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Contribution of the UK Open Access Repositories to OpenDOAR

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ABSTRACT:

Purpose: *The study aims to shed light on the growth and development of open repositories of the UK based on six parameters i.e. repository type, language, software usage, subject coverage, content type, and operational status.*

Methodology: *Directory of Open Access Repositories (Open DOAR) was consulted to extract the data on the selected parameters. As on 23rd January 2019, a total of 278 repositories were indexed by Open DOAR. OpenDOAR is the quality-assured global directory of academic open access repositories which enables the identification, browsing and search for repositories, based on a range of features, such as location, software or type of material held (OpenDOAR, 2019). All identified repositories were thoroughly analyzed to collect data to answer the laid-down objectives and repository websites were personally visited in order to ascertain the operational status.*

Findings: *The results reveal that most of the repositories are institutional with English as the preferred language interface. In terms of software used by the corresponding repositories, Eprints stays a preference. Most repositories are found to be multidisciplinary in nature. Content-wise information shows that the majority of the repositories archive journal articles and the majority of the repositories are operational in nature.*

Research implications: *The study will be of help to the repository administrators across the UK to know the actual position of repositories used for content management. It will reveal the actual position and help in eradicating the lacunae present in the repositories.*

Future research: *The study can be extended to know the use of the content of the repositories dotting the UK.*

Keywords: *Open Access; Open Access Repositories; Green OA; OpenDOAR; Scholarly communication*

Article type: *Research*

INTRODUCTION:

Prior to the emergence of digital publications, printed materials were the main mode of distribution for scholarly communication. The system of scholarly communications that existed for hundreds of years has been driven by the learned societies and their member communities around the world to publish findings of their research inquiries and scientific discoveries. Scholarly communication emerged with the publication of the first journal in 1665 (Journal Des Scavans and Philosophical Transactions of the Royal

Society). In 1960's and 1970's explosion in scholarly writing and research took place. Gradually book chapters, research monographs, conference proceedings began to be published at regular intervals. The continuing explosion lead to information overload making it difficult to purchase, store, and search print material. This traditional publishing model had many other problems also. During the past two decades due to advancement of IT and emergence of World Wide Web, scholarly communication has undergone a veritable revolution which give rise to rapid shift from print-only publishing to parallel print and electronic publishing with the help of which user can access, store and search broader range of journal article as compared to that of print era. But online publishing does not mean publications are freely available. Apart from technology publishers also play the most important and credible role in scholarly publishing lifecycle. Publishers not only facilitate scholarly communications but can also be barriers for the same. They charge users and libraries for subscription and provide access to only those who have subscribed to their journals. Due to increasing price and low budget, academic and research institutions can't afford subscription to all needed journals. Libraries are struggling to keep pace with these increases by transferring a bigger portion of their budget to journal subscription and by relying on "big deals" and consortia discounts (Albert, 2006).

All libraries with a result have lost ground and have been compelled into cancellation of critical materials. Merging of numerous publishers also led to an increase in prices as competition decreased. Moreover, research at universities and other institutions is usually funded by taxes paid by the general public, and when they are published people do not have free access to the research findings and have to pay again for the same. Scholars also have been required to surrender copyright to the publisher, thus limiting subsequent use of their own publications (Guernsey, 1998). These publishers generally don't pay scholars for their publications. They write for impact rather than money which help them to secure carrier points (Suber, 2012). In 1990s Scholars also realized that making use of WWW help to 'extent research, enrich education, share the learning of rich with poor and vice versa, makes this literature as useful as it can be, also lay a foundation for uniting humanity in a common intellectual conversation and quest for knowledge (Oppenheim, 2008). Growing dissatisfaction with this traditional scholarly communications system has gained global attention, with academic research institutions, governments, professional organizations, high-profile scientists, and the publishing community finally taking action to address these problems which resulted in the idea of providing free online publications and declarations of an open access (OA) movement.

Open Access

The four key properties which define OA is that it is digital, online accessible, free of charge and free of most copyright and licensing restrictions (Suber, 2015). It is 'barrier-free" access which removes two major hurdles of accessing scholarly writings i.e. "tag barrier" and "copyright barrier". This means that readers and libraries can access different documents, research findings, and other literature easily and are not bound by their ability to pay or by budget of their institution and have fewer restrictions on their use, reproduction, citation, and onward transmission. Budapest Open Access Initiative (BOAI) defines the concept in relation to journal literature as follows: 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. The only constraint on reproduction and distribution and the only role for copyright in this domain should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited (Budapest Open Access Initiative, 2002). Bethesda and Berlin statements put it: For a work to be OA, the copyright holder must consent in advance to let users "copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship" (Berlin Declaration on Open Access to Knowledge in Science and Humanities,

2003; Bethesda statement on Open Access publishing, 2003). Harnad, et al., (2004) witness two modes of OA- Gold OA (publishing the scholarly works in an OA journal) and Green OA (hosting the scholarly content on OA repositories). The chief difference between them is that OA journals conduct peer review while OA repositories do not.

Open Repositories ("Green OA")

"Open Access repositories can hold digital duplicates of published articles and make them freely available. Subject to copyright authors can deposit copies of their finished articles in repositories alongside their publication in normal journals" (SHERPA, n.a). By 1994, the scholarly community had already used digital files for archiving their literature. In 1991, the first centralized archive (arXiv) came into existence. Many publishing units have changed their traditional policies to allow scholars' self-archiving of post-prints and paved the way to open repositories. Normally duplicates become available after embargo periods caused by publisher. Literature can include preprints and post-prints of, theses and dissertations, journal articles, bibliographic references, patents, course materials, departmental databases, data files, audio and video files, institutional records, or digitized special collections from the library. By making its material freely accessible to all open repositories, it has increased the dissemination of scholarly writings, enhanced the potential for readership and citations. Green OA is more cost-effective and affordable means for institutions, funders, and other stakeholders to move ahead towards OA (Houghton & Swan, 2013). There are huge numbers of open access repositories around the globe. Directory of Open Access Repositories (OpenDOAR) and Registry of Open Access Repositories (ROAR) are such two leading lists which allow us to search for OA repositories and their content.

LITERATURE REVIEW:

Lynch (2006) is of the view that an increased elimination of barriers to the use of scholarly literature can be achieved through open access with compelling advantages. Sawant (2013) stated that the open access movement can solve to a great extent the problem of unaffordability to subscribe to every scientific publication. There are a host of good reasons to establish and maintain OA digital data repositories. From a scientific perspective they: facilitate the re-use of data and enable datasets to be conjoined, increasing the likelihood of new discoveries and innovations; promote research integrity through the promotion of transparency about the research process and facilitate the replication of results; enable data to be exposed to the power of computational analytics, meaning that procedures and calculations that would be difficult to undertake by hand or using analog technologies become possible in just a few microseconds; and ensure the best opportunity for reaching as large an audience as possible (Borgman, 2007; Lauriault et al., 2007). Zaki and Dollah (2012) reveal that OA intends to break the hold of commercial publishers on the intellectual output of universities and research institutions. Rather than giving published research to private companies, the universities and other research institutes should publish their research finding themselves on freely available, public domain websites. Jacso (2006) believes that Open Access Repositories (OARs) are beneficial for all the stakeholders, including publishers, editors, and authors as they can substantially increase their impact and the impact factor for the source journals. Silva and Vance (2017) emphasized that the OA publishing model is evolving, gaining the support of the academic and research communities, research funders, policymakers, and even the traditional journal publishers. Singh (2014) analyzed the role of BRICS (Brazil, Russian Federation, India, China, and South Africa) in the open access movement. The findings reveal that the majority of OAR's are multidisciplinary, Dspace is the favorite choice for developing institutional repositories and both Brazil and India are ahead of the rest with respect to the contribution of OARs. Dhanavandan and Tamizhchelvan (2014) discussed about the trends and growth of Institutional Repositories (IR) in South Asian countries and found that Bhutan and Maldives have not

established any institutional repositories in their respective libraries while as countries like India, Pakistan, Nepal, Bangladesh, and Sri Lanka have well-established repositories which are usually multidisciplinary and host collections in English language. Also, Dspace is the most preferred software and articles, conference papers and thesis are the most archived content. Abrizah, Noorhidawati and Kiran (2017) highlighted the state of OARs of Asian universities. Findings signify Japan as the biggest contributor, followed by India and Taiwan. Most repositories host journal articles, are multidisciplinary in nature and prefer Dspace over other software platforms. Dhanavandan and Tamizhchelvan (2014) analyze the repositories for Library and Information Science around the world and found that the United States has maximum repositories, followed by the United Kingdom. Furthermore, maximum repositories are institutional, powered with Dspace, use English language and are multidisciplinary in nature. Verma and Shukla (2014) evaluate the growth and development of OARs of the world. Paper concludes with maximum, operational, open access institutional repositories establishment in western countries and the Dspace & Eprints being the most preferred software. Maximum repositories host research papers & electronic theses/dissertations as dominant content types with English language interface. Ejikeme and Ezema (2019) examine the state of open access institutional repositories in Nigeria and observed slow growth of OA repositories. Furthermore, they also found that the dominant content of the repositories are journal articles followed by theses and dissertations and Dspace is the preferred software platform. Yaseen, Jan and Loan (2018) studied the status of open access e-book repositories and reveal that maximum operational repositories were contributed by Europe with the USA topping the list and Dspace remaining the most preferred content management software. Institutional repositories turn out to be the most preferred repository type. Sharma (2018) while evaluating the OAR's in Asian continent indicates that Japan is in lead followed by India. Ramasamy, Maheswaran, Pratheepan and Subbaiah (2017) report the functioning of open institutional repositories on Law & Politics and reveal that the United States leads in the contribution followed by the United Kingdom and Germany while maximum repositories are operational. Maximum repositories are institutional in nature, host journal articles, use Dspace and have content mostly in English language. Ganaie, Jan, Loan and Nisa (2014) identified the status of OA repositories in the field of Library and Information Science (LIS).The findings reveal that OA repositories in the field of Library and Information Science are gaining momentum worldwide. The United States is leading followed by the United Kingdom and Germany. Furthermore, maximum repositories are institutional and the dominating content in them is journal articles. Dspace is the favorite choice for content management and most repository websites are found to be operational.

DATA ANALYSIS:

A. Type of repositories:

220 (79.1 %) repositories are *institutional* in nature followed by 47 *disciplinary* (16.9 %), 6 *aggregating* (2.2 %) and 5 *governmental* repositories (1.8 %) respectively **(Table 1)**. Dhanavandan and Tamizhchelvan (2014); Singh (2014) and, Verma and Shukla (2014) have also confirmed *Institutional* repositories in lead.

Table 1: Type of repositories

S.No	Type	No. of repositories	Percentage
1	Institutional	220	79.1 %
2	Disciplinary	47	16.9 %
3	Aggregating	6	2.2 %

4	Governmental	5	1.8 %
	Total	**278**	

B. Language of content:

278 (100%) repositories have content in *English* language followed by *Welsh* and *French* each (6, 2.2%), *Spanish* (5, 1.8%), *German* (4, 1.4%), *Arabic* and *Polish* each (2, 0.7%) and *Hebrew* (1, 0.3%). However, 7(2.5%) repositories have used other languages **(Table 2).** Previous studies also confirm *English* as the most preferred language interface (Dhanavandan & Tamizhchelvan, 2014; Ramasamy, Maheswaran, Pratheepan & Subbaiah, 2017 and Verma & Shukla, 2014).

Table 2: Language of content

S.No	Language	No. of repositories	Percentage
1	English	278	100 %
2	Welsh	6	2.2 %
3	French	6	2.2 %
4	Spanish	5	1.8 %
5	German	4	1.4 %
6	Russian	3	1.1 %
7	Arabic	2	0.7 %
8	Polish	2	0.7 %
9	Hebrew	1	0.3 %
10	Other	7	2.5 %

C. Software:

Eprints is preferred by 137 (49.3 %) repositories followed by *DSpace* (40; 14.4 %) and *PURE* (21; 7.6 %). *Equella* and *Fedora* are used by 3 (1.1 %) repositories each while as *CONTENTdm*, *Digitool* and *HAL* software are used by 2 (0.3%) repositories each. 32 repositories use other software platforms. However, 35 repositories have not specified the type of software used by them **(TABLE 3)**. Dhanavandan and Tamizhchelvan (2014), Ejikeme and Ezema (2019), Singh (2014) and Yaseen, Jan and Loan (2018) also held *Dspace* as the preferred software. However, UK repositories seem to prefer Eprints software more than Dspace thus deviating from the usual trend.

Table 3: Software Used In Management of Repositories

S.No	Software	No. of repositories	Percentage
1	Eprints	137	49.3 %
2	Dspace	40	14.4 %
3	PURE	21	7.6 %
4	Equella	3	1.1 %
5	Fedora	3	1.1 %
6	Drupal	2	0.7 %
7	Greenstone	2	0.7 %
8	CONTENTdm	1	0.3 %
9	Digitool	1	0.3 %
10	HAL	1	0.3 %

11	Other	32	11.5 %
12	Unspecific	35	12.6 %
	Total	**278**	

D. Subject of content:

Multidisciplinary repositories are highest in number i.e. (163, 58.6 %) followed by *Health and medicine* and *Computers and IT* repositories both 31 (11.1 %), *History and Archaeology* 27 (9.7 %), *Education* 20 (7.2 %). Repositories devoted to other disciplines range from 0.3 % to 6.5 % **(TABLE 4)**. Abrizah, Noorhidawati and Kiran (2017); Dhanavandan and Tamizhchelvan (2014) and Singh (2014) also reveal that the majority of repositories are multidisciplinary in nature.

Table 4: Subject Content of Repositories

S.No	Subject of content	No. of repositories	Percentage
1	Multidisciplinary	163	58.6 %
2	Health and Medicine	31	11.1 %
3	Computers and IT	31	11.1 %
4	History and Archaeology	27	9.7 %
5	Education	20	7.2 %
6	Arts and Humanities General	18	6.5 %
7	Business and Economics	17	6.1 %
8	Biology and Biochemistry	17	6.1 %
9	Geography and Regional Studies	16	5.7 %
10	Social Sciences General	16	5.7 %
11	Law and Politics	15	5.4 %
12	Fine and Performing Arts	14	5 %
13	Library and Information Science	14	5 %
14	Mathematics and Statistics	14	5 %
15	Ecology and Environment	13	4.7 %
16	Philosophy and Religion	12	4.3 %
17	Language and Literature	11	4 %
18	Technology General	10	3.6 %
19	Science General	10	3.6 %
20	Management and Planning	9	3.2 %
21	Psychology	9	3.2 %
22	Earth and Planetary Sciences	9	3.2 %
23	Agriculture, Food and Veterinary	8	2.9 %
24	Chemistry and Chemical Technology	8	2.9 %
25	Physics and Astronomy	7	2.5 %
26	Electrical and Electronic Engineering	5	1.8 %
27	Architecture	3	1.1 %
28	Mechanical Engineering and Materials	3	1.1 %

29	Civil Engineering	1	0.3 %

E. Content type:

A majority (190, 68.3%) of the repositories host *journal articles* followed by *Conference and workshop papers* (114, 41 %) and *Books, Chapters and Sections* (98, 35.2 %). It is evident that trend line decreases subsequently further down the table with the least archived content type being *Patents and Software* with 6 (2.1 %) and 5 (1.8 %) repositories archiving them respectively **(TABLE 5).** Ejikeme and Ezema (2019); Ganaie, Jan, Loan and Nisa (2014) and Ramasamy, Maheswaran, Pratheepan and Subbaiah (2017) also confirmed *Journal Articles* as the dominant repository content.

Table 5: Content type of Repositories

S.No	Content type	No. of repositories	Percentage
1	Journal Articles	190	68.3 %
2	Conference and Workshop Papers	114	41 %
3	Books, Chapters, and Sections	98	35.2 %
4	Unpublished Reports and Working Papers	97	34.8 %
5	Thesis and Dissertations	89	32 %
6	Bibliographic References	71	25
7	Multimedia and Audio-Visual Materials	66	23.8 %
8	Other Special Item Types	48	17.3 %
9	Datasets	35	12.6 %
10	Learning Objects	33	11.9 %
11	Patents	6	2.1 %
12	Software	5	1.8 %

F. Operational status:

Majority of repositories are *operational* i.e. 247(88.8%) whereas 31(11.2%) repositories are *closed* **(TABLE 5).** Ganaie, Jan, Loan and Nisa (2014); Ramasamy, Maheswaran, Pratheepan and Subbaiah (2017) and Yaseen, Jan and Loan (2018) also emphasized that majority of western repositories are operational.

Table 5: Operational Status of Repositories

Type	No. of repositories	Percentage
Operational	247	88.8 %
Closed	31	11.2 %
Total	**278**	

FINDINGS:

The above findings on the status of UK based open repositories reveal that among the various categories, *institutional repositories* hold a maximum share. This can be attributed to the fact that the majority of institutions endorse research-based activities for which OA is most viable. On the other hand, *governmental repositories* contribute the least share signifying that these institutions are overlooking the benefits of OA. As far as language interface is concerned, *English* emerges as the prominent language interface of repositories since it is the native language of the UK. Also, a portion of repositories have developed their interface in languages other than *English* to facilitate the multilingual approach of users. Among the diverse range of software used, *Eprints* is highly preferred primarily because of user-friendly interface and in-built preservation, dissemination and reporting services. Further, the findings reveal that the majority of the repositories host more than one subject i.e. are *multidisciplinary* in nature. Subjects like *Health and Medicine, Computers and IT* and *History and Archaeology* are archived more by the repository as compared to others. This can be attributed to the fact that researchers in these fields are cognizant of the advantages of OA and its implications. As far as the content type is concerned, repositories have been found to archive *journal articles* the most followed by *conference and workshop papers* since these increase the visibility and ease of use of scholarly work thereby promoting their increased usage and impact. On the basis of the functionality of repository websites, maximum are found to be operational. This asserts the fact that institutions worldwide are determined to create and maintain their respective repositories for unceasing dissemination of their intellectual output.

CONCLUSION:

Growth and advancement in the field of Open Access has been parallel to that of the digital world with Open Access repositories being recognized as essential vehicles for scholarly communication. In recent years repositories have become a compelling and useful tool for storage and dissemination of intellectual output of an organization. More and more organizations are coming forward to make their indigenous intellectual e-resources available on the Open Access publishing platforms.

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