

Global Visibility of Indian Open Access Institutional Digital Repositories

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Abstract

Highlights the current state of open access institutional digital repositories (IDRs) of India. It describes and compares characteristics of all institutional digital repositories in terms of content types, repository type, number of records, software used, disciplines covered, languages, technical and operational issues, and policy matter. Lastly, key findings have been highlighted along with suggestions for further development of IDRs in Indian context.

Keywords: Digital repositories, Open source software, digital archive, institutional digital repositories, OAI-PMH.

Introduction

The open source software, open access and open standards movements are gaining tremendous momentum. Prior to the advent of the Internet publishers and academic societies dominated scholarly communication, and researchers channeled their research output solely through authoritative publishers and academic societies. Global trends in scholarly communication increasingly gravitate towards a digital environment, and the development of the OAM and electronic publishing have been outgrowths of this process. Two contemporary developments in particular have helped shape the nature of today's institutional repositories (IRs): the emerging knowledge management movement; and the maturing, but still rapidly advancing, technology of content or asset management in the digital information system. The knowledge management movement of the 1990's influenced the development of open access repositories (OARs).

Literature Review

Several studies have already been conducted in the area of institutional repository. Many papers, articles, survey reports highlight the development of institutional repository in several developed and developing countries.

A group of authors (Lynch & Lippincott, 2005; Markey et al., 2007; van Westrienen & Lynch 2005; Rieh et al., 2007) reported the development of institutional repository in the USA. Another group of authors reported the repository movement in European countries such as UK (Pinfield, 2003; Markland, 2006); Spain (Melero, et al, 2009); Italy (Gargiulo & Cassella, 2009); Greece (Chantavaridou, 2009). Another report (http://www.heal-link.gr/SELL/OA_reports/FranceReport.pdf) described and gave an historical overview on the development of both the green and golden roads to Open Access in France. Several other experts gave an overview of the state of the institutional repository of few other developed countries like Canada (Shearer, 2006); Australia (Kennan & Kingsley, 2009) and South African (Deventer & Pienaar, 2008).

Though Asia started relatively late but the situation of few Asian countries is quite satisfactory. Wani, Gul & Rah (2009) conducted a study on the growth and development of institutional repositories in Asia using the data from the OpenDOAR (Directory of Open Access Repository) database. Several other authors highlighted the repository development of few Asian countries like China (Fang & Zhu, 2006; Zhong, 2009); Taiwan (Chen & Hsiang, 2008); Hongkong (Chan, 2009); Turkey (Tonta, 2008) and Malaysia (Kiran & Chia, 2009). The other researcher (Mukarami & Adachi, 2006) described the repository movement in Japan whereas another expert (Matsuura, 2008) concluded that Japan has been placed as the fourth biggest contributor in the world as per total number of institutional repositories (OpenDOAR, 2012). Another study (Lee, 2008) showed the growth and development of institutional repository systems in Japan and Korean universities.

Major Initiatives in India

The repository movement in India started mainly after 2002 and described by many researchers (Ghosh & Das, 2007; Swan, 2008; Alexander & Gautam, 2006; Venkadesan, 2009; Nazima & Devib, 2008; Das, Sen & Dutta, 2005; Fernandez, 2006; Anuradha, 2005; Arunachalam, 2008; Ghosh, 2007 & 2009; Gobbur, 2007; Kataria, 2007). Bangalore declaration (2006) drafted a model National Open Access Policy for Developing Countries also support this view and advocated for open access institutional repository.

Many initiatives have been taken by the different Ministries of the Government of India. University Grants Commission (2005) enacted “UGC (Submission of Metadata and Full-text of Doctoral Theses in Electronic Format) Regulations, 2005” to strengthen national capability of producing electronic theses and dissertations, and, to maintain university-level and national level databases of theses and dissertations. It has already developed a policy document on building University level Institutional Digital Repository (http://www.ugc.ac.in/new_initiatives/etd_hb.pdf) in India. Another government organization, National Knowledge Commission (2007) strongly advocates open access to public-funded

research literature and recently has taken initiative for building nation wide institutional Repository. Several educational institutions and research organizations have already developed repository to provide global access to their research.

As of November 2006, Bharathidasan University has made it mandatory for all faculty members publishing in refereed journals to send their papers to the University Informatics Centre (matram AT bdu.ac.in) for deposit in the university's Institutional Repository (<http://www.eprints.org/openaccess/policysignup/fullinfo.php?inst=Bharathidasan%20University%20>). The National Institute of Technology, Rourkela has implemented Open Access policy for faculties and students and has made it mandatory to submit all research papers to the archive so that others interested may benefit by referring to these documents (<http://www.eprints.org/openaccess/policysignup/fullinfo.php?inst=National%20Institute%20of%20Technology,%20Rourkela>). In addition, some professional associations and societies like Developing Library Network (DELNET), INFLIBNET (Information Library Network) are also involved in modernization of libraries, training and setting up the IRs.

Growth and Development of IDRs

Many universities and research institutes in India have developed institutional repository for archiving documents of their own. It is not only limited to Science and Technology but also on other disciplines. More than eighty (80) academic and research institutions have set up repositories as indicated by Registry of Open Access Repository (ROAR, 2012). There are few institutions did not register in ROAR or DOAR databases and did not provide information about registration. I have not considered those repositories developed in 2012. But this year the growth rate is quite high in compare to previous year and during this period (from January 2012 to July 2012), seven (7) repositories have already been registered. Table 1 shows the chronological development of repositories in the country.

Year	No. of Repository Added	Growth Rate (%)
2011	17	22
2010	10	12
2009	11	14
2008	10	12
2007	5	6
2006	12	16
2005	8	10
2004	4	----
Total	77	

Table 1: Growth Rate of Repository (year-wise)

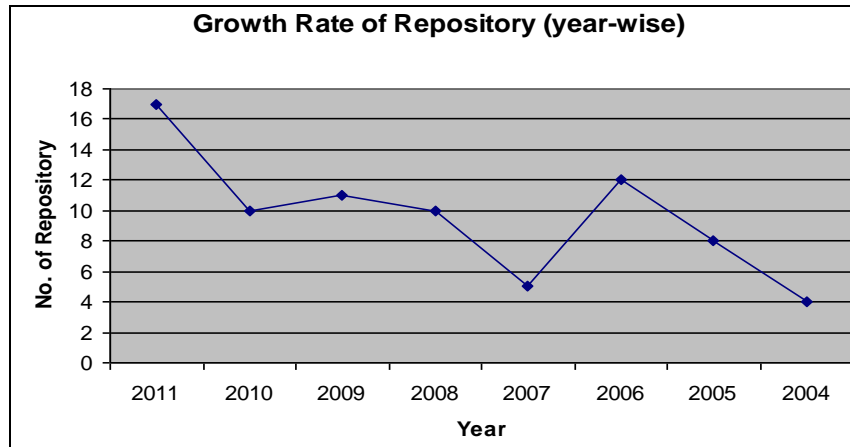


Fig. 1: Growth Rate of Repository (year-wise)

The growth rate of IDRs per year is not satisfactory in compare to other developed countries. The study shows that there has been a steady growth in this context. The total number of IDRs was only 4 in 2004 and now it has been 77 in 2011 (December), an average increase of about 10 new repositories per year. In 2005, the number was 8, whereas in 2006, 12 institutes have registered but the picture is quite different in 2007, only 5 institutes have registered. Much of this success is undoubtedly connected to government support as well as other professional and learned organizations like INFLIBNET, DELNET etc.

Number of OAI-PMH Repositories

The following table highlights the development of IDRs in different developed and developing countries. It also shows the position of India in global scenario in respect of number of repositories registered in OpenDOAR or ROAR databases and percentage of OAI-PMH repositories developed in the country. The only eleven (11) countries have been selected from OpenROAR and DOAR database (Table 2) against the following three criteria.

1. Countries having more than 50 IDRs registered both in OpenDOAR & ROAR databases;
2. Highest value from OpenDOAR & ROAR databases have been considered; and
3. How many IDRs supports OAI-PMH verb in that country (this check is useful in case of two countries with equal number of IDRs).

Ranking of Countries as per		Countries	Number of Repositories*	No. of OAI-PMH Compliant Repository	Percentage (%) of OAI-PMH Compliant Repository♦
Number of Repositories*	Percentage of OAI-PMH Repository♦				
1	11	United States	407	265	65
2	7	UK	220	169	77
3	10	Germany	132	94	71
4	4	Spain	114	89	78
5	8	Brazil	105	81	77
6	9	Japan	104	79	76
7	5	India	77	60	78
8	1	Canada	67	61	91
9	3	Italy	67	55	82
10	6	France	67	52	78
11	2	Taiwan	63	55	88

Table 2: Countries as per number and percentage of OAI-PMH Repositories

Ranking of Indian Repositories in World's Repositories

There is a need for Web metric ranking of IRs for the following reasons -

- To measure the global visibility and impact of scientific repositories;
- To know the relative position of a particular IR; and
- To evaluate the present status of IR at the state level, national level and at the global level.

As per Cybermetrics Lab, research groups based in Spain, ranking of Indian repositories is given below (<https://mallikarjundora.wordpress.com/2010/07/07/ranking-web-of-repositories-july-2010/>).

Name of the Repository	Rank (2009)	Rank (Jan, 2010)	Rank (July, 2010)	Rank (January, 2012)
Eprint@IISc (Bangalore)	41	82	161	98
ISI Digital Library	76	180	221	163
Openmed@nic	123	148	118	190
Indian Institute of Astrophysics (Bangalore)	182	210	196	469
Raman Research Institute	211	278	518	499
National Institute of Oceanography	243	245	305	250
National Aerospace Laboratories		370	508	316
IIT (Bombay)			492	
IIM (Kozhikode)			558	
IISc Thesis and Dissertation			561	483
IIT (Delhi)			800	
Central Marine Fisheries Research Institute				321
NITR				458

Table 3: Ranking of Indian Repositories in World's Repositories

The picture is quite satisfactory in compare to previous year. In 2010 (July), only 11 repositories were listed out of 800 world's repositories whereas in 2009 only 6 repositories were listed and in 2010 (January) it was 7 increased by only 1 repository. In 2012, there are 1239 repositories are in the ranking, from India there are 10 repositories are listed. An analytical study has been performed on the basis of the following parameters –

Contents

Most of the repositories hold several types of contents. There is no consensus on contents type and different institutions have different contents policy. The majority of deposited contents are journal articles followed by Conference and workshop papers, Theses and dissertations, Unpublished reports and working papers etc. Another study (OpenDOAR, 2012) is in support (Fig. 2). While the least deposited contents type are Patents, References, Special items, Multimedia and software. Few repositories have accumulated special items other than books, theses, articles, journals, reports etc. The special items are mentioned below:

- Newspaper clippings, Newspaper articles, newspaper reports,
- Previous Exam. papers,
- Case reports, Biographic,
- Links.

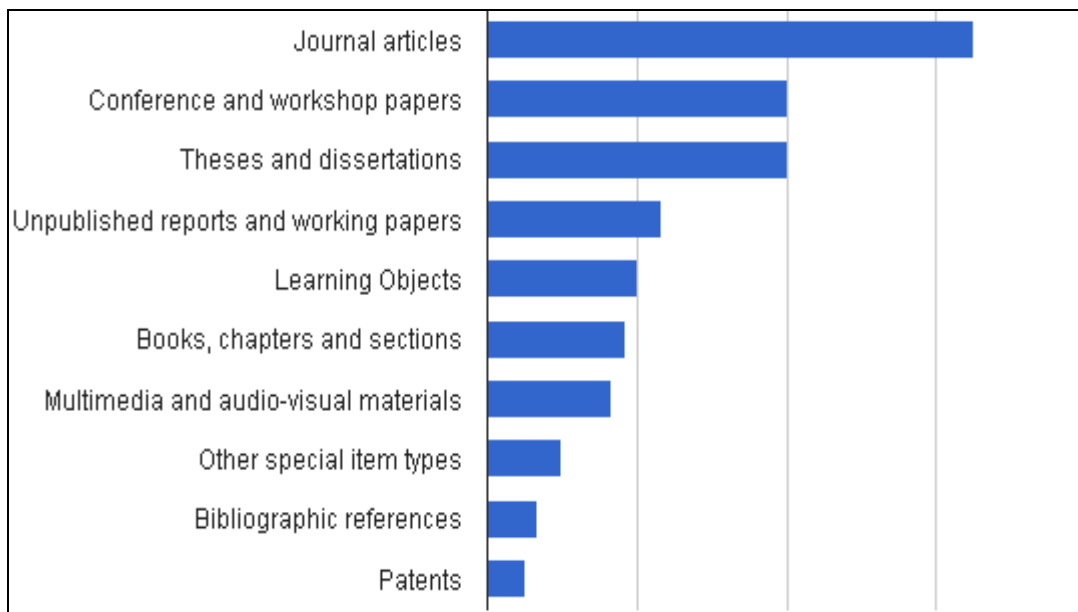


Fig. 2: Content type of Repositories
Source: (OpenDOAR, 2012)

Type of Repository

It has been found that most of the institutions are multidisciplinary in nature and cover different subjects to their repositories. On the contrary, few repositories hold specialized subjects like Health, Medicine, Mathematics, Physics, Statistics, and Technology etc. In addition few repositories cover subjects like History, Economics, and Management etc. There are 3 repositories deal with single subject each. Out of 77 IDRs, the highest percentages of repositories are research institutional or departmental (65%) followed by E-theses (10%), whereas more than 6% repositories are Disciplinary (research cross-institutional) and E-journal repository each, more than 3% repositories are Learning and Teaching repository, almost 8% repositories do not mentioned their type. Figure may differ and fraction has not been considered.

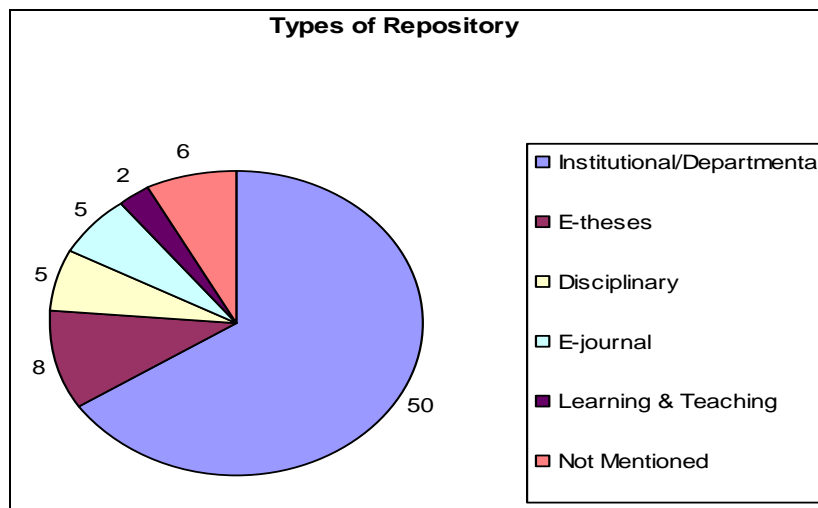


Fig. 3: Types of Repositories

Language

All the repositories under study hold mainly documents in English language. Only few IRs have documents other than English. It is found that out of 2165 (as on 19/06/2012) IRs, near about 1562 IRs (72.14%) covers only English documents (OpenDOAR, 2012). It is also true in case of India. It is found that only 7 (seven) IRs have documents other than English (<http://www.opendoar.org/find.php>) language. It may cover Sanskrit, Hindi, Urdu, Gujarati, Malayalam, Kannada etc.

Software

The different IDRs use different types of open source repository software like Dspace, Eprints, Greenstone, Nitya etc. It is found that 3 repositories did not mention about type of software used. It is obvious from the study that Indian IDRs mainly use DSpace and out of 77 repositories, DSpace software is used by 47 (61%) repositories followed by EPrints 24 (31%). Greenstone is used by 2 repositories only. Nitya is used by only one (1) repository. The table (4) shows the software used by the different repositories-

Software used	No. of Repositories	Percentage (%)
DSpace	47	61
EPrints	24	31
Greenstone	2	3
Not Specified/In-house	3	4
Nitya	1	1
Total	77	

Table 4: Repositories by Software Type

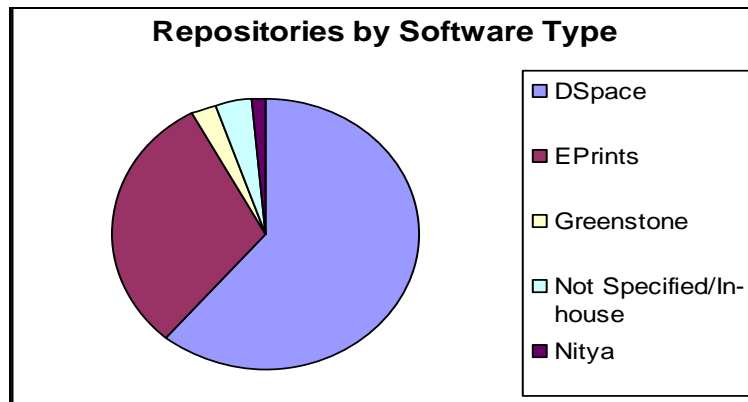


Fig. 4: Repositories by Software Type

Policies

In a survey for OpenDOAR in early 2006, Peter Millington discovered that about two thirds of open access repositories did not have publicly stated policies (Millington, 2006). It is found that 71 (92.2%) repositories do not have policy whereas only 6 (7.79%) repositories have clearly stated their policy regarding above mentioned issues. However few policies (Content policy and Preservation policy) are missing from the list and are not properly stated. Some of the policies are still being developed and improved. We have identified five main types of policies namely -

1. Recorded Metadata Re-Use Policies;
2. Full-Text Data Re-Use Policies;
3. Recorded Content Policies;
4. Recorded Submission Policies; and
5. Recorded Preservation Policies.

Name of the Repository	Policy				
	Metadata	Data Re-Use	Content	Submission	Preservation
CMFRI Digital Repository	Y	Y (Rights vary)	Y	Y	N
Eprints@IARI	Y	Y (Rights vary)	Y	Y	N
Etheses - A Saurashtra University Library Service	Y	Y (Rights vary)	Y	Y	Y
Indian Academy of Sciences: Publications of Fellows	Y	Y	Y	Y	N
Open Access Repository of IISc Research Publications	Y	Y	N	Y	N
OpenMED@NIC	Y	Y	N	Y	N

Table 5: Policies of Indian Repositories

Findings

From the above study of 77 Indian digital repositories, major key findings have been grouped under the following three broad headings:

Generic Features

- Growth rate of IDRs per year is quite low in compare to other developed countries;
- Only a few IDRs have included learning objects and multimedia documents;
- No information regarding year of registration and repository type;
- Few IDRs contain documents in Arabic, Kannada, Malayalam, and Marathi etc;
- Most of the IDRs do not have any policy document;
- Few institutes have not provided total number of records;
- Growth rate of objects uploaded per year is quite low;
- Insufficient number of full text documents in IR;
- Only a few IDRs contain special items; and
- Lack of documents other than English language.

Search Features

- There are mainly two search options viz. simple search advance search;
- Users can browse by Communities & Collections, Author, Title, Subject and Date;
- All the IDRs have Boolean search facility; and
- No proper mechanism for searching regional and multilingual documents.

Technical Features

- Only a few IDRs customized their interface;
- OAI-PMH base URLs are not working for a few cases;
- Few IDRs do not have their own domain or sub-domain;
- Generally repositories are not Unicode compliant;
- Only a few IDRs provide email alerting service;
- Few IDRs support RSS feed;
- No system for feed back mechanism;
- Non availability of IDRs in World Area Network; and
- No standards exist for access statistics.

Conclusion

The study suggests several strategies for improving nation-wide growth of repositories in compatible with global standard. As almost all the Indian IDRs are based on open standards and open source software so surely there is scope for developing a 'Best Practice Guidelines' for designing institute-oriented IDR. The study has identified several key issues such as contents quality, metadata standards, preservation technique, workflow pattern, customization and technical specifications of software, copyrights policy, OAI-PMH compatibility etc. that need to be properly considered before developing repository for any organization. If the strategies are implemented and policies are formulated in a calm and orderly way, Indian's repositories are expected to be more successful.

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