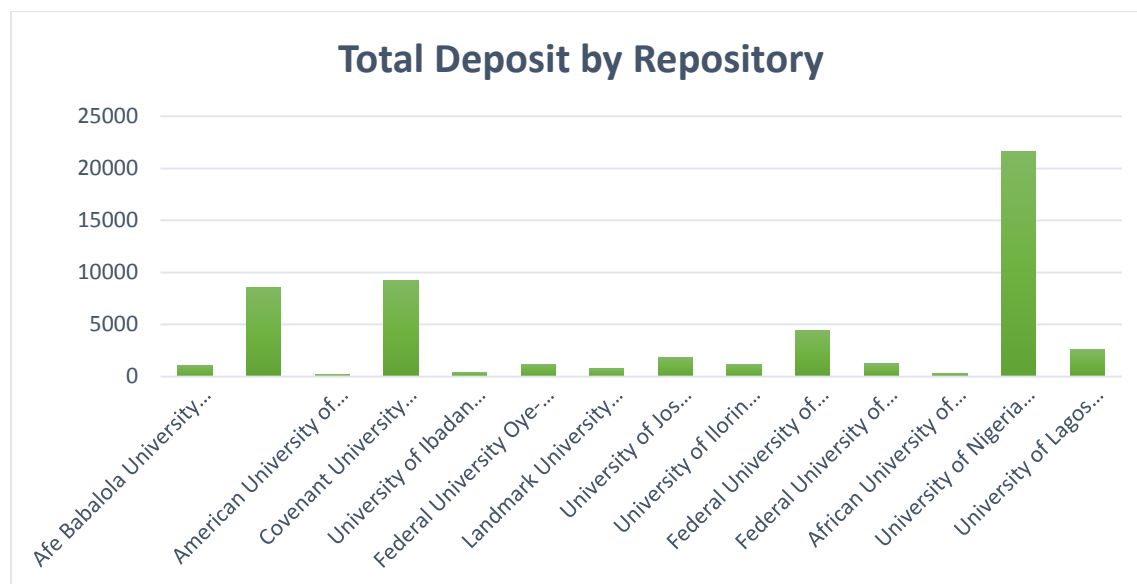

Figure 3: Summary of deposit by Repository in Nigeria

Contents analysis of the IRs in Nigeria.

Types and number of the content.

The major types of information resources deposited on the repositories in Nigeria are; theses and dissertations, journal articles, seminar / conference paper and books. Covenant University Repository has the largest deposit by theses and dissertations followed by Ahmadu Bello University Institutional Digital Repository and University of Nigeria Nsukka UNN Repository. While University of Nigeria Nsukka UNN Repository, University of Jos Institutional Repository and Afe Babalola University Repository have the highest deposit by journal articles respectively. All repositories accessed deposited 21,642 theses and dissertation, 20,256 journal articles, 239 books, 776 seminar and conference papers, 2,152 other resources, 45 videos and 1 image. Other resources include; lectures, lecture notes, courses Outline, speech, question papers, news papers data set and others. Table 3 above display the number of deposits by types for each repository as well as the total deposit by type for all repositories. The percentage deposit by types of information resources are demonstrated on figure 4 below.
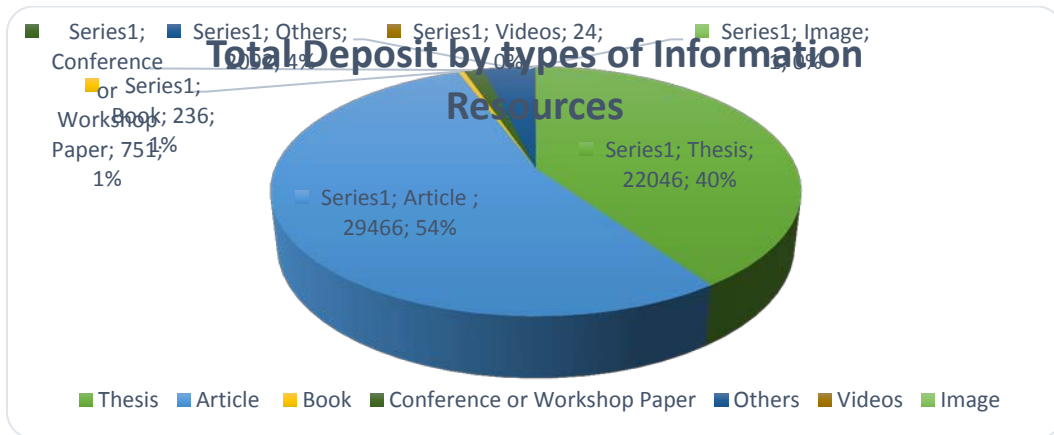
Figure 4: Analysis of Deposit by types of Information Resources in Nigeria

Currency of the content

The following figure indicated the number of information resources deposited on the repositories by year of publication:
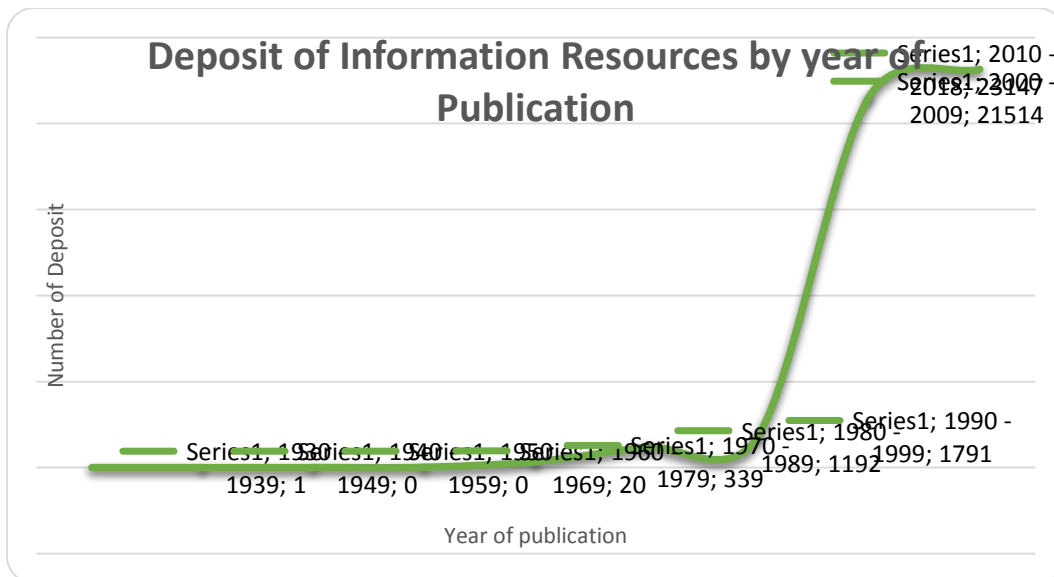

Figure 5: total deposit by year of publication

The finding on this point indicated there are publication from 1932 up to 2018. This mean that digitization plays vital role in the development of the content of IRs in Nigeria. Although there are number of repositories that did not include any option for identification of content by year of publication and some resources archived with unidentified year of publication but majority of the content of IRs in Nigeria were published between 2000 and 2018.

Technical and operational issues as well as policy adopted by IRs in Nigeria.

The technical issues include types of software uses by the repositories, falling links and the status of the policy.

Types of software use by repositories.

On investigation into OpenDOAR and ROAR, it was discovered that; Afe Babalola University, Covenant University and Landmark University Repositories use ePrint software. ABU Zaria Research Publications, Covenant University Electronic Theses and Dissertations Repository use unknown software while the rest of the 19 repositories use Dspace software.
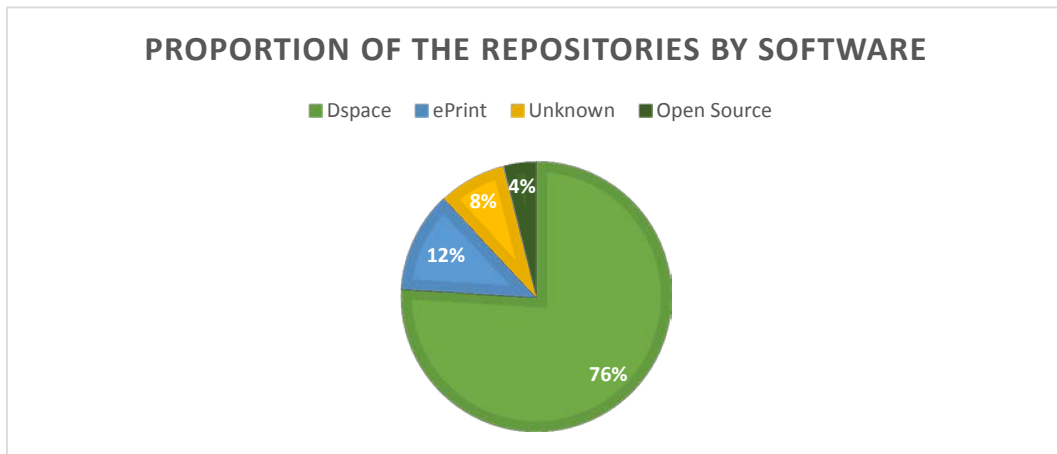
PROPORTION OF THE REPOSITORIES BY SOFTWARE

- Dspace
- ePrint
- Unknown
- Open Source

4%
8%
12%
76%

Figure 6: Proportion of the registered repositories by software

Failing links and Functionality of the repositories

After the functionality test of the identified URLs of the registered repositories on OpenDOAR and ROAR databases. The following were found
- One out of the sixteen (16) registered organization was a duplicate which is "Federal University Oye Ekiti" bearing the same name of organization and URL for the repository.
- Two (2) out of the twenty-one (21) registered repositories were duplicate and registered as Federal University Oye Ekiti Repository and dspace.funai.edu.ng. the two repositories are belonging to Federal University Oye Ekiti and Federal University Ndufu-Alike Ikwo respectively. The repositories were registered as second repository but appeared to have the same URL as the first repository in their perspective organizations. And they were not existing on the university web site.

- Three (3) repositories registered as Theses & Dissertations, ABU Zaria Research Publications and Open Resources under Covenant University, Ahmadu Bello University and University of Nigeria Nsukka respectively have non-functioning links (URLs) in other words, they are not functioning.
- The University of Nigeria Nsukka have two repositories online with the following links; http://www.repository.unn.edu.ng/   is registered on OpenDOAR but is unstable and http://www.unn.edu.ng/internals/repository is working 24 hours service hosted by Tenece Professional Services. Both repositories have different number of content and statistics.
- Four (4) registered organizations namely; Ebonyi State University, Abakaliki, Federal University Lokoja, Federal University Ndufu-Alike Ikwo, Federal University of Technology, Akure have nonfunctioning links (URLs).
- Others, i.e. Ahmadu Bello University Institutional Digital Repository, University of llorin are functioning but not on twenty-four hours service. They seem to be functioning only during working hours of the organization.

On RAOR, the URL of University of Ibadan Institutional Repository is functioning while URL of DSpace at MOUAU is invisible. Out of the twenty-five (25) repositories it has found that:

- Duplicate registered organization   =   1
- Duplicate registered repositories   =   1
- Nonfunctioning links   =   7
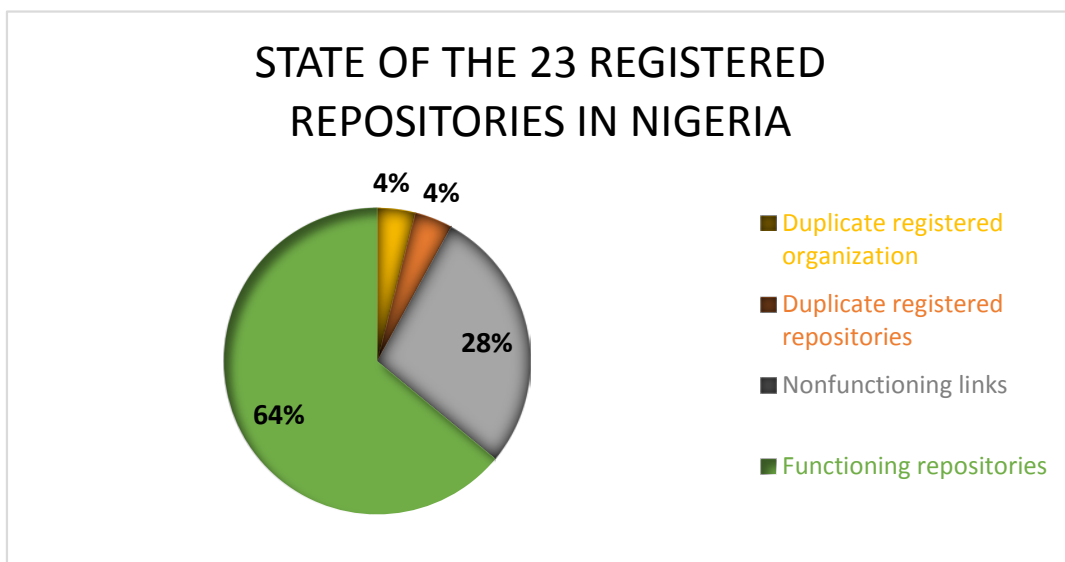- Total registered functioning repositories =   16

Figure 7: State of the 25 Nigerian institutional repository online

Each of the functioning URL has been monitored for more than one month to ensure of the state of functionality and time frame of work.

Policy adopted

Careful search for the policy adopted by any of the repositories on OpenDOAR, ROARMAP and site of the repositories was conducted. Only Landmark university repository appeared to have Metadata, Data, Content, Submission and Preservation policies identified on OpenDOAR. While only Covenant university repository was cited on ROARMAP from Nigeria. Apart from this two no other university has policy stated on any platforms.

IMPLICATION OF THE FINDINGS

The implications of the finding were viewed through reflection of the impact of the IRs on Webometrics Ranking of World Universities (WRWU) Site. The choice webometric ranking considered because it aims at promoting academic web presence and supporting "**Open Access initiatives"** to significantly increase the dissemination of scientific information and local content produced by universities to the global community. The process of webometric ranking "is not to evaluate websites, their design, usability or the popularity of their contents according to the number of visits or visitors. Web indicators are considered as proxies in the correct, comprehensive, deep evaluation of the university global performance, considering its activities and outputs and their relevance and impact" (RWU, 2018).

Table 4: describes the current methodology used by ranking web of universities 2018

INDICATORS	DESCRIPTION	SOURCE	WEIGHT
PRESENCE	Size (number of webpages) of the main webdomain of the institution. It includes all the subdomains sharing the same (central or main) webdomain and all the file types including rich files like pdf documents	Google	5%
VISIBILITY	Number of external networks (subnets) originating backlinks to the institution's webpages After normalization, the average value between the two sources is selected	Ahrefs Majestic	50%
TRANSPARENCY (or OPENNESS)	Number of citations from Top authors according to the source But see Transparent Ranking for additional info	Google Scholar Citations	10 %
EXCELLENCE (or SCHOLAR)	Number of papers amongst the top 10% most cited in 26 disciplines Data for the five-year period (2012-2016)	Scimago	35 %

Source: Ranking web of universities site (RWU), 2018

It is interesting to notice that almost all universities with functioning IRs were included among the first 40 ranked universities out of the 253 universities / high institution ranked by ranking web of universities in Nigeria. And they were also ranked between 1000 – 7000 in the world as indicated in Table 5 below:

Table 5: World Ranking Universities in Nigeria

ranking	World Rank	University	Presence Rank*	Impact Rank*	Openness Rank*	Excellence Rank*
		Nigeria				
1	1076	University of Ibadan	571	844	1391	1682
2	2187	University of Nigeria	1551	3435	1491	2537
3	2230	Obafemi Awolowo University	3033	3791	2523	2226
4	2251	Covenant University Ota	1163	3152	2516	2594
5	2649	Ahmadu Bello University	1539	6136	2926	2339
6	2672	University of Lagos	3980	5367	2751	2513
7	2849	University of Ilorin	5461	6341	1859	2709
8	2896	University of Port Harcourt	8660	3609	2580	3472
9	3066	Federal University of Technology Minna	3197	6303	2901	3075
10	3097	Federal University of Technology Akure	2943	8515	2622	2625
11	3516	Federal University of Technology Owerri	2786	4878	3516	4120
12	3683	University of Agriculture Abeokuta	2808	6175	8474	3245
13	3707	University of Benin	13797	7433	2352	3804
14	3765	Bayero University Kano	14352	8960	3530	3323
15	3796	Ladoke Akintola University of Technology	17199	9470	2632	3370
16	3812	Lagos State University	6836	9359	3318	3472
17	3815	University of Uyo	23907	9459	3310	3143
18	3910	University of Calabar	11073	11182	2511	3245
19	4048	Nnamdi Azikiwe University	7154	9051	2625	4014
20	4157	University of Jos	4643	8737	3712	4120
21	4255	Adekunle Ajasin University	8809	6411	4463	4547
22	4266	University of Abuja	16904	11328	4396	3435
23	4406	Olabisi Onabanjo University (Ogun State University)	6738	10058	4030	4120
24	4409	University of Maiduguri	12965	11349	3976	3767
25	4733	Usmanu Danfodiyo University	8210	11520	4876	4075
26	4756	(1) Ebonyi State University	21568	12088	4350	3846
27	5032	American University of Nigeria	5002	8964	4796	4894
28	5418	Abubakar Tafawa Balewa University	18196	11870	4521	4547
29	5824	Delta State University Nigeria	20802	12183	4146	4751
30	6240	Niger Delta University	17656	12989	5474	4751
31	6255	Federal University Oye Ekiti Ekiti State	3680	7882	3739	6007
32	6369	Enugu State University of Science & Technology	13583	6097	5938	6007
33	6448	Federal University of Agriculture Makurdi	26726	12062	6241	4751
34	6567	Landmark University	4888	8371	4162	6007

WRU, 2018

DISCUSSION

From the above findings it shows that, it took Nigeria almost a decade to register 23 repositories, from 2009 to date. Even though there are more than 300 higher institutions in Nigeria (Oguche, 2018). The slow adoption appeared as a reflection of social-behavioral conflict before anything, as lamented by Harnad (2009), "many authors are often reluctant in publishing their works in institutional repositories", the same as all the stakeholders; managers, developers and decision makers. People always need mandate to motivate them before they can make any step. There is no mandate at all levels. If IRs became prerequisite for accrediting any programme by the National Universities Commission (NUC), there would be tremendous development of functioning IRs within short time. In other words, the lack of mandate and guiding policy at government, regulatory body and institutional levels contributed to low implementation and practice of IRs in Nigeria. Although, there is lack of encouragement and scholarly environment for authors to fully engage in self-archiving at institutional level but the number of articles being deposited by scholars is encouraging. Awareness of IRs by faculty members is increasing as observed by (Bamigbola, 2014).

From the issue of registration of the repository to the issue of web site usability and design (IRs interface), it shows that there is no adequate knowledge and skills for providing standard interface and efficient user information need. Some information need for web assessment are missing and many of the systems are deployed as default. Searching and browsing options are also limited. There is no detailed statistics especially on the interface; almetric, downloads, visits, data import and export and user interaction options are completely absent. One of the librarians contacted informed the researcher that; their duty as librarians is to upload the information resources but design and development of the platform is fully done by ICT unit, this shows where the problem lies. In a situation where there is no librarian with adequate ICT skills to develop the web interface, collaboration between librarians and ICT unit became necessary for effective design and development of standard IR interface. This also tallies with the finding of (Gbaje & Mohammed, 2017; Gbaje, Yani, & Odigie, 2018) that there is lack of skills on IRs management among librarians in Nigeria. Also, power supply and internet connections problems has been observed during the monitoring phase as reasons why some of IRs are not operating 24 hours service, as they may go down at any giving time. This also corroborated the finding of (Ifijeh, 2014; Ridwan, 2015; Oguche, 2018). Unstable power supply is still epidemic in Nigeria.

In a bid to identify the implication of the findings, the impact of IRs is viewed based on the performance of Nigerian universities on ranking web of universities site, the IRs have impact only at the level of Nigerian universities while it appeared to have less or no impact at the global level. Therefore, the web performance of research output of the universities is far below expectation according to their academic excellence. This show absent of good practice of IRs in Nigeria.

CONCLUSION AND RECOMMENDATIONS

Practice of IRs in Nigeria has started taking a new shape. Deposit into the repository is taking place with diverse distribution of different types of information resources. Authors started depositing their articles without any hesitations. But the process of registration of repositories on OpenDOAR or ROAR and deposition of information resources are still very slow. The absent of policy mandate is among the major challenges that are facing the practice of IRs, which if provided could have changed the slow-moving face of the development of IRs in Nigeria. Librarians are also lacking IT and professional skills for development and management of IRs. Implementation of policy mandate, more training for librarians on data curation, development and management of IRs as well as collaborations between libraries locally and internationally for the achievement of good practice of IRs were recommended. Finally, the universities are urged to consider substantial increasement of the quantity and quality of their research output through the repositories. Further study on IRs development in developing counties in Africa may provide the way forward from different perspectives.

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