

Open Access in developing countries: African Open Archives

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Abstract. This paper presents the results of a study on the open archives in developing countries. It provides the elements of type, size and contents of open archives. The methodology is based on information collected from open repository websites. The survey is based on an almost exhaustive sample list of developing countries websites retrieved from directories and a list of open repositories. The purpose of this study, carried out from 2011 up to now, is to measure, at a second level, the impact of open access on the Algerian researchers by analyzing their practices related to open access, through the identification of their scientific publications at a second level in the open archives, in which they can deposit.

Keywords. Open Access, developing countries, Open repository, Open archives, academic publication, Africa.

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Introduction

Open Access movement has become an increasingly strong and significant part of research landscape and a major political issue [1]. The aim is to meet the dissatisfaction of the traditional publishing model and make academic research results freely available for anyone, anywhere through the World Wide Web, via two ways Open Access scientific journals, or Open Access archives.

In this context, open access is the prime alternative to publish in traditional journals, whose subscription, being based on business model, inhibits the distribution of scientific knowledge [2].

Moreover, the studies and efforts expended to create open archives and to measure their impact have demonstrated the strength of open access to increase the impact of publications that have led publishers to move towards greater acceptance of self-archiving, so the number of open archives increased through making deposit compulsory for universities, institutions and research foundations [3].

We do mean by open access repository or open archives; a server / platform to deposit (authors or laboratories) and consult publications, documents, texts, data and tools... of the research world and higher education. This must be accessible to through Internet without any restriction, using common protocols that facilitate the accessibility to contents from multiple servers which are maintained by different data providers. In addition to that, it should allow "...fast and wide dissemination of results; the preservation of the record..."[4].

We mean by institutional repository; a comprehensive archive of the whole institution outputs (research, heritage, educational, administrative, ...), preservation and management in order to serve interests of faculty researchers and teachers.[5 It proposes a wide variety of materials in digital form, such as research journal articles, preprints and post prints, digital versions of theses & dissertations, administrative documents, course notes, or learning objects."[6].

However, while the open access movement is becoming a trend in the developed countries, and both the scientific community and professionals have started analyzing the results of its existence through studies on open archives use, studies on this movement and on its impact over the scientific production of developing countries are still lacking.

In this way, the objective of this part of study is to identify the developing countries open archives, by mapping out its characteristics, such as the volume of deposits of scientific researchers, their disciplinary belonging, fields and type. Once this unique mapping defined, we can have an analytical view, so that the results will help building further works and analysis, such as studying the researchers practices and the uses of these open archives (own researchers of the repository or foreign researchers who may file in this repository).

It should be noted that the developing countries repositories (Africans open repositories in this paper) is just a part of the overall sample of the global study.

1. Methodology

To have clear and reliable information on our questioning, our methodology is as follows:

State of the art: This part was elaborated to study the existing operations and analyze the available literature in our study.

Directories and lists of reference websites: The second step is to identify the open archives directory web sites to obtain a comprehensive sample of open archives. The list of directories listing of open archives is appended as Appendix 1.

Criteria analysis & data collection: After analyzing the open archives directories lists, we have compiled a list of open archives in all subject fields. We opted for open archives whose interface language is at least one of the following:

- Arabic (mother tongue of the Arab-Muslim African developing countries)

- French (French-speaking region: common colonial history of North Africa)
- English (openness to the market economy).

This selection criterion is the specificity of our study. For each site, we checked the URL, the location in Africa and the presence of recent deposits. Each site was characterized on the basis of the following criteria:

- General information: (name, logo, URL, institution, institution type ...)
- Open archives characteristics (year of establishment, Archives type, subject, content, software, interface language, number of items, the possibility of filing by author, ...)

It should be noted that the development of the analytical framework was based on several surveys: Schöpfel [1], Bath [6], Chérifa Boukacem & all [8] and Ben-Romadhane [16].

Data collection and results obtained are incorporated into a word processing statistical data (Sphinx), verified, validated and / or modified.

The study has been conducted as follows:

- Identification of reference directories: September 2011
- Choice of open archives: September-November 2011
- Data collection of open archives: September-December 2011
- Validation and operating data: November to January, 2012

2. Results

2.1. Size, institutions and languages

During the analysis of the directories and reference lists of open archives we have listed more than 50 web sites under the name of an open access repository (digital libraries, open access journals articles sites).

Through the selection criteria we have defined above and in order to limit the scope of the study and make it significant and homogeneous we added another criterion; open archives containing over 100 documents. And as a result, we obtained 27 Open Archives in different subject fields, visited and thoroughly tested.

Most of the different institutions that are responsible for the management of open archives belong to the public research, and are distributed as the table above.

Table 1. Number open archives by institutions type

Institutions type	Sites on 2011
University	26
Research center	1
Academic library	0
Others	0

The majority of the archives are presented with an English interface, which reveals and demonstrates the understanding and awareness of developing countries research institutions, that English is the language of exchange, sharing and research. It is also symptomatic of the history of some of these countries, which have been colonized by UK in the past.

Table 2. Interface language

Language	Sites on 2011
Arabic	1
French	2
English	25
Others	4

2.2. Typology

Another analysis step based on Armbruster & Romary (2009) typology of open archives focuses in our study on three types by adding the document type archive:

- Subject-based or disciplinary repository which records documents relating to a common topic. We identified two Africans repositories; South Africa “UCT Computer Science Research Document Archive” and “UCT Lawspac”
- National or Central repository that gather up scholarly output of different communities (research centers, institutes and libraries). Among these sites to national character, there are for example Uganda Scholarly Digital Library and that of Addis Ababa University Libraries
- Institutional repository contains various outputs of the institution
- Open archive by kind of document (such as thesis)

Table 3. Open Repositories types

Types	Number of site in 2011
Institutional repository	27
Subject-based or disciplinary repository	2
National or central repository	5
Document type repository	4

All the open repositories collected belong to Institutional type. However, it should be noted that these institutional repositories can include one or two other type of open repositories, as presented in the table below. University of Cape Town Lawspace South Africa repository is an example. It is an institutional and subject repository at the same time.

It is sort of reactions, symptomatic of a lack of Scientific and technical information (STI) policy and open access policy.

By combining the two criteria - type of institution and type of archives - we obtain the following table:

Table 4. Number of sites by archives type and institutions type (2011)

	University	Research center	Others
Institutional repository	26	1	0
Subject-based or disciplinary repository	2	0	0
National or central repository	9	0	0
Document type repository	4	0	0

The results show that open archives in developing countries are institutional type and belong to the public sector.

2.3. Discipline

According to their discipline, we have classified the open repositories into three categories:

- Multidisciplinary that covers the humanities social sciences, applied sciences, and science, technology and medicine
- Humanities and Social Science (HSS)
- Science, technology and medicine, covering applied science (STM)

Table 5. Discipline of open archives in developing countries 2011

Disciplinary	Number of site in 2011
Multidisciplinary	23
HSS	2
STM	2

The results show that most of the sites are multidisciplinary which means that there are several institutional open archives of that kind which is logical regarding the fact that most of them are institutional and are linked to university libraries.

In the other disciplinary type, the number is equal and not significant compared to the multidisciplinary sites.

If we compare disciplinary with institutions and the type of archives, we obtain the following results:

Table 6. Type of archives and disciplinary archives 2011

	Institutional	Subject	National	Document type
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Multidisciplinary	24	0	5	5
HSS	1	1	0	0
STM	2	1	0	0

Almost institutional sites are multidisciplinary. According to their discipline, there are only two repositories; one related to humanities & social science (SHS), the other to Science, technology & medicine (STM).

Table 7. Type of institutions and disciplinary archives 2011

	University	Research center	Academic library	Others
Multidisciplinary	21	1	2	0
HSS	1	0	0	0
STM	2	0	0	0

The most developing countries are multidisciplinary repositories

In the area where the subjects are clearly defined (SHS & STM) in our case disciplinary open archives consist of universities archives.

2.4. Content growth and document type

Table 8. Number of items the first year of the survey 2011

	Number of site in 2011
Unanswered	1
Less than 2000	15
From 2000 to 4000	3
From 4000 to 6000	5
From 6000 to 8000	2
From 8000 to 10000	1
From 10000 to 12000	0
12000 and more	1

Minimum= 133, Maximum=16002, Sum=79339, Mean=2938, 48, Standard deviation=3550.36

The majority of repositories have less than 2000 items: 144 items for Kenya SU-Portal, 597 items for Tunisia UVT e-doc, etc.

The only repository of more than 12000 items, is SUNScholar Stellenbosch University in South Africa which is also an online academic research information service supplier of the library we can cite SUNJournals, SUNProxy and SUNSearch¹.

This content is split up into the following types of documents. Most is for these, articles and conferences respectively

We can see also a great number of content for other documents which include maps, letters and dataset (records with abstracts)², speeches, books chapters, manuscripts, inaugurates lectures etc.

¹ Stellenbosch University Research Repository, from <http://scholar.sun.ac.za/>

Table 9. Number of items by type of documents

Number of site in 2011	Books	Articles	Conferences	Theses	Reports	Teaching and learning	Multimedia	Others	Total
Unanswered	0	0	0	0	1	0	0	0	1
Less than 2000	2	12	11	12	5	4	5	7	58
From 2000 to 4000	0	2	2	3	1	0	0	1	9
From 4000 to 6000	0	3	3	4	0	1	0	4	15
From 6000 to 8000	0	1	0	2	0	1	1	1	6
From 8000 to 10000	0	0	0	0	0	0	0	0	0
From 10000 to 12000	0	0	0	0	0	0	0	0	0
12000 and more	1	1	1	1	1	0	1	1	7
TOTAL	3	19	17	22	8	6	7	14	96

2.5. Software & statistics

As to the African developing countries open repositories software, DSpace takes the Lion's share.

Nevertheless there are a few attempts to use free software innovation for African Higher Education Research Online in South Africa and Digital Assets Repository in Egypt.

Table 10. Number of sites by categories of software

Software	Number of sites
Dspace	20
Eprints	3
ETD-db	1
Free Software innovation	2
Greenstone	1
Digital Commons	1

Otherwise, a few numbers of open archives which offer use statistics

Table 11. Statistics data offering

Statistics Data	Number of sites
Yes	03
No	23

² Dataset: references.

2.6. Submission

Most archives allow authors to submit a document Most of them do not define any Deposit policy

Table 12. Authors Ability submission

Submission	Number of sites
Yes	23
No	1
Not mentioned	4

3. Findings and Discussion

The study reveals results which give a better vision of the OA repositories reality in this area of the world:

University appears clearly as the most active and more involved in open access projects.

Like the other developed countries, English language – Science dominates and we can hypothesize that the developing open archives present windows to abroad.

As was clearly indicated by Schöpfel (2010) in his report, the non-commercial distribution has found a means of communication, which are open institutional archives in particular. In our case of study, the first Position (non-commercial) publication items returns to thesis.

However, few are open archives whose purpose is the communication of pre-publication and post publication. : the only archives that proposes these types of documents are la Wits institutional repository of Dspace of preprint publication and SUNScholar Reseach Repository for post print, both in South Africa, both are from south Africa

Directories and repositories references list reveal some heterogeneity. Each site listing applies its own criteria. Directories referencing identify under the heading of open archives, any kind of site that the most common is free access to content.

Although free access means unrestricted access, unlimited and free, our results reveal another reality.53.6% of open archives in developing countries do not open completely access to their content, in the same area the access is limited and reserved only for the institution users.

Virtually no site informs archive creation date as well as of its evolution by document type. It is difficult to have the number of items per type. The Open Archives such as DSpace software rarely provides those statistics, only Eprint offers this possibility.

The heterogeneity observed is probably the result of a lack of political leadership, and that initiatives are actually quite isolated and experimental. For proof, the critical mass of open archive remains quite modest.

It clearly transpires that the open archives, particularly institutional archives, dominating our results are the way the academic libraries have embarked in, in the absence of a national policy. These are places to archive and display their scientific production results. But it seems they are not integrated to the enlarged process of the scientific communication. They play the role of 'a second library', in adding in digital items to the traditional library (theses, limited access to local users,...) but they are not engaged in an open scientific publication. This can explain the "confidential" character of some of them. Finally, we can say that OA have come along to assist libraries traditional functions however they do not yet allow taking part in the open scientific communication adventure in these countries

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Appendix 1: Reference Directories

Dspace: DSpace Registry.

<http://www.dspace.org/whos-using-dspace>

OpenDOAR: Directory of Open Access Repositories.

<http://www.opendoar.org/>

ROAR: Registry of Open Access Repositories.

<http://roar.eprints.org/view/software/>

APBHATOO: Documentary research portal.

<http://www.abhatoonet.ma/index.php/fre/Webographie>

Webometrics: Ranking Web of World Repositories.

<http://repositories.webometrics.info/>

AIOA: Arab Initiative of Open Access

<http://aioa.blogspot.com/>

Appendix 2: African Developing Countries Open Archives list

Archives	URL	Countries
Addis Ababa University Libraries Electronic Thesis and	http://etd.aau.edu.et/dspace/	Ethiopia

Dissertations Database		
Institutional repository for KNUST	http://dspace.knust.edu.gh:8080/jspui/	Ghana
Mahider	http://mahider.ilri.org/handle/10568/1	Kenya
SU-Portal	http://www.digital.library.strathmore.edu/	Kenya
Biens Culturels Africains	http://bca.ucad.sn/jspui/	Senegal
African Higher Education Research Online	http://ahero.uwc.ac.za/	South Africa
Research Repository North-West University	http://dspace.nwu.ac.za/community-list	South Africa
CSIR Research Space	http://researchspace.csir.co.za/dspace/	South Africa
Digital Knowledge	http://dk.cput.ac.za/	South Africa
Durban university of technology-institutional repository	http://ir.dut.ac.za/handle/10321/210	South Africa
Rhodes eResearch Repository	http://eprints.ru.ac.za/	South Africa
SUNScholar Research Repository	http://scholar.sun.ac.za/	South Africa
UCT Computer Science Research Document Archive	http://pubs.cs.uct.ac.za/	South Africa
University of Cape Town Lawspace	http://lawspace2.lib.uct.ac.za/dspace/	South Africa
UJDigispace	https://ujdigispace.uj.ac.za/	South Africa

UKZN ResearchSpace	http://researchspace.ukzn.ac.za/xmlui	South Africa
Unisa Institutional Repository	http://uir.unisa.ac.za/	South Africa
University of Fort Hare Institutional Repository	http://ufh.netd.ac.za/js	South Africa
University of Limpopo Institutional Repository	http://ul.netd.ac.za/jspui/	South Africa
University of Pretoria Electronic Theses and Dissertations	http://upetd.up.ac.za/UPeTD.htm	South Africa
UWC Research Repository	http://repository.uwc.ac.za/xmlui/	South Africa
University of Zululand Repository	http://uzspace.uzulu.ac.za/	South Africa
Wits Institutional Repository on DSpace	http://wiredspace.wits.ac.za/	South Africa
Sudan Open Archive	http://www.riftvalley.net/index.php?view=soahome	Sudan
DSpace@ScienceUof K	http://oascir.uofk.edu/	Sudan
UVT e-doc	http://pf-mh.uvt.rnu.tn/	Tunisia
Uganda Scholarly Digital Library at Makerere	http://dspace.mak.ac.ug/	Uganda