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Digital Repositories in Ecology and Environment: An analytical study

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Digital Repositories in Ecology and Environment: An analytical study

Abstract

The present study aims to identify the status of Open Access Repositories (OARs) in the field of Ecology and Environment. The data was collected from the Directory of Open Access Repositories (OpenDOAR). Data collected was analysed on different parameters such as geographical distribution, software usage, content type, repository type and language diversity. As of now OpenDOAR holds 176 repositories in the field of Ecology and Environment. The findings further reveal that the maximum number of repositories belong to the USA accounting for 18(10.2%). Also, the maximum number of repositories are institutional accounting for 134(76%).

Keywords: *Open access repositories, Digital repositories, OpenDOAR, open access, Ecology and environment repositories.*

1. Introduction

Open access (OA) is a buzzword in the scholarly publishing. It acts as a key in providing global access to information and knowledge. The Budapest Open Access Initiative (BOAI) defines open access as “free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself.” (BOAI, 2002). Pinfield (2005) defines OA as free, immediate and unrestricted access to the content. OA refers to the free and unlimited access to the literature on the public internet without the expectation of direct payment (Prosser, 2003). “OA removes *price barriers* (subscriptions, licensing fees, pay-per-view fees) and *permission barriers* (most copyright and licensing restrictions)” (Suber, 2015). OA is based on the ethical argument that research funded by public should be made available to public. OA accelerates research, enhances education and shares learning across rich and poor nations. The two routes to OA are OA journals and OA repositories. These two routes are sometimes also called as “Gold” and “Green” routes respectively (Pinfield, 2009). Green OA access involves authors publishing their articles in a non- open access journal but also, self- archiving them in an OA repository and Gold open access involves authors publishing articles in an OA journal (Harnad et al.,2004). OA digital repositories have gained great attention from the academic and research communities globally. According to Hayes (2005), “Digital repository is where digital contents and assets are stored and can be searched and retrieved for later use”. Digital repositories improve dissemination of content – making it quick, easy, wide and cheap. They break down

access barriers to content inherent in the subscription-based publishing system. In 2005, Directory of Open Access Journals (OpenDOAR) was launched as a result of collaboration between University of Nottingham and Lund University. It is an authoritative global directory of open access repositories. It enables the identification, browsing and search for repositories, based on a range of features, such as location, software or type of material held. (<http://v2.sherpa.ac.uk/opensoar/information.html>)

2. Literature review

A number of studies have been carried that highlight the importance and significance of open access repositories. Citing the value of institutional repositories **Nazim and Devi (2008)** believe that institutional repositories create visibility for institutions scholarly research, collect content at a single location, provide access to institutional research output by self-archiving it and preserve institutional assets. Adding to the magnitude of open access repositories. **Cullen and Chawner (2011)** believe that institutional repositories have gained momentum among librarians, professionals, academics, scholars and readers for the communication and awareness of their research results. **Roy, Biswas, and Mukhopadyay (2016)** are of the opinion that open access repositories (OAR's) are becoming exceedingly important to the world of academics as they support teaching and learning, increase the way to maximize availability, accessibility and functionality of the research products at no cost to the user. The survey studies of worldwide open access repositories are generally based on the data indexed in OpenDOAR and ROAR. **Pinfield, et al., (2014)** studied the growth of open access repositories from 2005-2012 using OpenDOAR. It was observed that there was a visible growth in repositories of East Asia, South America and Eastern Europe in the year 2010 accompanied by steady growth in Italy, France and Spain with a limited growth of repositories in China and Russia during that period. According to **Wani, Gul & Rah (2009)** Asia contributes 138 OAR's to OpenDOAR with 69 repositories by Japan followed by India which contributes 30 repositories and rest of the countries contribute 1 to 6 OAR's. DSpace (95 countries) was the most preferred software followed by EPrints (15 countries). Mostly, all prominent content type deposited were journal articles, and English was the most widely used language for the contents deposited. **Abirazah, Noorhidawati, and Kiran (2017)** explored the Asian institutional repositories registered in OpenDOAR as of June 2010. A total of 191 open access repositories were found in Asia belonging to 25 Asian countries. The highest number of repositories were found in Japan (78, 38%), followed by India (39, 19%) and Taiwan (22, 11%), the series is similar to **Wani, Gul**

& **Rah's (2009)** findings. The majority of deposited content were journal articles (79%), followed by theses and dissertations (50%). India has shown a stable growth in this field from 4 institutional repositories recognized in 2004 to a total of 49 in 2009, a steady increase of about 9 new institutional repositories is witnessed per year (**Prabhat & Guatam, 2009**).

3. Purpose and Scope

The study aims to assess the status of the OA repositories in the field of Ecology and Environment worldwide available on the OpenDOAR based on selected parameters such as geographical distribution, software usage, content type, repository type and language diversity in terms of the interface of repositories.

4. Methodology

The data was collected from the OpenDOAR on March, 2019 and analysed using various quantitative techniques to reveal the findings.

5. Data analysis and interpretation

5.1 Country-wise distribution of repositories

Table-1 highlights the country-wise distribution of repositories in OpenDOAR in the field of Ecology and Environment. The USA emerges out to be the leading contributor with 18 (10.22%) repositories followed by United Kingdom and France with 15 (8.52%) and 12(6.8%) repositories respectively. Germany and China account for 9(5.11%) repositories each followed by Ukraine and Peru with 8 and 7 repositories respectively. Other contributors include India, Belgium and Netherlands with 5 repositories each.

Table-1. Country-wise distribution of repositories

Country	No. of repositories	Percentage
United States	18	10.22
United Kingdom	15	8.52
France	12	6.8
Germany	9	5.11
China	9	5.11
Ukraine	8	4.54
Peru	7	3.97
India	5	2.84
Belgium	5	2.84
Netherlands	5	2.84
Other countries	83	47.15
Total	176	100

5.2 Top 10 leading countries and their economic zones

Table-2 highlights the economic zones of top 10 countries in terms of their repositories share in the field of Ecology and Environment. Out of 10 countries, 6 belong to high economic zones while 2 belong to upper middle and lower middle economic zones each (as per World Bank status).

Table-2. Top 10 leading countries and their economic zones

Country	Economic Zone*
United States	High
United Kingdom	High
France	High
Germany	High
China	Upper middle
Ukraine	Lower middle
Peru	Upper middle
India	Lower middle
Belgium	High
Netherlands	High

* as per World Bank statistics (<http://data.worldbank.org/>)

5.3 Software usage by repositories

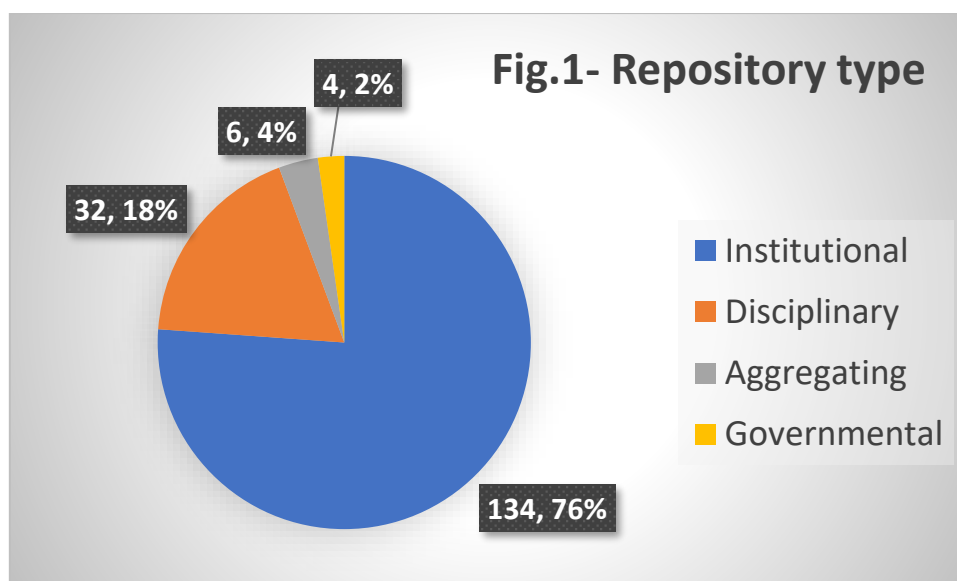
Knowledge institutions make use of various open source as well as commercial software to create their repositories and share their knowledge stock globally. Table-3 highlights different software used by institutions for creating their repositories. DSpace turns out to be the most preferred software among institutions accounting for the creation of 76(43.2%) repositories followed by EPrints with 28(15.9%) repositories. HAL accounts for the creation of 10(5.68%) repositories followed by Greenstone and Digital Commons with 5(2.84%) repositories each. Institutions that didn't mention the software used for the creation of their repositories were put under "not specified" category.

Table-3. Software usage by repositories

Software Name	Number	Percentage
DSpace	76	43.22
E Prints	28	15.9
HAL	10	5.68
Greenstone	5	2.84
Digital Commons	5	2.84
OPUS	4	2.27
CONTENTdm	3	1.7
Other	28	15.9
Unspecified	17	9.65
Total	176	100

5.4 Type of repository

OA repositories have been categorized into four types based on the nature of their host organization i.e. Institutional, Disciplinary, Aggregating and Governmental. As evident from the Figure 1 majority of the repositories are Institutional (created, hosted and maintained by an institution or department) accounting for 134(76%) followed by Disciplinary(subject) with 32(18%) repositories. Aggregating (created by individuals after collaborating and sharing responsibilities) and Governmental repositories account for the least with 6(4%) and 4(2%) respectively.



5.5 Content type

Table-4 highlights the different content types incorporated by institutions into their repositories. The majority of the repositories hold content in the form of *journal articles* (138,78.4%) followed by *unpublished reports and working papers* (91,51.4%). *Conference and workshop papers* account for 88(50%) followed by *thesis and dissertations* and *books, chapters and sections* with 86(48.86%) and 79(44.8%) respectively. The least content type archived by repositories are *Patents* and *datasets* accounting for 18(10.2%) and 8(4.54%) respectively.

Table-4. Content type archived by repositories

Content type	Number	Percentage
Journal Articles	138	78.4
Unpublished reports and working papers	91	51.7
Conference and workshop papers	88	50
Thesis and Dissertations	86	48.86
Books, Chapters and sections	79	44.8
Bibliographic references	43	24.43
Multimedia and audio-video materials	39	22.15
other special item types	30	17.04
Learning objects	29	16.47
Patents	18	10.2
Datasets	8	4.54

*Note: Since, the majority of repositories hold several content types, so the number of repositories for content type exceeds the actual number of repositories.

5.6 Language interface

Table-5 highlights the language interface of repositories available in the field of Ecology and Environment in OpenDOAR. Out of the total 176 repositories, English appears to be the most prominent language for majority of the repositories accounting for 134(76.13%) followed by Spanish and French language with 26(14.7%) and 19(10.8%) repositories respectively. Italian, Chinese and Dutch account for 14(7.95%), 11(6.25%) and 9(5.11%) repositories respectively.

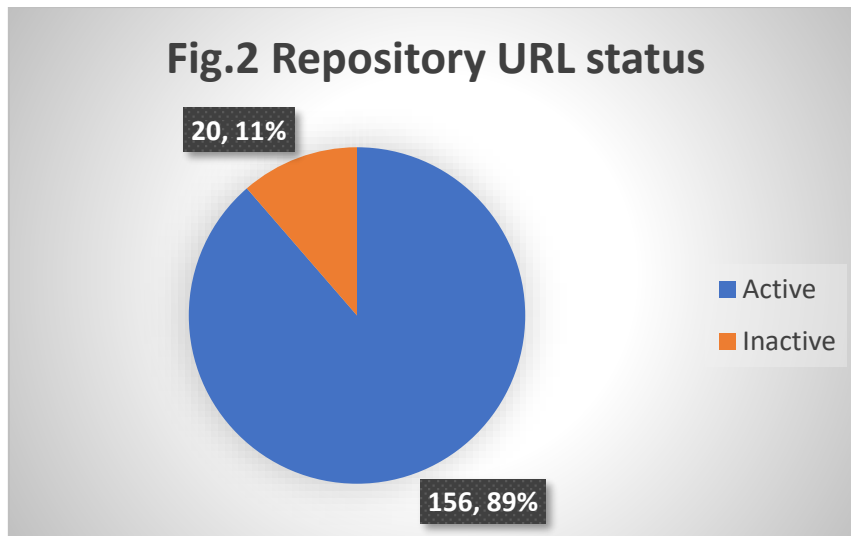
Table-5. Language interface of repositories

Language	Number	Percentage
English	134	76.13
Spanish	26	14.7
French	19	10.8
Italian	14	7.95
Chinese	11	6.25
Dutch	9	5.11
Ukranian	8	4.54
Russian	4	2.27
Portuguese	4	2.27
Polish	4	2.27
Greek(modern)	4	2.27
Croatian	3	1.7
Arabic	1	0.56
Japanese	1	0.56
Indonesian	1	0.56
Korean	1	0.56
Hungarian	1	0.56

*Note:Since, repositories develop interface in multiple languages so the number of repositories with multiple language interfaces exceeds the actual number of repositories

5.7 Repository URL status

Figure 2 highlights the URL status of 176 repositories. As evident from the figure 156(89%) of the repository URL's are active while 20(11%) are inactive.



Conclusion

Open Access is gaining momentum day by day. The above statistics on the status of OA repositories in the field of Ecology and Environment reveal that majority of the repositories are contributed by developed nations while developing nations still lag behind. So, developing countries need to be sensitized about the importance of OA repositories especially in present knowledge-based society. Also, in terms of repository type, institutional repositories account for the maximum share that can be attributed to the fact that majority of the institutions endorse research-based activities for which OA is most feasible while governmental repositories account for the least suggesting that these institutions aren't still aware about the importance of OA repositories. In terms of language diversity English is the most commonly used language when it comes to language interface of repositories. Since users come from multiple language backgrounds, institutions should give importance to other languages as well while designing their repositories.

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