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The Growth of Open Access Literature: A Case Study of the OpenDOAR

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The present study is conducted to analyze the growth of open access literature as seen by the growth of repositories in the OpenDOAR. The results revealed that the growth of repositories in the OpenDOAR has shown a steady increase from only 78 in 2005 to 5660 in May 2021. The major contribution is from the USA. The repositories in the English language rank 1 in terms of their languages. The majority are developed by using DSpace software. The subject analysis also shows that the OpenDOAR is multidisciplinary, having subject representation from almost all subject areas. The types of documents available in it reveal that Journal articles occupy top rank.

Keywords: *Open Access, OpenDOAR, OAI-PMH, Metadata*

1 INTRODUCTION

A Digital Repository is an important source for dissemination of individual productivity in an organization. A digital repository can contain information in various formats like, pdf, videos, audios, etc for variety of users. It can support research and development activities of an institution. However, when these repositories are provided open access, their importance becomes more. Now a days number of repository models are available globally and used by number of institutions.

An Open Access repository is a database created for the collection, organization, and dissemination of scientific knowledge such as journal articles, conference proceedings, books, etc. to make them freely available to every user. The user can deposit any material in such a database on its intention. Such types of repositories can be developed by an institution or any of its

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departments or can be developed on any subject, i.e., Institutional or Subject Repository.

Open access repositories must be compatible to the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). The content of the open access repositories is scanned by different search engines through its spiders, organized, and made available for access to the endusers.

The Open-access repositories are also referred to as the self-archiving or "green" route to open access.

The benefits of open-access repositories are:

- Providing access to literature to worldwide users;
- Maximizing the visibility of information and its impact;
- Preserving the institutional publication for posterity;
- Collecting, organizing, and curating information in electronic format;
- Assisting multidisciplinary research activities;
- Assisting dissemination of various electronic materials for faculties, researcherscholars, etc.;
- Supporting students by providing access to theses and dissertations, etc.

Open Access (OA) repositories movement gained momentum over the last decade. Currently, there are 5660 repositories registered in the OpenDOAR, a directory of OA repositories. (http://www.OpenDOAR.org) the OpenDOAR is the Directory of Open Access Repositories created world-wide. It hosts information about the repositories that provide free, open access to academic information and resources.

The service was launched in 2005 in collaboration withthe/ University of Nottingham/ and/ Lund University, funded by OSI, JISC SPARC Europe and CURL, UK.

2 OBJECTIVE

The main aim objective of this paper is to study the growth of open access literature contributed in the OpenDOAR.

3 LITERATURE REVIEW

The literature search on the topic Open access repositories, OpenDOAR etc. lot of articles were retrieved. However, in this paper I have included only few latest ones.

Gupta et al.[1] in a paper studied the status of Open Access Repositories in BRICS Countries. They retrieved data for the year 2020. In total 400 open

access repositories were found in the OpenDOAR. Out of these, 292 have working homepages. DSpace was mostly used to create them. As expected, English was preferred language. 361 repositories were Institutional ones. India has highest contribution. Only 39 repositories have policy support system. Out of 400 repositories, 45 were updated in the year 2020.

Hazra[2]analyzed the contribution of BIMSTECcountries (the Bay of Bengal Initiative for Multi-Sectional Technical Economic Cooperation countries includingBhutan, India, Myanmar, Sri Lanka, Thailand, Bangladesh, Nepal) in Open access repositories. The paper analyzed the country wise submission, highly used language, type of repositories, software used in their creation, etc.

Duffin[3]has compared different open access (OA) search tools available for the library professionals. A number of such tools are available but no proper comparison of their features is available. This was creating problems to librarians in selecting proper open access search tool. The paper used Six OA search tools by evaluating 153 inter library loan article requests for analyzing quantity of articles found, accuracy of results, etc. The performance of Google and Google Scholar was very good in comparison to specific OA search tools.

Egbe and Okeoma Chineloi[4] in one of their papers analyzed the growth of open access institutional repositories in Nigeria over the last 10 years which were available in the OpenDOAR. The study found that a total of 25 open access institutional repositories were created in Nigeria. They have 68,610 items in them. University of Nigeria, Nsukka have the highest records of 23,367 items. DSpace software was found as the mostly used software for their creation. The study recommended that it should be made mandatory to have institutional repository for getting Nigerian Universities Commission (NUC) accreditation. Also, the funding should be provided to make institutional repositories functional in Nigeria.

Onwubiko[5]studied the status of institutional repository in the library of Alex Ekwueme Federal University Ikwo, Nigeria. The study investigated different parameters like softwares used to create them, policy followed in digital preservation, type of content available in it. The study also finds challenges that were faced by the staff in building the repository.

Loan and Shah[6] in the article authors evaluates the electronic thesis and dissertation (ETD) repositories found in the OpenDOAR on parameters such as country wise distribution, subject coverage, language of the documents, etc. It also identifies different management issues of the ETD repositories such as their collection, software, content management and the metadata policies followed by them.

Xavier[7]has studied the status of open access platforms in Brazil. With the

data obtained from the OpenDOAR and DOAJ directories throughout the decade of 2010. It was found that in the first half of 2010 Via Verde has highest growth. Digital repositories had doubled in the year 2011. At the end of 2015, its growth reached 218%. However, Via Dourada in Brazil has its highest growth in the second half of 2010.

Chakrabarti and Maharana[8] in their paper evaluated the open access digital repositories in the field of library and information science which are present in the OpenDOAR. The total 126 such repositories in the said field were found in the OpenDOAR. It was found thatdigital repositories in Library and Information Science are mostly in English language, with few exceptions. Eprints and DSpace are mostly used to create theses repositories.

The study by Shah[9]evaluates the development of open access repositories in Asia. The year-wise growth, country wise records, platforms used in their creation wereanalysed. The study analyses how much progress is made by the developing nations in Asia in the year 2019 by comparing it to the results of earlier studies conducted.

Mehraj et al.[10] in the study aims to identify the status of open access repositories in the field of Ecology and Environment. the OpenDOAR retrieved 176 repositories. The maximum number of repositories was from USA, contributing 18 (10.2%).

The study by Ibrahim and Beigh[11]aims to analyse the growth and development of open access repositories inthe UK. The study was done based on six parameters i.e., repository type, language, software usage, subject coverage, content type, and operational status. In the analysis a total of 278 repositories were indexed by the OpenDOAR. The results found that English is the preferred language interface. The most of the repositories are institutional. In terms of software used by the corresponding repositories, Eprints is highly used software. Content-wise analysis found that the majority of the repositories archive journal articles and the majority of the repositories are operational in nature.

Kalbande[12] in the study the data related to the 84 institutional repositories have been collected from the OpenDOAR and ROAR websites.

This study was conducted by Nazim and Ahmadi[13] to examine the growth and development of Open Access initiatives in India. The data was collected from Web of Science-Core Collection, Directory of Open Access Journals (DOAJ), and the OpenDOAR. The study found that India's position in terms

of share of gold OA publications is relatively higher than other leading countries of the world. Some Government departments have made it compulsory self-archiving for their journals. It was also revealed that despite the large number of scholarly publications produced in India, the country is not present at global stage. It may be due to poor quality of research output and publication in local journals. A proper policy is, required in open access scholarly publishing to address these problems.

Loan et al.[14]studied the status of open access e-book repositories in the OpenDOAR. The findings reveal that repository having e-books were 1329 in number. Europe was dominating continent submitting 55.2% of the repositories. The USA has highest contribution with 10.2% of the repositories. DSpace software with (42.1%) was mostly software.

Bauer and Ferus[15]evaluate the status of repositories in Austria. The article evaluates the types of documents included in these open repositories, subject coverage of them, which software is used to create these repositories, and policies followed by the respective repositories.

Hemantha Kumar et al.[16]attempts to study the different initiatives taken by India to provide open access to the agriculture literature. The results revealed that the position of India in the DOAJ is 5th and in the OpenDOARit is at 11th position.

4 METHODOLOGY

The relevant data from the OpenDOARwasretrieved for the study. This data was interpreted and analysed to get insight into the growth of open access literature. The total number of repositories available in the OpenDOARwas found to be 5660 (Retrieved on 15-05-2021).

5 DATA INTERPRETATION & ANALYSIS

1. **Country-wise contribution to the OpenDOAR:** The data revealed that the total repositories available in the OpenDOAR are 5660. The total number of countries listed in it is 29. In terms of the number of repositories in the OpenDOAR, the USA ranks number 1 in the OpenDOARwith 904 repositories, followed byJapan with 683 repositories, and the UK with 315repositories. The top ten countries as per the number of repositories in the OpenDOARare listed in Table 1.

Table 1: Top 10 Countries in the OpenDOAR

Rank	Country	Number of Repositories	%
1	USA	905	16
2	Japan	683	12
3	UK	315	6
4	Germany	279	5
5	Spain	173	3
6	Peru	160	3
7	Turkey	156	3
8	Indonesia	153	3
9	Brazil	152	3
9	France	152	3
10	Italy	140	2

2. **Year-wise growth of repositories in the OpenDOAR:** The year-wise growth of repositories in the OpenDOAR shows a steady increase in number from only 78 in the year 2005 to 5660 repositories in the year May 2021. The year-wise growth has represented the Table 2.

Table 2: Year-wise growth of repositories in the OpenDOAR

Rank	Year	Number of Repositories	Cumulative %
1	2005	78	
2	2006	611	11
3	2007	727	13
4	2008	937	17
5	2009	1148	20
6	2010	1359	24
7	2010	1600	28
8	2011	1897	34
9	2012	2098	37
10	2013	2229	39
11	2014	2554	45
12	2015	2662	47
13	2015	2993	53
14	2016	3242	57
15	2017	3432	61
16	2018	3565	63
17	2019	4002	71
18	2020	5236	93
19	2021	5660	100

3. **Language-wise contribution to theOpenDOAR:** Repositories in the English language occupied Rank 1 with 3672 records, followed by repositories in the Spanish language with 748 records, Japanese with 539 records. The language-wise contribution is shown in Table 3.

Table 3: Top 10 Languages in the OpenDOAR

Rank	Language	Number of Repositories	%
1	English	3672	65
2	Spanish	748	13
3	Japanese	539	10
4	German	360	6
5	French	300	5
6	Portuguese	246	4
7	Turkish	157	3
8	Russian	153	3
9	Italian	150	3
10	Others	1652	29

4. **Softwares/platformsused in repositories contributed to theOpenDOAR:** Table 4 shows the ranking of different software/ platforms used in making repositories available in the OpenDOAR. The most commonly used platform is DSpace with 39% repositories, followed by Eprints with 11% and WEKO with 9% occupies the third rank.

Table 4: Top 9Softwares/Platforms in the OpenDOAR

Rank	Software/Platform	Number of Repositories	(%)
1	DSpace	2207	39
2	Eprints	623	11
3	WEKO	509	9
4	Digital Commons	283	5
5	islandora	170	3
6	CONTENTdm	113	2
7	OPUS	113	2
8	HAL	57	1
9	dLibra	57	1

5. **Types of documents contributed to the Open DOAR:** The analysis of data on the types of records available in the repositories shows that almost all the important documents used in the communication of scientific information are available in these repositories. The journal articles are at rank 1 with 3974 records; these are followed by theses/

dissertations with 3282 records, and bookswith 2165 records. The types of documents along with their ranking are given in Table 5.

Table 5: Top 12 Types of documents in the Open DOAR

Rank	Types of Documents	Number of Repositories	%
1	Journal Articles	3974	70
2	Thesis/Dissertations	3282	58
3	Books	2165	38
4	Conference Proceedings	1966	35
5	Reports	1882	33
6	Other special items	1733	31
7	Bibliographic	868	15
8	Learning objects	785	14
9	Datasets	395	7
10	Patents	179	3
11	Softwares	90	2
12	Others	144	3

6. **Subjectwise contribution to the OpenDOAR:** The multi-disciplinary nature of the OpenDOAR is visible from the data. The subject analysis of repositories in the OpenDOARhas shown the ranking of different subjects, given in Table 6. Total 29 broad subject categories are listed in it. Rank 1 is held by the multi-disciplinary subject category with 3341 records.

Table 6: Top 10 Subjects in the OpenDOAR

Rank	Subjects	Number of Repositories	%
1	Multi-disciplinary	3341	59
2	Health & Medicine	534	9
3	Technology (General)	363	6
4	Science (General)	362	6
5	Business & Economics	334	6
6	Social Sciences (General)	318	6
7	Law & Politics	303	5
8	History & Archaeology	285	5
9	Arts & Humanities (General)	258	5
10	Education	244	4

7 **Types of Repositories:** Repositories available in the OpenDOAR are mainly threetypes, Institutional and Government. The first type, Institutional type occupies top rank with 5026 repositories, followed by Disciplinarywith 361 repositories and Government with 138 repositories.

Table 7: Top 4 Types of Repositories in the OpenDOAR

Rank	Types of Repositories	Number of Repositories	%
1	Institutional	5026	89
2	Government	138	2
3	Disciplinary	361	6
4	Others	113	2

6 CONCLUSION

The present study was conducted to analyse the growth of open access literature by the growth of repositories in the OpenDOAR. the OpenDOAR was launched in 2005. The results revealed that the growth of repositories in it has increased from only 78 in 2005 to 5660 in May 2021. The major contribution is from the USA. The repositories in the English language rank 1 in terms of their languages. The majority of the repositories are developed by using DSpace software. The subject analysis also shows that the OpenDOAR is multidisciplinary, having subject representation from almost all subject areas. The types of documents available in it reveal that journal articles occupy top rank. The access to scholarly literature is becoming increasingly difficult for developing countries due to escalating cost of accessing literatureinternationally. Also, research output from the developing countries published in periodicals that do not receive much attention in the international community because distribution channels for such periodicals in developed countries are very limited. It was also revealed that despite the large number of scholarly publications produced in these countries, they are not visibleat theglobal stage. It may be due to poor quality of research output and publication in local journals. The open access movement has resulted in significant changes in accessibility. Now a days a number of funding organisations in developed countries encourage publishing in open access journals and archiving in open access repositories, research literature is becoming more easily accessible to the world's research communities. The significance and utility of open access literature have been recognised all over the world. Several countries are taking the issue

seriously. Various open access policies and declarations have been issued in various countries over the last decade. In India, a declaration and statement that will serve as a framework for developing open access repository is required very much.From the analysis, it is clear that the movement of creating open access repositories has now become a trend in almost all countries. Every institution/department is providing access to its resources through these OA Repositories. The creators of these resources are depositing their outputs in these repositories themselves. They are now aware that in this way the visibility of their research results will increase manifold.

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