

Global Repository Movement in the Domain of Library and Information Science Discipline

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Abstract

Provides an overview of Subject Repositories (SRs) throughout the World in response to the open access movement (OAM). It mainly highlights the current trends of repository development in Library and Information Science (LIS) field. This paper covers all repositories in LIS field as registered in OpenDOAR (Directory of Open Access Repository) database. The main objective of the paper is to select a set of parameters for evaluation of LIS repositories with other disciplinary repositories taking into consideration global recommendations and best practice guidelines. The paper also shows the growth of selected LIS repositories in terms of volume and number of objects, contents type, software pattern, subjects coverage etc. Lastly points out lacunas of LIS repositories in compare to other disciplinary repositories as well as recommends possible directions which can make the repository sustainable and will change the culture of information exchange pattern in the social science disciplines as a whole.

Keywords: open access, self-archiving, digital library, institutional repository, subject repository, library and information science.

Introduction

Institutional Repositories (IRs) are now common in Higher Education. Organizations throughout the World are making their intellectual contents available for all in public domain through repositories. Several declarations and statements (BOAI, 2002; Bethesda Statement; 2003; Berlin Declaration, 2003) at international level advocated that results of the research funded by the government should be available in public domain as in open access (OA) resources. But successful examples of Subject Repositories (SRs) are rare, and limited to a few scientific disciplines (Puplett, 2010).

In 1991, the first subject repository 'arXiv' was founded by Paul Ginsparg, a physicist at Los Alamos National Laboratories, allowing scientists to share e-prints in Physics, Mathematics, Computer Science etc (Roy, 2015). The importance of Subject Repositories

(SRs) has now identified and is growing rapidly in different disciplines. Now, repositories are being maintained in different subjects such as in agriculture (Roy, Biswas & Mukhopadhyay, 2016a, 2016b) and library and information science (Ganaie et al., 2014; Sengupta, 2012). Till now, there is a huge gap in LIS literatures about Subject Repositories (SRs) or Disciplinary Repositories (DRs). There is still significantly less general literature on the usefulness of SRs (cross-institutional contributions on a single subject area or a group of related subjects) than on IRs (cross-disciplinary coverage from a single institute of a group of related institutes). In addition to this, till date, there are no guidelines and no proper mechanisms by which SRs could be evaluated. But gradually self archiving in both Institutional and Disciplinary repositories have become increasingly acceptable and enthusiastically supported by scientists, subject experts etc. Research scholars are more attracted to the SRs because they can get the latest research information immediately and freely in compare with traditional publishing channels. As a result, development of domain-specific SRs and dissemination of open contents through these entities are rapidly becoming an area of research interests for library professionals.

Repository movement in India

Repository movement in India started getting attention from professionals since 2004 (Roy, 2007, 2010, 2014b; Roy, Biswas & Mukhopadhyay, 2012a, 2013). India is taking a lead role in open access movement in South-East Asia (OpenDOAR, 2014; ROAR, 2014). Many Indian initiatives (e.g. projects like UGC-Infonet, Shodhganga, National Digital Library at Indian Institute of Technology, Kharagpur etc) in open access (OA) are getting recognitions from different countries and Indian Government has developed policies to support OA (Roy, Biswas & Mukhopadhyay, 2012b, 2016d; UGC, 2005; Bangalore Declaration, 2006; NKC, 2007; DBT & DST, 2014). There are near about two thousands five hundreds repositories in the World (up to December, 2014) where as India possesses 80 repositories (ROAR, 2014). As per Cybermetrics Lab, research groups based in Spain, only eleven (11) repositories from India were listed out of 800 world's repositories (<https://mallikarjundora.wordpress.com/2010/07/07/ranking-web-of-repositories-july-2010/>). Many institutions have already developed IR in order to provide global access to the scholarly literature of their own. A number of workshops, conferences, seminars are being organized every year for making it (IR) popular towards the masses. But SRs are so far neglected and are not up to the standard. As per OpenDOAR (OpenDOAR, 2014) database, there are 118 repositories (up to December, 2014) in LIS field in the world whereas only five (5) repositories have been developed in India (Fig. I). Even all five (5) repositories are multidisciplinary in nature (except Librarians' Digital Library - LDL) and cover several disciplines. The Librarians' Digital Library (LDL) is the only repository meant for LIS professionals possesses only LIS literature.

Subject Repository or Disciplinary Repository

Quite a lot has been written about Open Access Repositories (OARs) in general. There are hundreds of SRs/DRs but there are a few studies that have concentrated specifically on SRs or DRs. Definitions of 'Subject Repository' are as rare as successful SRs themselves

(Puplett, 2010). A Subject Repository is a repository of research outputs (and possibly metadata about such outputs) whose primary mission is to give end users access to all and only the research contents available in a given subject. It is a collection of research outputs with a common link to a particular subject discipline. Wikipedia defines SR as follow-

“A Disciplinary repository is a collection containing works or data associated with these works of scholars in a particular subject area. The repository can be online and accept work from scholars across institutions in contrast to institutional repositories. The collections can include academic and research papers. A disciplinary repository generally covers one broad based discipline, with contributors from many different institutions supported by a variety of funders. Disciplinary repositories can also act as stores of data related to a particular subject, allowing documents along with data associated with that work to be stored in the repository” (Wikipedia, 2014).

Academicians, researchers and subject experts are very much keen to their discipline rather than the institutional or university repository because this type of repository (SR) explicitly holds documents in their research area. Now several SRs are operational in different countries and a growing literature are now available on this area. Figure II shows the growth and development of LIS repositories during last ten years e.g. 2006 – May, 2016).

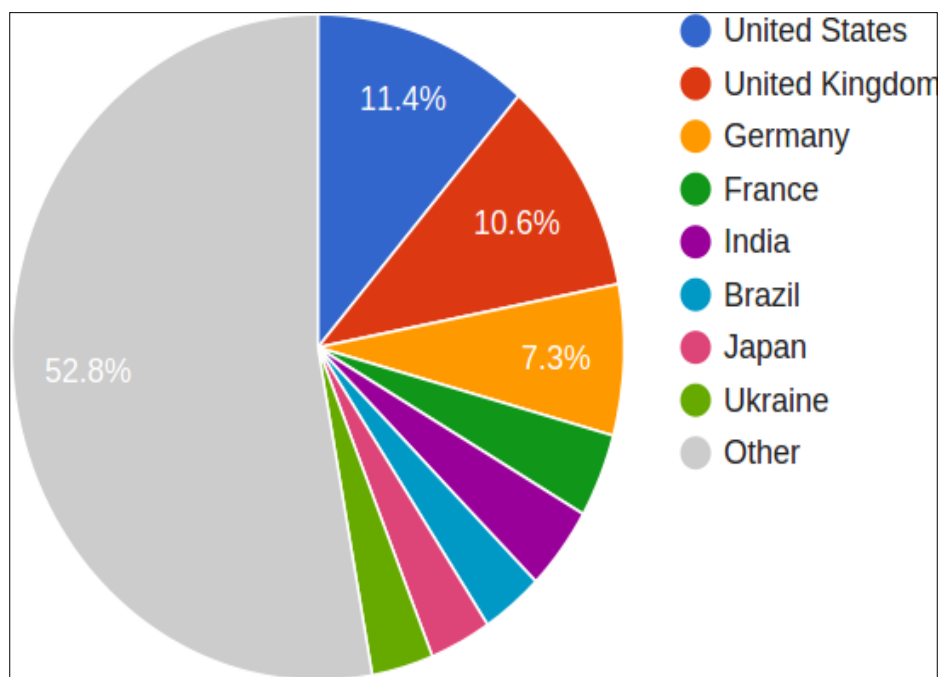


Fig. I: Proportion of Repositories-Country-wise (Source: OpenDOAR)

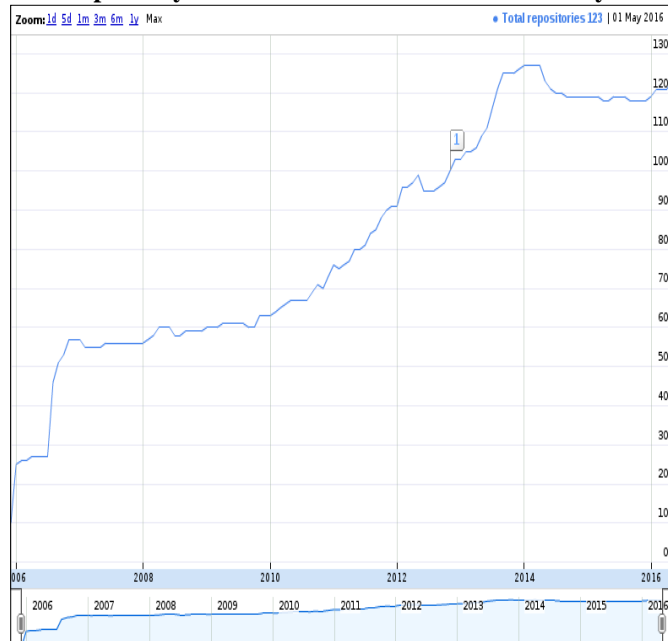


Fig. II: Growth and Development of LIS OARs (Source: OpenDOAR)

Adamick & Reznik-Zellen (2010a) stated that “*Subject repositories are under studied and under represented in library science literature and in the scholarly communication and digital library fields*”. In another article authors further discussed several key issues and analyzed top ten Subject Repositories (Adamick & Reznik-Zellen, 2010b). Discipline or Subject-based central repositories take the top spots in a new ranking of repositories that forms part of the January 2008 Webometrics Ranking of World Universities. The first three ranks go to: *Arxiv*, dedicated to physics and related sciences; *RePEc*, a big effort being made by the economic science world; and ‘*E-LIS*’ committed to Library and Information Sciences and Documentation (http://www.researchinformation.info/news/news_story.php?news_id=217).

The following (Fig. III) are the popular ten (10) subject - based repository arranged as per total items uploaded (Adamick & Reznik-Zellen, 2010a). Annexure II gives information of top ten (10) Subject Repositories (SRs) arranged as per World ranking (Cybermetrics Lab, 2013). And, the United States (US) topped the list with eight repositories.

Repository	Year Established	Total Items
PubMed Central	2000	1,597,053
CiteSeer ^x	1991	1,513,879
RePEc	1991	739,285
ArXiv	1991	590,250
SSRN	1997	220,035
AgEcon	1995	38,198
Policy Archive	2008	21,961
Archive of European Integration	2003	10,571
E-LIS	2003	10,500
Organic EPrints	2002	8,394

**Fig. III: Total collections in the top SRs (arranged as per total items)
(Source: Adamick & Reznik-Zellen, 2010a)**

Table I shows the total collections of top ten SRs (up to June, 2015) as well as number of documents (both abstract and full text) added during last five years (2010-2015). The cumulative growth of collections (year-wise) of top SRs is not available. Though, these data (e.g. size of collections or total records) are quite problematical and are difficult to assess accurately. Sometimes repositories listed in OpenDOAR, ROAR or ROARMAP databases show something different from its own website. It is quite clear that there are a very small number of large repositories and a large number of small repositories (in terms of total collections). Here, five repositories have less than 100000 items (column IV of table 1). Though the position of SRs change (in terms of total collections) if we compare column IV (table 1) with column III of figure III. Again, picture will differ if we compare SRs as per percentage (%) of growth of collections (e.g. column VI of table I). Then, small repositories listed below (as per column IV) will go to the top.

Table I.

Items added and percentage of growth of records

Position of SRs as per Column		Repository	Total Items (2010)	Total Items (June, 2015)	Data Added (2010 - 2015)	Percentage (%) of growth
IV	VI					
2	5	PubMed Central	1597053	3300000	1702947	106.0
3	7	CiteSeer ^x	1513879	2700000	1186121	78.3
1	1	RePEc	739285	17000000	16260715	2199.5
5	8	ArXiv	590250	1028792	438542	74.2
4	2	SSRN	220035	1101615	881528	400.6

Position of SRs as per Column		Repository	Total Items (2010)	Total Items (June, 2015)	Data Added (2010 - 2015)	Percentage (%) of growth
IV	VI					
6	4	AgEcon	38198	84688	46490	121.7
8	10	Policy Archive	21961	30000	8039	36.6
7	3	AEI	10571	42291	31720	300.0
9	9	E-LIS	10500	17320	6820	64.9
10	6	Organic EPrints	8394	17021	8627	102.7

column IV indicates total items (up to June, 2015); column VI indicates percentage (%) of growth of collections; column I indicates current position of SRs as per column IV & VI.

Why Repositories in LIS Field

Subject repositories are growing rapidly throughout the World. The domain of LIS is no exceptions. Need for cooperation between LIS education programs has been highlighted by various studies (Chaudhry, 2007; Lin, 2004). It offers much to the respective researchers in a field and a window to research as it happens. This type of repositories can be useful for LIS education in many ways. It will alert teachers, instructors, library professionals about new developments and will keep them up to date with the latest technologies being applied in the field. Students and research scholars will get tutorials, lecture notes, presentations, question papers and other supplementary readings from the repositories. Chaudhry & Khoo (2006) suggests that these subject repositories are expected to facilitate and to advance sharing of digitized teaching materials within the LIS academic community across Asia whereas Chaudhry (2007) put emphasis on identifying experts in this field working in the same area as well as in different areas of LIS. Chaudhry (2007) further reported that such efforts help in sharing teaching materials and faculty development with possible involvement of international forums for improving LIS education. And thus making regional and international collaboration of LIS communities and networks, it will enrich quality of LIS education at national and international arena (Chaudhry, 2007). It is widely acknowledged that authors prefer SRs to IRs, despite a persistent effort to develop institution-specific repositories (Cervone, 2008; Kingsley, 2008). Because authors identify with their discipline rather than the university social system, they are more likely to use a SR that explicitly collects in their research area. Roy & Mukhopadhyay (2011) advocated for repositories in LIS discipline for various reasons – i) *widening access of LIS literature*; ii) *supporting community and promoting sharing & reuse of open access contents*; iii) *helping to identify experts in the LIS field*; iv) *alerting about latest developments in courses*; v) *increasing the quality of content as well as research outputs*; vi) *improving global access to local research and*; vii) *ability to serve a large number of scholars at a potentially reduced cost.*

Geographical Distribution of LIS Repositories

Now almost all the continents are maintaining OARs (OpenDOAR, 2014; ROAR, 2014; Roy, Biswas & Mukhopadhyay, 2012d). Europe (Roy, Biswas & Mukhopadhyay, 2015), North America (Roy, Biswas & Mukhopadhyay, 2016c) and Asia (Roy, Biswas &

Mukhopadhyay, 2012c) have been the main players. As per OpenDOAR database, there are 118 repositories in LIS discipline (up to December, 2014). Europe possesses 54 (45.8%) repositories whereas North America 22 (18.6%) and Asia contributes 21 (17.1%) repositories respectively. Another continent Africa contains only 10 (8.5%) repositories and South America holds 6 (5.1%) repositories. A complete picture can be seen in Table II.

Table II:

Proportion of Repositories - Continent-wise (Source: OpenDOAR, 2014)

Continent	No. of Repository	Percentage (%)
Europe	54	45.8
North America	22	18.6
Asia	21	17.1
Africa	10	8.5
South America	6	5.1
Australasia	4	3.4
Others	1	0.8

Subjects Archived by Repositories

There is variety of subjects archived by repositories worldwide. In the distribution by subjects, out of 2527 repositories (up to December, 2014), LIS discipline possesses 118 (4.6%) repositories and stands 10th position (Table III). The subject 'Health & Medicine' possesses 248 (9.8%) repositories and ranks 1st position whereas 'History and Archaeology' possesses 210 (8.3%) repositories and ranks 2nd position respectively. The subjects like 'Business & Economics', 'Law & Politics', 'Computer & IT' possesses 191 (7.5%), 185 (7.3%) and 160 (6.3%) repositories respectively. In preparing this table III, broad disciplines like Multidisciplinary, Science General, Social Science General, Arts & Humanities General, and Technology General have been ignored as they all cover more than one subject. The study has ignored those subjects having less than one hundred (100) repositories. Table III shows the total number of repositories possesses by different subjects.

Table III

Proportion of Repositories - Subject-wise (Source: OpenDOAR, 2014)

Rank	Subjects	No. of Repository	Percentage (%)
1	Health & Medicine	248	9.8
2	History and Archaeology	210	8.3
3	Business & Economics	191	7.5
4	Law & Politics	185	7.3
5	Computer & IT	160	6.3
6	Education	155	6.1
7	Geography & Regional Studies	149	5.8
8	Ecology & Environment	135	5.3
9	Biology & Biochemistry	132	5.2
10	Library and Information Science	118	4.6
11	Language & Literature	117	4.6
12	Agriculture, Food & Veterinary	111	4.3

Rank	Subjects	No. of Repository	Percentage (%)
13	Mathematics and Statistics	103	4.0
14	Philosophy & Religion	102	4.0

Methodology

This study is a literature-based discussion and three popular databases (e.g. OpenDOAR, ROAR, ROARMAP) were consulted (up to December, 2014) along with their policy documentations in order to identify the key features of OARs. The study considered all LIS repositories (118) that were fully operational and were registered in OpenDOAR database as on December, 2014. Repositories covering '*Library and Information Science*' exclusively or at least LIS as one of the subjects covered in SRs were considered. Data were collected after visiting respective databases and websites. In the next level of analytical study, out of 118 repositories, twenty three repositories were selected on the basis of framed parameters (as proposed in table IV) based on global recommendations and existing best practices. Several recommendations and best practice guidelines (DINI, 2003; OpenAIRE, 2011; RECODE, 2014) at national and international levels were consulted in order to identify technical and socio-technical issues related to OARs. It was followed by selection and settings of key parameters for evaluation of LIS repositories on the basis of global recommendations. Finally, data were analyzed and compared against those framed criteria. The analytical work was done during January to June, 2015.

Sometimes it was found difficult to draw a line and a couple of border case due to some technical problems. Some repositories may have registered in OpenDOAR or ROAR databases in different name or their corresponding URL (Uniform Resource Locator) or OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting) verbs may not be working. Some policies are listed under a different name or wrongly recorded into the databases. Though some of the policies are still being developed and improved. The analysis of data as represented in section 7 took this limitation in consideration for the evaluation study.

Analysis of LIS Repositories

For this analytical study, twenty three (23) LIS repositories were selected from OpenDOAR database on the basis of pre-defined criteria (as given in table IV). Annexure I gives details information (such as OAI-PMH url, total objects uploaded, software used, subject coverage and content types etc) about twenty three selected LIS repositories from fifteen countries. Annexure II gives basic information about top ten Subject Repositories (SRs) in different subject areas including LIS. The following sub sections provide data analysis and interpretation under five major parameters such as total number and types of contents (column VI & IX in annexure 1), country (column IV of annexure I), and software used (column VII of annexure I).

Table IV

Parameters for selection of LIS repositories from OpenDOAR Database

Parameters	Conditions
Number of objects uploaded	Ten thousands and above
Support for OAI-PMH (version 2)	Available for metadata harvesting
Type of software used	Distributed architecture

Parameters	Conditions
Language covered	English (at least)
Data type	Textual (at least)
Data format	Variety of format supported
Data availability	Abstract or Full Text
Searching	Simple and Advanced (at least)
Licensing model	Standardized license
Metadata schemas	Open standard
Access pattern	Access without restrictions / embargo

Type of Objects and Content size

There is a similarity in between disciplinary repository and traditional or multidisciplinary repository in terms of contents type. Both the repositories contain almost same type of objects (OpenDOAR, 2014; ROAR, 2014). Generally repositories hold objects like articles, theses, multimedia, unpublished documents, published papers etc. There is no exception in case of LIS repositories. LIS repositories possess objects like published papers (preprints, post prints, conferences, and articles); theses & dissertations; unpublished documents; books; multimedia objects; learning objects etc. Though only a few repositories hold special items like multimedia, datasets, patents.

Subject Repositories differ with multidisciplinary repositories in respect of data size. As the concept of 'SR' is new, collection size is very small and only a few repositories are in good position. Some repositories have strong collections whereas repositories with recent origin have uploaded less number of objects. Even growth rate of objects uploaded per year is quite low in compare to other multidisciplinary repositories. It is also found that information regarding size of the uploaded objects is not always as accurate as reported.

Country-wise Distribution

It is found that Australia possesses three (3) repositories whereas other six (6) countries (e.g. China, France, Germany, Singapore, United Kingdom & United States) possess two (2) repositories respectively. The rest other eight (8) countries possess one (1) repository each. But picture may differ if repositories are compared in respect of percentage (%) of OAI-PMH compliant repository.

Proportion of Software Distribution

It is found that six (6) types of repository software have been used by selected twenty three (23) repositories under study (Fig. IV). DSpace and EPrints which initially were designed for Institutional Repositories (IRs) were found very popular platforms for developing SRs. It appears that DSpace is the most popular software and is used by twelve (12) repositories whereas EPrints is used by six (6) repositories. The other five repositories use local software. Digital Commons is used by two (2) repositories whereas software like CONTENTdm, DigiTool and HAL is used by one (1) repository respectively.

Metadata Schema

More than 84% repositories registered in OpenDOAR database have no metadata policy (Fig. V). So, it is quite difficult to provide information about the types of metadata standards used in the repositories. But IDR systems differ widely in the handling of metadata schema

(Green, Macdonald & Rice, 2009). Qualified Dublin Core and unqualified (simple) Dublin Core metadata schemas are the most popular metadata standards (Graaf & Eijndhoven, 2008; University Grants Commission, 2005; Roy, Biswas & Mukhopadhyay, 2016a, 2016e). Though some IDRs have either created their own metadata schemas or applied some domain-specific metadata schemas (like ETD-MS for ETDs, VRA-Core for images, IEEE-LOM for learning objects etc) in managing specific types of objects (Gibbons, 2004). Roy (2014a, 2015) reported after analyzing OpenDOAR, ROAR and ROARMAP databases that most of the IDRs have adopted simple Dublin Core schema as a descriptive metadata standard.

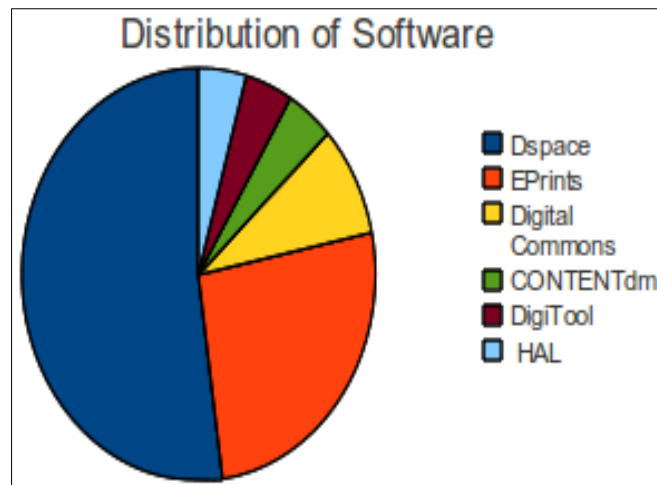


Fig. IV: Distribution of Software

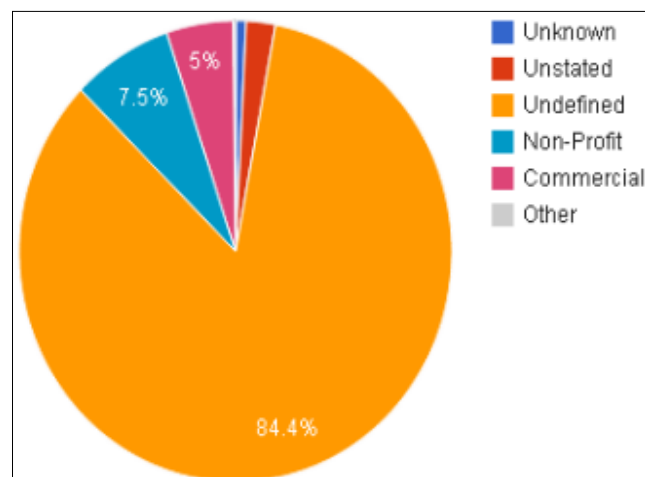


Fig. V: Metadata policy (Source: OpenDOAR, 2014)

Repository Policies

In a survey for OpenDOAR in early 2006, Peter Millington (Millington, 2006) discovered that about two thirds of OARs did not have publicly stated policies. The need for a policy to guide the operation of the repository is an important factor to be considered (Asamoah-Hassan, 2010). Laundry lists of OA self archiving policy issues were discussed by several experts (Ware, 2004; Barton & Waters, 2004-2005; Rieh et al., 2008; Armbruster, 2011; Johnson, 2002; Shearer, 2005). Swan et al. (2015) reported that ROARMAP database

approximately covers 70% of the policy documents while the remaining 30% were in the draft stage. After analyzing ROARMAP database, Roy (2014) in his research work reported that majority of OARs don't have OA self archiving policy documentations. In another study (Roy, Biswas & Mukhopadhyay, 2016c), it is found that most of the repositories in COPAI members countries in North America don't have publicly stated OA self archiving policies.

After analyzing LIS repositories, it is found that only 8 (34.78%) repositories have policy (at least one mentioned in Table V) whereas 15 (65.22%) repositories don't have policies regarding the above mentioned issues mentioned in Table V. Five key policies (e.g. *Recorded Metadata Re-Use Policies*; *Full-Text Data Re-Use Policies*; *Recorded Contents Policies*; *Recorded Submission Policies*; and *Recorded Preservation Policies*) that are common to almost all repositories have been identified and listed in Table V. However some of the important policies (like Contents policy and Preservation policy) are missing from the list as these were not properly stated in repository policy documents or LIS literature. Apart from this, several technical as well as non-technical issues have not been discussed in their policy documentations.

Table V

Policies of selected LIS Repositories

Sl. No.*	Name of the Repository	Policy				
		Metadata	Contents	Submission	Preservation	Data
02	Queensland University of Technology ePrints Archive	Y	Y	Y	N	Y
04	edoc	Y	Y	Y	Y	Y
12	Binus University Repository	Y	Y	Y	Y	Y
14	E-LIS	Y	Y	Y	Y	Y
15	OZone (OZone provided by Ontario Scholars Portal)	N	N	Y	N	N
16	eScholarship@UMMS	Y	N	N	N	Y
18	D-Scholarship @Pitt	N	Y	Y	N	Y
21	CADAIR (Aberystwyth University Repository)	N	N	Y	N	N

* Repositories are arranged as per column I of annexure I

Major Findings

This paper provides an insight picture of the repository movement in the field of LIS and highlights the areas need to be developed for betterment of these repositories. Key findings have been highlighted along with suggestions of a more general nature for further development of LIS repositories in global scale. After through study of selected repositories, the major findings have been identified and grouped under two broad headings as follow -

General

This sub-section highlights different key findings in a more generalized way – i) *only one (1) repository (sl. no. 14) holds documents in three languages*; ii) *two (2) repositories hold only LIS subject (sl. no. 14 & 15)*; iii) *Chinese (sl. no. 9, 13 & 17) language is used by three*

(3) repositories; iv) only one (1) repository (sl. no. 14) holds special items like Newspaper articles; v) four (4) Asian Countries (China, Indonesia, Singapore & Taiwan) have been enlisted; vi) only one Asian Country (China) possesses two (2) repositories; vii) growth rate of SRs per year is quite low in compare to OARs; viii) most of the repositories are either interdisciplinary or multidisciplinary in nature; ix) repositories are generally managed and controlled by libraries and; x) growth rate of objects uploaded in SRs per year is quite low.

Technical Features

This sub-section covers various technical features of different repository system under study – i) no standards exist for access statistics; ii) no system for feedback mechanism; iii) **software are not up to the global standard and are custom-built software**; iv) only a few repositories have customized user interface; v) workflow should be more robust; vi) lack of sophisticated multilingual search interfaces; vii) no proper mechanism for searching regional and multilingual documents; viii) repositories are not connected with others network at national level and; ix) only a few repositories are RSS-compliant and provide e-mail alerting service.

Conclusion

There is a growing trend of organization and management of SRs and providing seamless access to these OA knowledge objects has been a challenging task to the library professionals. As per OpenDOAR and ROAR databases, there are near about two thousands five hundreds repositories in the World but SRs have got importance just before a few years. As per the databases, every day one new repository is being added to the databases. Despite the success of SRs relative to Institutional Repositories, there is an enormous need for large-scale evaluations of SRs as tools. Without such studies, building a useful SR that responds to relevant needs is a challenging task. Their scope and community focus is specific and typically quite specialized. The main focus is on a particular subject and as contents are being specialized scientists/researchers are showing their interest by depositing contents to the archives. If strategies are implemented; standards are followed, policies are formulated in a calm and orderly way, SRs are expected to be more successful and may become an alternative publishing platform in scholarly communication process.

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Annexure I: List of selected LIS Repositories under Study

SL No.	Name of the Repository	OAI-PMH	Country	Languages	Items*	Software	Subjects	Contents
1	HAL (Hyper Article en Ligne)	http://hal.archives-ouvertes.fr/oai/oai.php	France	French	262831	HAL	Biology and Biochemistry; Chemistry and Chemical Technology; Education; Law and Politics; Library and Information Science; Psychology	Articles; Conferences; Theses; Unpublished; Books
2	Queensland University of Technology ePrints Archive (QUT ePrints Archive)	http://eprints.qut.edu.au/cgi/oai2	Australia	English	47076	EPrints	Multidisciplinary	Articles; Conferences; Theses; Unpublished
3	Memoria digital de Canarias (mdC)	http://bibmdc2.ulpgc.es/cgi-bin/oai.exe	Spain	Spanish	45251	CONTENTdm	Multidisciplinary; Computers & IT; History & Archaeology; Library & Information Science	Articles; Conferences; Unpublished; Books; Multimedia; Special
4	edoc	http://edoc.unibas.ch/cgi/oai2	Switzerland	English	29759	EPrints	Science General; Arts and Humanities General; Philosophy and Religion; Business and Economics; Law and Politics; Library and Information Science	Articles; References; Theses; Books
5	UPSpace (UPSpace at the University of Pretoria)	http://repository.up.ac.za/oai/request	South Africa	English	28069	DSpace	Agriculture, Food & Veterinary; Ecology & Environment; Civil Engineering; Arts & Humanities General; Education; Library & Information Science	Articles; Conferences; Theses; Datasets; Multimedia
6	MADOC (Mannheim Document Server)	http://ub-madoc.bib.uni-mannheim.de/cgi/oai2	Germany	German; English	25567	EPrints	Mathematics and Statistics; Social Sciences General; Business and Economics; Law and Politics; Library and Information Science	Articles; References; Conferences; Theses; Unpublished; Books
7	ScholarBank@NUS	http://scholarbank.nus.edu.sg/oai/request	Singapore	English	23300	DSpace	Business and Economics; Law and Politics; Library and Information Science; Psychology	Articles; Conferences; Theses; Multimedia; Patents
8	KOPS (Konstanzer Online-Publikations-System)	http://kops.ub.uni-konstanz.de/oai-dini/request	Germany	German; English	21252	DSpace	Language and Literature; Philosophy and Religion; Social Sciences General; Library and Information Science; Psychology	Articles; Conferences; Theses; Unpublished; Books
9	PKU Institutional Repository	http://ir.pku.edu.cn/oai/request	China	English; Chinese	20257	DSpace	Language and Literature; Philosophy and Religion; Business and Economics; Law and Politics; Library and Information Science; Management and Planning	Articles; Conferences; Theses; Books
10	FAC (Flinders Academic Commons)	http://dspace.flinders.edu.au/dspace-oai/request	Australia	English	19126	DSpace	Arts and Humanities General; Law and Politics; Library and Information Science	Articles; Unpublished
11	UniSA Research Archive	http://ura.unisa.edu.au/OAI-PUB	Australia	English	18104	DigiTool	Multidisciplinary; Ecology & Environment; Health & Medicine; Technology General; Arts & Humanities General; History & Archaeology; Business & Economics; Education; Library & Information Science	Articles; References; Conferences; Theses; Multimedia
12	Binus University Repository	http://eprints.binus.ac.id/cgi/oai2	Indonesia	English; Malay	17392	EPrints	Computers and IT; Language and Literature; Social Sciences General; Business and	Articles; References; Theses

SL No.	Name of the Repository	OAI-PMH	Country	Languages	Items*	Software	Subjects	Contents
							Economics; Education; Library and Information Science; Management and Planning; Psychology	
13	Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS (IGSNRR OpenIR)	http://159.226.115.200/casirgrid-oai/request	China	Chinese; English	16471	DSpace	Agriculture, Food & Veterinary; Ecology & Environment; Physics & Astronomy; Geography & Regional Studies; Library & Information Science	Articles; Conferences; Theses; Books
14	E-LIS	http://eprints.rclis.org/dspace-oai/request	Italy	English; Italian; Spanish	15678	DSpace	Library and Information Science	Articles; References; Conferences; Theses; Unpublished; Books; Datasets; Learning Objects; Special
15	OZone (OZone provided by Ontario Scholars Portal)	https://ospace.scholarsportal.info/oai/request	Canada	English	15283	DSpace	Library and Information Science	Articles; Unpublished; Datasets; Learning Objects
16	eScholarship@UMMS	http://escholarship.umassmed.edu/do/oai/	United States	English	14196	Digital Commons	Health and Medicine; Library and Information Science	Articles; References; Theses; Books
17	Chaoyang University of Technology Institutional Repository (CYU TIR)	http://ir.lib.cyut.edu.tw:8080/dspace-oai/request	Taiwan	Chinese; English	13092	DSpace	Science General; Technology General; Arts & Humanities General; Social Sciences General; Education; Library & Information Science; Management & Planning	Articles; References; Theses; Unpublished; Books
18	D-Scholarship@Pitt	http://d-scholarship.pitt.edu/cgi/oai2	United States	English	12706	EPrints	Language & Literature; Library & Information Science; Management & Planning Engineering, Science General, Technology General	Articles; Conferences; Theses; Books; Multimedia
19	Toulouse 1 Capitole Publications		France	French; English	12250	EPrints	Multidisciplinary; Mathematics and Statistics; Arts and Humanities General; History and Archaeology; Language and Literature; Business and Economics; Law and Politics; Library and Information Science	Articles; Conferences; Theses; Unpublished; Books
20	InK (Institutional Knowledge at Singapore Management University)	http://ink.library.smu.edu.sg/cgi/oai2.cgi	Singapore	English	12079	Digital Commons	Social Sciences General; Business and Economics; Law and Politics; Library and Information Science; Management and Planning	Articles; Conferences; Theses; Unpublished; Books; Multimedia
21	CADAIIR (Aberystwyth University Repository)	http://cadair.aber.ac.uk/dspace-oai/request	United Kingdom	English; Welsh	11679	DSpace	Multidisciplinary; Mathematics and Statistics; Physics and Astronomy; Computers and IT; Library and Information Science	Articles; Theses
22	University of Wales Aberystwyth Repository (CAD AIR)	http://cadair.aber.ac.uk/dspace-oai/request	United Kingdom	English; Welsh	11524	DSpace	Multidisciplinary; Mathematics and Statistics; Physics and Astronomy; Computers and IT; Library and Information Science	Articles; Theses
23	REPOSCOM (Repositórios Institucionais em Ciências da Comunicação)	http://repositorio.com.intercom.org.br:8081/dspace-oai/request	Brazil	Portuguese	10138	DSpace	History and Archaeology; Language and Literature; Library and Information Science	Articles; Conferences; Theses; Books

*Repositories arranged as per total number of items uploaded (column VI of annexure I)

Annexure II: List of Top Ten Subject Repositories

Repository	World Ranking	Country	Year of Origin	Total Items	Contents	Software	Subjects	Policy stated	Organization
arXiv	1	USA	1991	1028792 (2015-04-13)	pre- prints and post-prints	Local/ arXiv	Sciences General, Quantitative Finance and Statistics	NA	Cornell University
RePEc	2	USA	1991	1700000 (2015-04-13)	Articles; Books; Software; Unpublished	local, decentralized	Business and Economics	NA	Initially, RePEc emerged from the NetEc group, RePEc Project
PubMed Central	3	USA	2000	3300000 (2015-04-13)	Articles; References; Special Links	Local/PMC	Biology and Biochemistry; Health and Medicine	Contents; Data & Submission	NIH (NCBI/NLM)
CiteSeerx	4	USA	1991	2700000 (2015-04-13)	research articles, citations	local	Computer Science and Information Science	NA	National Science Foundation, previously Microsoft Research and NASA
SSRN	5	USA	1997	1101615 (2015-04-13)	Articles; working papers and forthcoming papers	locally developed	Social Sciences and Humanities	NA	Social Science Electronic Publishing Inc
AgEcon	14	USA	1995	84688 (2015-04-13)	Articles; Special; Conferences ; Unpublished;	DSpace	Agriculture & Veterinary, Business & Economics; Food	Submission	Dept. of Applied Economics, University of Minnesota
E-LIS	22	Italy	2003	17320 (2015-04-13)	Articles; Datasets; Books; Theses; Unpublished; Learning Objects	DSpace	Library and Information Science	Contents; Data Submission; Metadata & Preservation	CILEA, AePIC
Organic Eprints	45	Denmark	2002	17021 (2015-04-13)	Articles; Multimedia; Books; Unpublished; Learning Objects	Eprints	Organic, Agriculture, Food and Veterinary; Ecology and Environment	Metadata; Data; Contents & Submission	International Centre for Research in Organic Food Systems, Research Institute of Organic Agriculture
AEI	79	USA	2003	42291 (2015-04-22)	Articles; Special Conferences ; Unpublished	Eprints	Geography and Regional Studies; Law and Politics	Contents; Data; Submission & Metadata	University Library System, University of Pittsburgh
Policy Archive	190	USA	2008	30,000 (2015-04-22)	Articles; videos; reports; Unpublished multimedia	DSpace	Public Policy; Law & Politics; Management & Planning	NA	Various Foundations (MacArthur, Joyce, Revson, Markle, Hewlett)

- Repositories arranged as per world ranking (column II of annexure II) shown in Cybermetrics Lab; NA indicates not available