

CURRENT TREND AND DEVELOPMENT OF INSTITUTIONAL REPOSITORIES IN INDIA

Rashmi Rekha Gohain

Junior Research Fellow, Department of Library and Information Science, Mizoram University, Mizoram, India.

ABSTRACT

Aims to make an assessment of existing functional institutional repositories in the Indian Universities and R&D organisations. Provides an overview of some of the registered institutional repositories that are in top position among the other repositories of the world. The present trend and developments of IR in India is discussed in detail. Analyses the websites of the IRs in India to determine the total deposits to each IR and the use of various open source software for their development. The result reveals that the growth and development of IR in India is encouraging with the significant proliferation of open access and digital library initiatives. The study will help the institutions in India which are in their initial stages or planning stage to develop their own IRs.

KEYWORDS: Institutional Repository, Open Source Software, OAI-PMH, Open Access, Scholarly Communication

Introduction

Institutional Repositories help to provide seamless access to information and knowledge in a digital world to the students, faculty members and researchers of an institution and thus serve its users' information needs. It reflects the past and present research interests of the institution as well as its future research goals. In today's environment of knowledge based society every aspect is influenced by Information and Communication Technologies (ICTs). The electronic environment has resulted into an increase in the overall volume of research and communication and publishing of these scholarly outputs in digital format. Moreover, the increases in the cost of the academic journals have been limiting the access to the vast amount of scholarly information. It is increasingly becoming impossible for any institution to provide access to them because of the limited funds. Library and information centers are the means to preserve and communicate the scholarly output of an institution. Therefore, to make the scholarly literature available and accessible globally and to ensure their long-term preservation the concept of open access and institutional repositories has emerged. Today Institutional repository is a global phenomenon that helps in promoting the research output of an institution to all its members in an open access environment.

Scope and Objective of the Study

After visiting the Registry of Open Access Repositories (ROAR) and the Directory of Open Access Repositories (OpenDOAR) and some other institutional websites, 79 institutional repositories have been identified in India with open access facility. These are a few IRs hosted on the Intranets of Defense Labs, Space Research Labs which are not openly accessible. Though ROAR and OpenDOAR listed the IRs available across the globe yet, they are not able to represent all the open access initiatives as they need the registration of the IR. ROAR also includes archives in testing or development phase

which may not be openly accessible. There are some new initiatives which are under development, initial stage or in the testing phase and not yet listed by ROAR or OpenDOAR yet others are hosted on public domain (Internet) or on Intranets/LAN and are not yet openly accessible. The paper covers the open access journals, e-print archives and e-theses repositories for study. The intent of the paper is to create an awareness of emerging institutional repositories in India and examine the current trends and developments. It also aims to present some of best practices related to IRs.

Methodology

The existing IRs in India was identified from ROAR and the OpenDOAR and some other institutional websites. It has also helped to determine the functionality and activity of the IR. Literature review related to IR and web search have also been done by the author. The data relevant for the study was collected from the analysis of the content of the respective websites maintained by the host institution. The data collected from the institutional websites was analysed to determine the total deposits to each IR, their subject coverage and the use of various open source software for their creation and maintenance.

Definition of Institutional Repository

An Institutional Repository (IR) is a database of digital content with a set of services to capture, store, index, preserve and redistribute the intellectual output generated by faculties, staff and students of a university. To advance scholarly communication the content can be made accessible to its own members through Intranet within the campus and also to other academic community and general public through Internet. The Scholarly Publishing and Academic Resources Coalition (SPARC) Organisation defines IRs as follows: Institutionally defined; Scholarly; Cumulative and Perpetual; Open and Interoperable (Crow, 2002).

According to Clifford Lynch (2003), a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organisational commitment for the stewardship of these digital materials, including long-term preservation where appropriate, as well as organisation and access or distribution. This definition identifies an institutional repository as more than simply a technology platform for digital storage. It implies strategic planning for institution-wide digital-asset management and development of a support structure and related applications.

IRs forms a 'Shop window' for the endeavors of an institution and ensures the long-term preservation of vital academic results; as it helps to display the valuable intellectual outputs, research programmes, projects and initiatives of an institution, particularly a research institution. "For a university, this would include materials; such as research journal articles, before (pre-prints) and after (post-prints) undergoing peer review and digital versions of theses and dissertations, but it might also include other digital assets generated by normal academic life, such as administrative documents, course notes, or learning objects (Gopikuttan, 2008)".

Institutional Repositories: Need and Objectives

The rhetoric about open access is that the presentation of the institution's published research output via a repository would inevitably improve its visibility and raise the profile of both the institution and the researchers involved, and it would potentially lead to greater citation frequency and impact of the published items (Robinson, 2009). The main reasons for establishing an IR given by a sample of ARL libraries surveyed was "to increase the global visibility to preserve and provide free access and to collect and organize the institution's scholarship". The four main objectives for having an IR are to:

- Create global visibility for an institution's scholarly research;
- Collect content at a single location;
- Provide open access to institutional research output by self-archiving it; and,
- Store and preserve other institutional digital assets, including unpublished or otherwise easily lost ("grey") literature (e.g., theses or technical reports) (Gopikuttan, 2008)".

An institutional repository is not a substitute for the traditional publishing process that leads to tenure and promotion, but it can operate tangentially with those practices in building up a scholar's recognition (Gaffney, 2008, p. 574). Immediate unrestricted access to scientific ideas, methods, results and conclusions will speed up the progress of science, technology and medicine and will more directly bring the benefits of research to the public (Nazim, & Maya Devi, 2008). Institutional repositories have the potential to bring together intellectual output of the researchers of the institution and make it available and accessible to the public through Internet. While faculty publications reflect positively on the host university, the interoperable repositories demonstrate the reputation and quality of the institution, and the scientific, social and economic relevance of its research output. Institutional repositories help to measure the productivity of the institution and increase the institution's visibility, prestige, status and public value. At individual level, a strong institutional repository enhances the visibility of the communities and helps to identify the expertise of the communities belonging to it. It also helps publications in receiving more citations by the fellow scholars due to its free access facility without geographical boundary. It also helps in establishing priorities for their research findings (made possible by data sampling and publication identifier); share unpublished ideas with peers and obtain feedback; and support long term preservation of their research output.

Open Access Initiatives

Open access is the concept of making public-funded research freely available to all without any geographical boundary. Different key factors like policy frameworks, institutional frameworks, information infrastructure, trained manpower, and adequate financial resources influence the process of development of IRs in a country. The concept of Open Access was initiated in the developed countries and was progressed with the declaration of Budapest Open Access Initiative (BOAI), Hungary in 2002. Presently, 6035 signatures have been added to the initiative. BOAI aims to remove access barriers to scholarly literature which will accelerate research, enrich education, and share the learning of the rich with the poor and vice-versa. The term 'Open Access' was first properly defined at Budapest Open Access Initiative (BOAI) as follows:

"By 'open access' to this literature (primarily peer-reviewed journal articles, as mentioned earlier in the Initiative), we mean its 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.”

The Budapest Open Access Initiative (BOAI) was followed up by Bethesda Statement on Open Access Publishing, USA in 2003. The goal of Bethesda Statement was to agree on significant, concrete steps that all relevant parties- the organisations that foster and support scientific research, the scientists that generate the research results, the publishers who facilitate the peer-review and distribution of results of the research and the scientists, librarians and others who depend on access to this knowledge- can take to promote the rapid and efficient transition to open access publishing. The Berlin Declaration (Germany in October 2003) on Open Access to Knowledge in the Sciences and Humanities is another milestone in the open access movement. The initiative aims to disseminate knowledge not only through the classical form but also increasingly through the open access paradigm via the Internet. Since then the issue is spreading throughout the world and many developing countries including India have joined the effort and signed in the declaration.

The Scholarly Publishing and Academic Resources Coalition (SPARC) developed by the Association of Research Libraries, is an international alliance of academic and research libraries, working to correct imbalances in the scholarly publishing system. SPARC has become a catalyst for change. Its pragmatic focus is to stimulate the emergence of new scholarly communication models that expand the dissemination of scholarly research and reduce financial pressure on libraries. Action by SPARC in collaboration with stakeholders– including authors, publishers, and libraries– builds on the unprecedented opportunities created by the networked digital environment to advance the conduct of scholarship.

Under the guidance of India's tireless open access advocate, Subbiah Arunachalam, a two day workshop on research publication and open access was organized at the Indian Institute of Science in Bangalore on November 2-3, 2006 at which the three most research-active developing countries India, China and Brazil framed the "Bangalore Commitment"; a commitment to mandate OA self-archiving in their own respective countries and thereby set an example for emulation by the rest of the world. "Recently a group of young professionals has formed a Registered Society known as Open Knowledge Society under The Travancore Cochin Literary, Scientific and Charitable Societies Registration Act, 1955. This 'OKSociety' aims to promote Open Access in India through creating awareness and organizing training programmes and it would act as a forum to provide support services through an array of volunteers." (Narayana, Biradar & Goudar, 2008)

Mechanism of Open Access

To accomplish the open access idea within universities and research institutions two mechanisms are available there– OA Self-Archiving or the 'Green Road' to open access, and OA Publishing or the 'Golden Road' to open access. OA Self-Archiving or the 'Green

Road' refers to publicly accessible digital repositories where the authors or their representatives or other right holders upload the published or pre-published documents to it. These repositories provide easy access to its collection and allow other systems to harvest their metadata associated with its documents. OA Publishing or the 'Golden Road' refers to OA journals which have undergone through the process of peer reviewing of submitted articles by experts to determine the quality and accuracy of the article.

Institutional Repositories: Global Scenario

Realization of the importance of IRs for the dissemination and preservation of scholarly communication is spreading rapidly across the academic community. The effort to enhance access to the scholarly publications has brought the concept of IR in India. United States had been the pioneer in the development of IRs in the early 1990s (e.g., arXiv) among the other countries of the world. Since then, the number of IRs has been increasing not only in the United States and Europe but also elsewhere in the world. The growth of IR applications advanced rapidly parallel a number of significant developments including:

- Open source software for operating systems (Linux)
- Open archive initiatives to preserve digital content (Greenstone, DSpace and ePrints)
- Hardware maintenance is affordable
- Standards like open archives metadata harvesting protocol have been adopted (Thomas, 2007).

OpenDOAR maintained by the Securing Hybrid Environment for Research Preservation and Access (SHERPA) project of University of Nottingham, lists the open access repositories around the world. OpenDOAR takes initiatives to harvest and assign metadata to the contents of the registered repositories and to allow categorization and analysis to assist the wider use and exploitation of repositories. Gradually the numbers of IRs have been increasing worldwide. Currently, ROAR lists out 1,793 and OpenDOAR lists about 1,966 IRs all over the world. The highest number of IR in each country as identified is listed in the following Table 1.

Table 1: Countries with Number of Institutional Repositories

Name of the Country	Number of IR in ROAR	No. of IR in OpenDOAR
United States	338	396
United Kingdom	178	191
Germany	113	145
Brazil	93	56
Japan	89	133
India	60	47
Taiwan	59	56
Canada	56	53
Australia	53	64
Italy	53	60

According to ROAR (as on 29 May 2011), there are 60 registered repositories in India (out of total registration of 1793) whereas OpenDOAR lists only 47 registered repositories in India (out of total registration of 1966 as on 29 May 2011). According to ROAR and

OpenDOAR in the list of registered open access repositories India ranks sixth and eight respectively. The OAIster search engine (<http://www.oaister.org>) which is a union catalog of millions of records representing open access digital resources includes results from about 1,100 IRs, amounting to more than 23 million digital objects like Digitized (scanned) books, journal articles, newspapers, manuscripts and more Digital text, Audio files (wav, mp3), Video files, (mp4, QuickTime), Photographic images (jpeg, tiff, gif), Data sets (downloadable statistical information) and Theses and research papers; most of which are accessible full-text. Both, ROAR and OpenDOAR do not completely represent open access initiatives in India as they depend on voluntary registration. There are more than 80 Institutional Repositories (IRs) available in India with open access facility (see Appendix). Contents in IRs in India mostly cover articles, books, book chapters, Conference papers, learning objects, patents, references, theses and various other unpublished documents having primary information.

With the development of many open source software with distinct features and suitability for digital preservation and to create and maintain institutional repositories; the number of IR is increasing all over the world. Among the various softwares available under open source license (BSD, GNU GPL, MIT, Apache etc) for the development of institutional repositories; EPrints and DSpace are more widely used today internationally. These Institutional repository softwares comply with OAI metadata harvesting protocol and aims towards long term digital preservation. Most of the OSS are freely available at open source software directories such as SourceForge. SourceForge which is owned and operated by Geeknet, Inc., is a publicly traded US-based company. The website helps to find, create, and publish open source software for free. With its popular directory it provides about 2.7 million developers create powerful software in over 260,000 projects. Some of the open source softwares widely used for the creation of IR are:

- DSpace (Digital Space) (<http://www.dspace.org/>), developed by Massachusetts Institute of Technology (MIT) Libraries, Cambridge and Hewlett-Packard (HP) Company, USA.
- GNU Eprint (www.eprints.org/), developed by University of Southampton, UK.
- CDS Invenio (formerly CDSWare) (<http://cdsware.cern.ch/>), developed by CERN, the European Organisation for Nuclear Research, based in Geneva.
- FEDORA (Flexible Extensible Digital Object Repository Architecture) (<http://www.fedora.info/>), developed jointly by University of Virginia and Cornell University.
- GSDL (Green Stone Digital Library) (<http://greenstone.unam.na/gSDL/cgi-bin/library>). developed by New Zealand Digital Library Project at the University of Waikato.
- Various In-house/local software.

Institutional Repositories and Open Source Software (OSS)

Considering the economic aspect, built-in interoperability between systems and adherence to international standards for metadata format; most of the institutions in India prefer to use OSS for developing institutional repositories. Use of these softwares helps to capture, preserve and provide seamless access to the digital content and scholarly output of an institution over the web and also provide interface for online submission of research materials (intranet) to the faculty members and research scholars of the institution. Among the various softwares available under open source license for the development of institutional repositories, EPrints and DSpace are more widely used today internationally. The use of GNU EPrint and DSpace software for E-print

repositories and of DSpace for ETDs is shown below in the summary listing of various institutional repositories of India.

The use of OSS in India has been depicted in Table 2 for clear vision of the statement. It reflects that in India DSpace constitute the highest i.e., 47 (62%), followed by 26 (35%) EPrints and 02 (03%) GSDL. Thus it is clear that DSpace and EPrints are considered to be the leading softwares for repository development in India.

Table 2: Usage of Open Access Repository Software in India

Name of the Software	Total No. of User
DSpace	47
EPrints	26
GSDL	02

Trend and Development of IRs in India

A few of India's premier institutions, particularly in the science and technology area, are providing open access to their research publications. In these repositories access to retrospective material appears to be substantial; both in terms of research articles and theses with less access to preprints and current publications. Much of the content is designed to showcase the intellectual product of the institution giving wide coverage to publications in international journals and less of the "hidden science" targeted by open access advocates (Fernandez, 2006). In India, the efforts towards adopting open access initiative have already been started. But there are some hurdles and misunderstandings about open access among the Indian research community. These are: Lack of expertise in every organisation to promote creation of institutional archives and encourage scientists to place their papers in them; lack of infrastructural facilities like hardware and connectivity of high bandwidth; Scientists are under the impression that the editors of renowned journals may not accept the archived papers. Scientists are not aware of the fact that the attitudes of the journals are now changing and renowned journals also now permit the authors to archive both preprints and post prints (Hirwade & Hirwade, 2006, p.4).

In India, poor access to international journals and the low visibility of papers are major problems being faced by Indian researchers. Open access is viewed as a solution to this deficit (Fernandez, 2006). Development of IRs in Indian Universities and R & D Organisations is a growing phenomenon, with an increasing number of libraries planning to implement it. In India, the process of growth of IRs or to have a strong platform for the development of IRs is encouraging with the significant proliferation of open access and digital library initiatives.

The development of IRs in universities and R & D organisations helps in managing and sharing research resources among the scholarly community. Universities in India can also make their research publications more visible and accessible by encouraging their researchers to deposit their scholarly publications into the institutional repository. With the development of Information and Communication Technologies (ICT), the concept of IR is gaining momentum today not only in developed but also in developing countries including India. In recent years, Open Access is becoming a movement in India and a large number of organisations are taking initiative for this. University Grants Commission (UGC), All India Council of Technical Education (AICTE), Council of Scientific and Industrial Research (CSIR) and National Knowledge Commission (NKC) of Govt. of India

are also providing help and support for the development of infrastructure and other related matters for sustainable development of IRs in Indian universities. University Grants Commission (UGC) provides grants placed at its disposal by the Central Government to universities established by Central and State Governments for various research projects and activities.

UGC through Information and Library Network (INFLIBNET) has been serving towards modernization of libraries through a National Network of libraries in around 264 Universities, Colleges and R & D Institutions across the country. The OAI repository of INFLIBNET, which is named as “Shodhganga” is developed with DSpace open source software which collects, preserves and disseminates the post prints, preprints, news clippings, CALIBER and PLANNER full text proceedings, training material and other scholarly publications of it. UGC has developed a policy document on building university level Institutional Digital Repository, which aims to improve the local access to global research and global access to local research. UGC through its national policy framework (2005) proposed and made it mandatory for all the researchers of Indian universities to submit their Doctoral theses, dissertations in electronic form for the creation of Indian National Theses Database to ensure free access to research theses. Through INFLIBNET, UGC is also taking initiatives to develop the ICT infrastructure and support in all the universities run under its purview.

National Knowledge Commission (NKC), whose aim is to transform India into a vibrant knowledge-based society, is trying to ensure an easy and widespread availability of high quality educational resources to improve collaborations and sharing, needed to enhance the quality of our education. Working Group on Open Access and Open Educational Resources and Working Group on Libraries have strongly recommended open access to public-funded research literature. To achieve this, NKC emphasizes on Open Educational Resources (OER) and Open Access (OA). NKC has recommended for building a National Knowledge Network with gigabit capabilities to connect all universities, libraries, laboratories, hospitals and agricultural institutions to share data and resources across the country. NKC has also recommended creating knowledge portals for basic sectors like water, energy, education, food, agriculture and employment etc. The trend of development of IRs in India is reflected in Figure 1 showing the total number of registered repositories of India in ROAR over time.

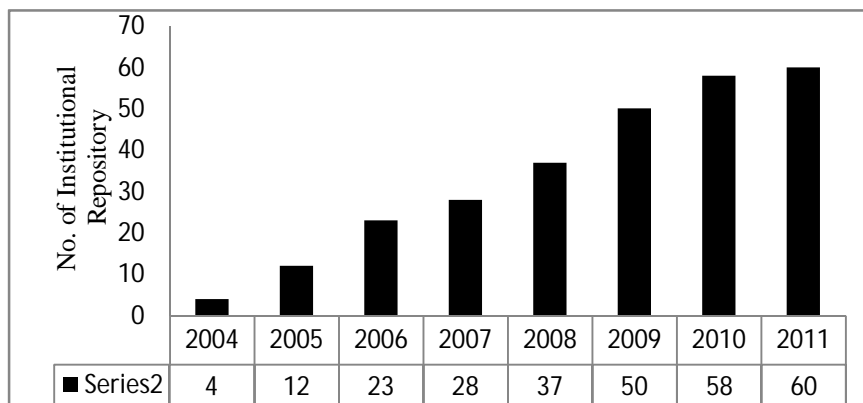


Figure 1: Trends of Development of IR in India

In order to provide open access to scholarly output different organisations, Higher Education Institutions, etc are taking initiatives and coming up with their own IR. Most of the operational IRs in India are Open Archive Initiative-Protocol for Metadata Harvesting (OAI-PMH) compliant and are indexed by search engines. To measure the global visibility and impact of the scientific repositories Cybermetrics Lab, Consejo Superior de Investigaciones Científicas (CSIC), Spain, has taken an initiative called 'Ranking Web of World Repositories' using web indicators. The ranking of Indian IRs in the 'Ranking Web of World Repositories' along with their size, visibility, rich file and scholar position is given below.

Table 2: Indian IR in the 'Ranking Web of World Repositories'

Rank	Name of the IR	Size	Visibility	Rich Files	Scholar
116	ePrints@IISc Link: http://eprints.iisc.ernet.in/	71	235	85	245
222	Indian Institute of Astrophysics Repository Link: http://prints.iap.res.in/	475	198	273	517
248	OpenMED@NIC Link: http://openmed.nic.in/	2,761	408	216	271
271	Vidyanidhi Digital Library and E-Scholarship Link: http://dspace.vidyanidhi.org.in:8080/dspace/	252	438	24	742
341	Librarians' Digital Library Link: https://drtc.isibang.ac.in/	232	342	532	606
382	DRS@nio National Institute of Oceanography, Goa. Link: http://drs.nio.org/drs/index.jsp	247	684	244	276
519	Dspace@nitrr Link: http://dspace.nitrkl.ac.in/dspace/	451	752	332	475
527	National Aerospace Laboratories Institutional Repository (NAL Repository). Link: http://nal-ir.nal.res.in/	290	836	397	285
529	Eprints@CMFRI Link: http://eprints.cmfri.org.in/	660	672	680	125
555	Dspace@IITB Link: http://dspace.library.iitb.ac.in/jspui/	423	729	311	736
558	DigitalLibrary@CUSAT Link: http://dspace.cusat.ac.in/dspace/	470	772	309	629
647	Digital Repository Link: http://dspace.rri.res.in/	400	928	364	661
654	National Science Digital Library (NSDL) Link: http://nsdl.org/	448	729	464	884
655	Dspace@TU Link: http://dspace.thapar.edu:8080/dspace/	603	897	394	591
689	Dspace@IIMK Link: http://dspace.iimk.ac.in/	625	908	513	549
771	ETD@IISc Link: http://etd.ncsi.iisc.ernet.in/	464	754	906	585

864	Eprints@NML Link: http://eprints.nmlindia.org/	648	993	851	634
920	Digital Knowledge Repository of Central Drug Research Institute (DKR@CDRI) Link: http://dkr.cdri.res.in:8080/dspace/index.jsp	869	1,079	647	823
973	Sudhganga Link: http://shodhganga.inflibnet.ac.in/	867	1,151	710	556
1019	ICRISAT Institutional Repository Link: http://openaccess.icrisat.org/	983	1,096	906	670
1044	DSpace@NCRA Link: http://ncralib1.ncra.tifr.res.in:8080/jspui/	1,027	1,138	790	783
1047	ETD@IIT Delhi (Indian Institute of Technology Delhi Research and Electronic Submission of Theses and Dissertations) Link: http://eprint.iitd.ac.in/	898	989	979	945
1153	Mahatma Gandhi University Theses Online Link: http://www.mgutheses.org/	1,131	1,079	987	1,041
1160	DSpace@NCL Link: http://dspace.ncl.res.in/	1,168	1,034	987	1,041
1167	DU Eprint Archive. Link: http://eprints.du.ac.in/	1,168	1,092	987	1,041
1171	Management Development Institute - Open Access Repository (DSpace@MDI) Link: http://dspace.mdi.ac.in/dspace	1,168	1,108	987	1,041
1173	VIDYA Institutional Repository Link: http://dspace.vidyaacademy.ac.in/	1,110	1,179	960	1,041

* Data collected from 'Ranking Web of World Repositories', Retrieved on May 17, 2011 from <http://repositories.webometrics.info/toprep.asp>

Conclusion

Institutional repositories enhance teaching, learning, research and are considered as a boon to the scholarly community. Institutional repositories have great potential for improving visibility and impact of institutional research. The establishment of IRs in a developing country like India will help to get access to global research results and in turn global presence to the local research results. The Indian researchers, library and Information professionals, administrators of academic and R & D institutions must be aware of the new opportunities provided by Information and Communication technologies and the advantages of IRs. The awareness programs, training and workshops funded by the leading organisations like UGC, CSIR etc., to educate and instruct the faculty members, researchers and scientists and all other working bodies to adopt the "open access" approach must be more widespread. They must be encouraged to self-archiving their research outputs in institutional repositories. Though most the universities in India are lacking in infrastructure for establishing institutional repositories but today with the availability of several free, open source repository software packages it has become relatively easy to establish IRs. So, all the universities, R & D institutions in India which are being run by public or private fund should also establish their own repositories to make their research widely accessible by scholarly community throughout the world and to ensure its long term preservation for future use. Moreover, to enhance the visibility to

the established institutional repositories, they must be registered with open access registries such as ROAR, OpenDOAR and federated search services such as OALster.

NOTES

<http://roar.eprints.org/>

<http://www.opendoar.org/>

<http://archives.eprints.org/>

<http://sourceforge.net/>

<http://www.arl.org/sparc/openaccess/>

The Budapest Open Access Initiative (BOAI), Hungary on 14 February, 2002. Available at: <http://www.soros.org/openaccess>

Bethesda Statement on Open Access Publishing, USA on June 20, 2003. Available at: <http://www.earlham.edu/~peters/fos/bethesda.htm>

The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, Germany on October 22, 2003. Available at: http://www.zim.mpg.de/openaccess-berlin/berlin_declaration.pdf

Association of College & Research Libraries (ACRL) Principles and Strategies for the Reform of Scholarly Communication, August 28, 2003. Available at: <http://www.ala.org>

Organisation for Economic Co-operation and Development (OECD) Declaration on Access to Research Data from Public Funding, January 30, 2004. Available at: <http://www.oecd.org>

The International Federation of Library Associations and Institutions (IFLA) released the IFLA Statement on Open Access to Scholarly Literature and Research Documentation, February 24, 2004. Available at: <http://www.ifla.org>

Salvador Declaration: Commitment to Equity, September 23, 2005. Available at: <http://www.icml9.org>

REFERENCES

Crow, R. (2002). The case for institutional repositories: A SPARC position paper. The Scholarly Publishing and Academic Resources Coalition, Washington, DC. Retrieved March 15, 2011 from http://www.arl.org/sparc/bm~doc/ir_final_release_102.pdf

Fernandez, L. (2006). Opens access initiatives in India: An evaluation. *Partnership: The Canadian Journal of Library and Information Practice and Research*, 1(1), 1-22. Retrieved May 8, 2011 from <http://journal.lib.uoguelph.ca/index.php/perj/article/viewFile/110/172>

Gaffney, M. (2008). Involving the library and campus community in institutional repository projects. *The Serials Librarian*, 55(4), 568-576. doi:10.1080/03615260802380411

- Gopikuttan, A. (2008). Current developments in library & information services. *Journal of Information Science and Technology*, 1(1), 89-100.
- Hirwade, M. & Hirwade, A. (2006). Institutional repositories: challenge and opportunity for LIS Professionals in digital age. *Library Herald*, 44(2), 146-151. Retrieved May 3, 2011 from <http://eprints.rclis.org/bitstream/10760/7987/1/7D311B68.pdf>
- Lynch, C.A. (2003). Institutional repositories: Essential infrastructure for scholarship in the digital age. ARL: A Bimonthly Report on Research Library Issues and Actions from ARL, CNI, and SPARC, no. 226, 1-7. Retrieved January 18, 2011 from <http://www.arl.org/bm~doc/br226ir.pdf>
- Nazim, M. & Maya Devi (2008). Open access journals and institutional repositories: Practical need and present trends in India. *Annals of Library and Information Studies*, 55, 27-34. Retrieved May 8, 2011 from <http://nopr.niscair.res.in/bitstream/123456789/825/1/ALIS%2055%281%29%20%282008%29%2027-34.PDF>
- Poornima, N., Biradar, B.S. & Goudar, I.R.N. (2008). *Enhancing the impact of Indian scholarly communication through institutional repositories. ILA Platinum Jubilee International conference on quote; Knowledge for all: Role of libraries and information centers quote, 12-15 November, Mumbai, India.* Retrieved May 10, 2011 from <http://nal-ir.nal.res.in/4924/1/poornima.docx>
- Robinson, M. (2009). Promoting the visibility of educational research through an institutional repository. *Serials Review*, 35(3), 133-137. Retrieved May 3, 2011 from http://libir1.ied.edu.hk/pubdata/ir/link/pub/Robinson_IR_Paper_Final.pdf
- Thomas, G. (2007). Evaluating the impact of the institutional repository, or positioning innovation between a rock and a hard place. *New Review of Information Networking*, 13(2), 133-146. doi:10.1080/13614570802105992

Appendix: Institutional Repositories in India

Name of the Repository and Its Parent Institution	No. of Records	Software	Subject Coverage
Eprints@Medknow Eprints. MedknowEPrints, Mumbai, Maharashtra. Link: http://eprints.medknow.com	39,187	EPrints	Medical Science
Publications of the IAS Fellows. Indian Academy of Sciences, Bangaluru. Link: http://repository.ias.ac.in/	38,559	DSpace	Animal/Plant Science, Earth & Planetary Sciences, Mathematics Medicine, Physics
ePrints@IISc. Open Access Repository of Indian Institute of Science Research Publications. Indian Institute of Science, Bangaluru, Karnataka. Link: http://eprints.iisc.ernet.in/	27,120	EPrints	Chemistry and Chemical Technology; Mathematics and Statistics; Physics and Astronomy
eGyankosh. Indira Gandhi National Open University, New Delhi. Link: http://www.egyankosh.ac.in/	23,366	DSpace	Multidisciplinary
NISCAIR Online Periodicals Repository (NOPR). National Institute of Science Communication and Information Resources, New Delhi. Link: http://nopr.niscair.res.in/	10,403	DSpace	Multidisciplinary
NEHU Institutional Repository. North Eastern Hill University, Shillong, Meghalaya. Link: http://dspace.nehu.ac.in/jspui/	8,631	DSpace	Multidisciplinary
Eprints@CMFRI. Central Marine Fisheries Research Institute, Kochi, Kerela. Link: http://eprints.cmfri.org.in/	8,109	EPrints	Agriculture, Food and Veterinary; Biology; Ecology and Environment; Health and Medicine
Vidyanidhi Digital Library and E-Scholarship Portal. University of Mysore, Mysore, Karnataka. Link: http://dspace.vidyanidhi.org.in:8080/dspace/	5,480	DSpace	Multidisciplinary
Indian Institute of Astrophysics Repository. Indian Institute of Astrophysics, Bangaluru, Karnataka. Link: http://prints.iiap.res.in/	5,186	DSpace	Physics and Astronomy
Digital Repository. Raman Research Institute, Bangaluru, Karnataka. Link: http://dspace.rii.res.in/	3,938	DSpace	Physics and Astronomy
DRS@nio. National Institute of Oceanography, Goa. Link: http://drs.nio.org/drs/index.jsp	3,817	DSpace	Science General; Technology General; Arts and Humanities
National Aerospace Laboratories Institutional Repository (NAL Repository). Information Centre for Aerospace Science and Technology (ICAST),Bangaluru, Karnataka. Link: http://nal-ir.nal.res.in/	3,491	EPrints	Mathematics and Statistics; Technology General; Mechanical Engineering and Materials

ICRISAT Institutional Repository International Crops Research Institute for the Semi Arid Tropics (ICRISAT), Hyderabad, Andhra Pradesh. Link: http://openaccess.icrisat.org/	3,424	DSpace	Multidisciplinary
DigitalLibrary@CUSAT. Cochin University of Science & Technology, Cochin, Kerala. Link: http://dspace.cusat.ac.in/dspace/	3,212	DSpace	Multidisciplinary
OpenMED@NIC. Bibliographic Informatics Division, National Informatics Centre (NIC), New Delhi. Link: http://openmed.nic.in/	2,761	EPrints	Health and Medicine
Eprints@NML. National Metallurgical Laboratory (Council of Scientific & Industrial Research), Jamshedpur, Jharkhand. Link: http://eprints.nmlindia.org/	2,480	EPrints	Chemistry and Chemical Technology; Technology General
ETD@IIT Delhi (Indian Institute of Technology Delhi Research and Electronic Submission of Theses and Dissertations). IIT Delhi, Delhi. Link: http://eprint.iitd.ac.in/	2,143	DSpace	Multidisciplinary
Sudhganga. INFLIBNET, Ahmedabad, Gujarat. Link: http://shodhganga.inflibnet.ac.in/	1,725	DSpace	Multidisciplinary
DSpace@IITB. IIT Mumbai, Mumbai, Maharashtra. Link: http://dspace.library.iitb.ac.in/jspui/	1,659	DSpace	Multidisciplinary
Catalyst Database National Centre for Catalysis Research (NCCR), Dept. of Chemistry, IIT, Madras. Link: http://www.eprints.iitm.ac.in/	1,478	EPrints	Chemistry and Chemical Technology
Dyuti@CUSAT. Cochin University of Science & Technology, Cochin, Kerala. Link: http://dyuthi.cusat.ac.in/xmlui	1,429	Dspace	Multidisciplinary
Dspace@nitr National Institute of Technology, Rourkela, Orissa. Link: http://dspace.nitrkl.ac.in/dspace/	1,383	DSpace	Chemical Technology; Physics, Astronomy; Mechanical Engineering
DSpace@NCRA. National Centre for Radio Astrophysics (NCRA), Tata Institute of Fundamental Research, Pune, Maharashtra. Link: http://ncralib1.ncra.tifr.res.in:8080/jspui/	1,370	DSpace	Physics and Astronomy
ETD (Electronic Theses and Dissertations). Sri Venkateswara University, Tirupati, Andhra Pradesh. Link: http://202.141.117.109:8080/dspace	1,201	NA	Multidisciplinary
Mahatma Gandhi University Theses Online. Mahatma Gandhi University, Kerala. Link: http://www.mgutheses.org/	1,129	Nitya	Multidisciplinary

Institutional repository of Intellectual Contributions of Delhi Technological University. Delhi Technological University, Delhi. Link: http://www.dspace.dce.edu/	1,120	DSpace	Chemistry, Mathematics and Statistics, Physics and Astronomy, Electrical and Electronic Engineering
ETD@IISc. Indian Institute of Science, Bangaluru, Karnataka. (Electronic Theses and Dissertations) Link: http://etd.ncsi.iisc.ernet.in/	1,098	DSpace	Multidisciplinary
DSpace@TU. Thapar University, Patiala, Punjab. Link: http://dspace.thapar.edu:8080/dspace/	938	DSpace	Multidisciplinary
Bhagirathi (IIT Roorkee Repository). Mahatama Gandhi Central Library, Indian Institute of Technology, Roorkee, Uttarakhand. Link: http://bhagirathi.iitr.ac.in/dspace	823	DSpace	Multidisciplinary
Ethesis@nitr. National Institute of Technology Rourkela, Orissa. Link: http://ethesis.nitrkl.ac.in	823	EPrints	Chemistry, Physics and Astronomy; Mechanical Engineering and Materials
DSpace@BMA. Bangalore Management Academy, Bangaluru, Karnataka. Link: http://bma.ac.in:8080/dspace/	823	DSpace	Management
DSpace@IITK. Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh. Link: http://cse.iitk.ac.in/cgi-bin/library	797	DSpace	Science & Technology
Explorations - Open Access Repository (OAR) of Indian Theses. CSIR Unit for Research and Development of Information Products, Pune, Maharashtra. Link: http://eprints.csirexplorations.com/	737	EPrints	Multidisciplinary
EPrints@Central Library, IITD. Indian Institute of Technology Delhi (IITD), Delhi. Link: http://eprint.iitd.ac.in	599	DSpace	Multidisciplinary
DSpace@IIMK. Indian Institute of Management Kozhikode (IIMK), Kerala. Link: http://dspace.iimk.ac.in/	571	EPrints	Business and Economics
DSpace@NCAOR. National Center for Antarctic Research, Goa. Link: http://dspace.ncaor.org:8080/dspace	532	DSpace	Oceanography
EPrints@MDRF. Madras Diabetes Research Foundation, Gopalapuram, Chennai. Link: http://mdrf-eprints.in/	531	EPrints	Diabetes and Related Areas
DSpace@JIIT. Jaypee Institute of Information Technology, Noida, Delhi. Link: http://www.jiit.ac.in/infra/library.php	516	DSpace	Biotechnology, Computer, Material, Mathematics, Physics

National Science Digital Library (NSDL). NISCAIR (National Institute of Science Communication and Information Resources), New Delhi. Link: http://nsdl.org/	504	DSpace	Science General
DSpice@IISR. Indian Institute of Spices Research, Kozhikode, Calicut, Kerala. Link: http://220.227.138.214:8080/dspace/index.jsp	494	DSpace	Botony, Horticulture, Biotechnology, Biochemistry
DSpace@Vidya Prasarak Mandal. Vidya Prasarak Mandal - Thane, Maharashtra. Link: http://dspace.vpmthane.org:8080/jspui/index.jsp	463	DSpace	Multidisciplinary
Knowledge Repository Open Network. University of Kashmir, Jammu & Kashmir. Link: http://dspace.uok.edu.in:8080/dspace/	450	DSpace	Multidisciplinary
Sarai Multimedia Digital Archive. Sarai Multimedia Digital Archive, Delhi. Link: http://archive.sarai.net/dspace/	418	DSpace	Media Cultures and Urban Spaces
Scientific Information Resource Centre, NCRA (TIFR), DSpace at NCRA-GMRT. National Centre for Radio Astrophysics, Indian Institute of Technology, Bombay (IITB), Mumbai, Maharashtra. Link: http://ncralib1.ncra.tifr.res.in:8080/jspui/	416	DSpace	Radio Astrophysics
DSpace@NCL. National Chemical Laboratory, Pune, Maharashtra. Link: http://dspace.ncl.res.in/	407	DSpace	Chemistry and Chemical Technology
DSpace@UoH. IGM Library, University of Hyderabad, Andhra Pradesh. Link: http://didib.uohyd.ernet.in/dspace	396	DSpace	Multidisciplinary
Librarians' Digital Library. Documentation Research and Training Centre (DRTC), Indian Statistical Institute (ISI), Bangalore Centre, Bangaluru, Karnataka. Link: https://drtc.isibang.ac.in/	396	DSpace	Library and Information Science
Management Development Institute - Open Access Repository (DSpace@MDI) Management Development Institute, Gurgaon, Delhi. Link: http://dspace.mdi.ac.in/dspace	356	DSpace	Multidisciplinary
Digital Knowledge Repository of Central Drug Research Institute (DKR@CDRI). Central Drug Research Institute, Lucknow, Uttar Pradesh. Link: http://dkr.cdri.res.in:8080/dspace/index.jsp	342	DSpace	Biology and Biochemistry; Health and Medicine
Bioinformation. Biomedical Informatics. Link: http://www.bioinformation.net/	320	Other Softwares (OAI)	Biology

Dspace@IBSA. ICFAI Business School, Ahmedabad, Gujarat. Link: http://202.131.96.59:8080/dspace	213	Dspace	Mathematics and Statistics; Business and Economics; Library and Information Science; Management Science
Kautilya Digital Repository at IGIDR (Kautilya@igidr). IGIDR Library, Indira Gandhi Institute of Development Research (IGIDR), Mumbai, Maharashtra. Link: http://oii.igidr.ac.in:8080/dspace	204	Dspace	Multidisciplinary
DL@ISIB. Indian Statistical Institute, Bangaluru, Karnataka. Link: http://library.isibang.ac.in:8080/dspace/	191	Dspace	Mathematics and Statistics
Eprints@IARI. Indian Agricultural Research Institute (IARI), New Delhi. Link: http://eprints.iari.res.in/	188	Eprints	Agriculture, Food and Veterinary
DU Eprint Archive. University of Delhi, New Delhi. Link: http://eprints.du.ac.in/	178	Eprints	Multidisciplinary
Eprints@NIAS. National Institute of Advanced Studies, Bangaluru, Karnataka. Link: http://59.90.235.217:8081/	176	Eprints	Humanities, Natural Sciences & Engineering, Social Sciences.
Eprints@MoES. Open Access Digital Repository of Ministry of Earth Sciences, Government of India, New Delhi. Link: http://moeseprints.incois.gov.in/information.html	169	Eprints	Earth Science
VIDYA Institutional Repository. Vidya Academy of Science and Technology, Thrissur, Kerala. Link: http://dspace.vidyaacademy.ac.in/	168	Dspace	Science and Technology
E-Repository@IIHR (Knowledge Repository of Indian Institute of Horticultural Research). Indian Institute of Horticultural Research (IIHR), Bangaluru, Karnataka. Link: http://www.erepo.iihr.ernet.in/	160	Dspace	Multidisciplinary
Dspace@GGSIPU. Guru Gobind Singh Indraprastha University, Delhi. Link: http://dspace.ipu.ernet.in:8080/dspace	129	Dspace	Multidisciplinary
KR@CIMAP. Central Institute of Medicinal & Aromatic Plants, Lucknow, Uttar Pradesh. Link: http://kr.cimap.res.in/index.jsp	121	Dspace	Soil Science, Chemical Sciences, Biotechnology, Biology.
OneWorld South Asia Open Archive Initiative. OneWorld South Asia (OWSA), New Delhi. Link: http://open.ekduniya.net/	116	Eprints	Human rights and Sustainable Development
ePrints@ATREE. Ashoka Trust for Research in Ecology and the Environment, Srirampura, Bangaluru, Karnataka. Link: http://eprints.atree.org/	104	Eprints	Environment Science

Eprints@SBT. Madurai Kamraj University (School of Biotechnology), Madurai, Tamilnadu. Link: http://eprints.bicmku/	89	Eprints	Biology and Biochemistry
Dspace@SDMCET. Sri. Dharmasthala Manjunatheshwar (SDM) College of Engineering and Technology, Dharwad. Link: http://210.212.198.149:8080/jspui	67	Dspace	Chemical Technology; Technology; Electrical and Electronic Engineering; Library and Information Science
IMSc Eprint Archive. Institute of Mathematical Sciences, Chennai. Link: http://www.imsc.res.in/eprints/	43	Eprints	Mathematics and Statistics
Dspace@Webinito. Webinito Network, Vastrapur, Ahmedabad. Link: http://dspace.webinito.com/	39	Dspace	Digital Library, Dspace
Eprints@immt. Institute of Minerals and Materials Technology, Bhubaneswar, Orissa. Link: http://eprints.immt.res.in/	33	Eprints	Minerals and Materials Technology
Siddha Articles (ISSN 0974-2522). Bethesda CAM Research Center, Tirunelveli, Tamil Nadu. Link: http://www.freewebs.com/siddhapapers/	25 approx	Other Softwares (OAI)	Siddha Science
Eprints@IIITA. Indian Institute of Information Technology, Allahabad, Uttar Praesh. Link: http://eprints.iiita.ac.in/	22	Eprints	Management, Science and Technology
ePrints@SVNIT. Sardar Vallabh bhai National Institute of Technology, Surat, Gujarat. Link: http://eprints.svnit.ac.in/	14	Eprints	Technology General
Eprints@NII. National Institute of Immunology (NII), New Delhi. Link: http://eprints.nii.res.in/	10	Eprints	Biology and Biochemistry
Petrospace-PDPU Open Repository. Pandit Deendayal Petroleum University, Gandhinagar, Gujarat. Link: http://203.77.192.116:8080/dspace/	01	Dspace	Multidisciplinary
BUL Theses and Dissertations. Bangalore University, Bangaluru, Karnataka. Link: http://202.141.128.119/	NA	Eprints	Multidisciplinary
IR@Bharathidasan University (In-house). Bharathidasan University Library, Tiruchirappalli, Tamil Nadu. Link: http://www.bdu.ac.in/ckr/	NA	GSDL	Multidisciplinary
The IIOAB Journal (ISSN 0976-3104). The Institute of Integrative Omics and Applied Biotechnology, Purba Medinipur, West Bengal. Link: http://www.iioab-journal.webs.com/	NA	NA	Biology/Life Sciences

Library and Information Services. Physical Research Laboratory, Ahmedabad, Gujarat. Link: http://www.prl.res.in/~library/	NA	GSDL	Physics, Astronomy, Astrophysics; Solar Physics and Planetary & Geosciences
Open Access Agricultural Research Repository (OpenAgri). Agropedia, IIT Kanpur (Indian Institute of Technology Kanpur), Kanpur, Uttar Pradesh. Link: http://agropedia.iitk.ac.in/openaccess/	NA	NA	Agriculture, Food and Veterinaries
Rajiv Gandhi Center For Biotechnology. Rajiv Gandhi Center For Biotechnology, Trivandrum, Kerela. Link: http://rgcb.res.in/	NA	Other Softwares (OAI)	Biology, Molecular Medicine and Biotechnology
Scholarius. Scholarius Foundation, Coimbatore, Tamil Nadu. Link: http://www.scholarius.com/#	NA	NA	Multidisciplinary
Aryabhata Research Institute of Observational Sciences (ARIES) Digital Repositories. Nainital, Uttarakhand. Link: http://192.168.1.171:8080/jspui/	NA	DSpace	Astronomy and Astrophysics