

Open Access to Scientific Knowledge: Policy Perspectives and National Initiatives¹

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Key Issues

Various initiatives are taken globally to make knowledge repositories more accessible to researchers by exploiting the internet platform and developing a model that allows free access. India is also actively participating in this new initiative. Open access to scientific knowledge is an integral part of India's S&T policy intervention. Some of the major international and Indian national initiatives are highlighted. Further efforts that would be required to make Indian participation more fruitful are also brought out.

OA – Salient Aspects

Open access to scientific knowledge is a global movement for making scientific information and scholarly literature available in the public domain and accessible through internet. Open licensing is the key issue in the open access mode where the readers can view the literature without any payment and copyright restrictions. Some open licensing modes also allow readers to share and re-use the scholarly information in their future works. Creative Commons is most popular form of open licensing.

The global open access statements and declarations, accepted by major research funding agencies and apex research councils across the world, emphasize on availability of scientific knowledge originated from public funded research through open access channels. Some of the most significant open access statements and declarations are namely: Budapest Open Access Initiative, 2002; Bethesda Statement on Open Access Publishing, 2003; Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, 2003; IFLA Statement on Open Access to Scholarly Literature and Research Documentation, 2003. These declarations and statements have influenced national research funding agencies in adopting open access policy at the country level.

The NKC, established in 2005 in India, also got influenced by these global open access statements in making similar recommendations. NKC's Working Group on Open Access and Open Educational Resources and Working Group on Libraries have strongly recommended open access to public-funded research outputs. This indicates that all research articles published by Indian authors receiving any government or public funding must be made available under open access and should be archived in the standard OA format on OA repositories (NKC, 2007). The Council of Scientific and Industrial Research (CSIR) has accepted an Open Access Mandate for promoting open access to public-funded research [see Box 03.07.01]. Similarly, other research councils such as Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR) have accepted one or other form of open access to scientific knowledge. All these research funding agencies also agreed that grant funds may be used for article-processing charge in open access journals (BioMed Central, 2012).

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In India, several renowned higher educational institutions, R&D institutions and science academies have established open access channels for enhancing access to scholarly literature and scientific information originated from them. There is also growing interests in making open access to public funded research literature, so that outcomes of these research projects get more international visibility and recognitions.

Open Access Journals

Many journal publishers have joined in the global open access movement by initiating open access journals. Many e-journals also migrated to open access mode for getting global visibility and international readership. Open access journals from India have gained global visibility and outreach to an international audience and peer groups. Their acceptance is evident from the growing citation counts and article submissions from other countries.

As indicated in the Table 03.07.01, India has become one of the major contributors in publishing open access journals. India is ranked 4th in 2012-13 global Directory of Open Access Journals (DOAJ), only after the United States, Brazil and United Kingdom. Major open access journal publishers in India are mainly science academies, scientific societies and public institutions such as Indian National Science Academy (INSA), Indian Academy of Sciences (IAS), National Institute of Science Communication and Information Resources (NISCAIR), Indian Institute of Science (IISc), Indian Council of Medical Research (ICMR). Impact of open access scientific journals from India is discussed in another chapter in this Report.

Table 03.07.01: Top five OA journals publishing countries in DOAJ

#	Country	Cumulative Total number of journals in DOAJ (as on 17/01/2013)											
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	United States	16	213	298	384	435	522	699	804	961	1178	1268	1270
2	Brazil	0	8	125	172	223	278	350	394	529	660	801	804
3	United Kingdom	5	111	152	191	230	261	292	348	465	510	575	575
4	India	0	14	31	45	61	78	100	148	276	369	464	471
5	Spain	0	5	21	79	128	155	217	244	321	393	442	444

Open Access Knowledge Repositories in India

Open access knowledge repository for an institution is popularly known as institutional repository (IR). It usually archives scientific output of that institution contributed by the institutional community members, including scientists, faculty members, researchers, students and staff members. An IR stores full-text contents of journal articles, book chapters, books, conference papers, lecture notes, presentations, media articles, project reports, theses and dissertations.

An open access knowledge repository often serves a bigger scientific community at the national level. Then its scopes go beyond an institutional repository, and it becomes a national knowledge repository in a particular subject area.

As indicated in the Table 03.07.02, India has become one of the major contributors in hosting open access knowledge repositories. India is ranked 10th in 2012-13 global Directory of Open Access Repositories (OpenDOAR www.opendoar.org). India has about 54 stable open access institutional repositories. Among them majority of host institutions are universities, national institutions, laboratories and other R&D centres. The Registry of Open Access Repositories (ROAR <http://roar.eprints.org>) maintains another directory of similar kind, although it is not very standardized and authenticated. India is ranked 7th in 2012-13 version of ROAR.

Table 03.07.02: Top ten countries in OpenDOAR and ROAR

Country	OpenDOAR	OpenDOAR Country Rank	ROAR	ROAR Country Rank
United States	395	1	547	1
United Kingdom	209	2	249	2
Germany	165	3	193	3
Japan	138	4	166	4
Spain	98	5	153	5
Poland	75	6	106	6
France	71	7	82	10
Italy	70	8	88	8
Canada	58	9	85	9
India	54	10	94	7
As on 11 March 2013				

Contribution of CSIR in Open Access Movement

The CSIR is a major scientific research council in India. CSIR is the first scientific research council in India that adopted an open access mandate for its 42 laboratories and institutions. This open access mandate ensures public funded research literature originated from CSIR institutions will be made accessible through open access institutional repositories and a central open access knowledge repository. Many of the laboratories have already set up institutional repositories and many more would be made available soon. As indicated in Table 03.07.03, NISCAIR maintains three national-level open access repositories, namely NISCAIR Online Periodical Repository (NOPR), National Science Digital Library (NSDL) and CSIR Knowledge Gateway. NOPR mainly provides full-text open access to articles from the NISCAIR journals. NSDL maintains a collection of learning modules, popular science books and articles, suitable for the undergraduate and high school students. NSDL materials also help in creating an interest in science education. CSIR Knowledge Gateway is a central repository at NISCAIR created for hosting scientific outputs of a group of CSIR institutions. It will be an aggregator of research literature originated from all CSIR laboratories. Table 03.07.03 also indicates that four repositories are not listed in the OpenDOAR, however, those are listed in ROAR.

Table 03.07.03: CSIR knowledge repositories*

Name of IRs	Host Institution	Indexed in OpenDOAR	No. Of Records	Coverage/ Resources	Web Address
Niscair Online Periodical Repository (NOPR)	NISCAIR	Yes	14513	National	http://nopr.niscair.res.in/
National Science Digital Library (NSDL)	NISCAIR	Yes	577	National	http://nsdl.niscair.res.in/
CSIR Knowledge Gateway	NISCAIR	No	-	National	http://knowgate.niscair.res.in/jspui/
ePrints@ CFTRI	CFTRI	No, ROAR	5940	Institutional	http://ir.cftri.com/
Eprints@NML	NML	Yes	5536	Institutional	http://eprints.nmlindia.org/
Institutional Repository@ NAL	NAL	Yes	5371	Institutional	http://nal-ir.nal.res.in/
Digital Repository Service	NIO	Yes	4230	Institutional	http://drs.nio.org/drs/

(DRS@NIO)					
EPrints@ IICB	IICB	No, ROAR	1411	Institutional	http://www.eprints.iicb.res.in/
CSIR Explorations	URDIP	No, ROAR	837	National	http://eprints.csirexplorations.com/
Digital Knowledge Repository	CDRI	Yes	681	Institutional	http://dkr.cdri.res.in:8080/dspace/
Knowledge Repository @ CIMAP	CIMAP	No, ROAR	120	Institutional	http://kr.cimap.res.in/
Eprints@CSIR-AMPRI	AMPRI	No, ROAR	28	Institutional	http://eprints.ampri.res.in/
*Data as on 11 March 2013					

Important Open Access Knowledge Repositories in India

A diverse group of institutions and organizations take part in open access movement in India. Majority of them are academic or research institutions having strong belief in advancement of scientific knowledge through enhancing access to scientific information through open access channels. Table 03.07.04 provides an indicated list of open access repositories. University Grants Commission's "UGC (Submission of Metadata and Full-text of Doctoral Theses in Electronic Format) Regulations, 2005" and its lateral version "UGC Notification (Minimum Standards & Procedure for Award of M.Phil/PhD Degree), 2009" were the driving force for universities setting up open access institutional repositories [UNESCO, 2012]. Later, INFLIBNET Centre of UGC established a national repository of electronic theses and dissertations (ETD) named "ShodhGanga: A Resevior of Indian Theses" for providing access to ETD collections of UGC-funded universities in the country. Vidyanidhi Digital Library is another country-level ETD repository, established earlier than ShodhGanga. Some universities also have established institutional ETD repositories, e.g. ETD@IISc, Etheses@NITR, and MGU Online Theses Library. INFLIBNET Centre also maintains two more OA repositories namely "ShodhGangotri: Repository of Indian Research in Progress" and "Inflibnet's Institutional Repository". Both ShodhGanga and ShodhGangotri have exponential growth possibilities in near future as INFLIBNET Centre is signing memorandums of understanding (MoU) with all UGC-funded universities for submission of their ETD collections and proposals/synopses of all registered PhD and MPhil students.

Table 03.07.04 also indicates top open access repositories in the country. Official Debates of Rajya Sabha, maintained by Rajya Sabha Secretariat, stands first in terms of number of records in the repository. Publications of IAS Fellows, maintained by Indian Academy of Sciences, Bangalore, stands second; ePrints@IISc, hosted by Indian Institute of Science, Bangalore, stands third; eGyanKosh hosted by Indira Gandhi National Open University (IGNOU) stands fourth; and NOPR hosted by NISCAIR stands fifth. Other four OA repositories maintained by CSIR institutions also found place in top twenty categories, as indicated in Table 03.07.04.

Digital Repository of West Bengal Public Library Network, hosted by W.B. State Central Library, is a unique OA initiative that provides access to many out-of-print or out-of-copyright books and other twentieth century literature in vernacular language Bengali as well as in English.

OpenMED@NIC, hosted by National Informatics Centre, is an OA knowledge repository that provides access to biomedical literature written by researchers in India. It is a national facility that facilitates biomedical researchers in self-archiving their research publications and getting attention of worldwide audience.

Knowledge Repository Open Network (KNoor), hosted by University of Kashmir, is an OA knowledge repository that provides access to research literature contributed by researchers in Jammu and Kashmir state. This is a kind of common platform for researchers affiliated to

universities and institutions in Kashmir valley, helping them in self-archiving and getting global visibility.

The scientific institutions, which are hosting open access institutional repositories, have strong influence in institutional open access policy. Many institutions of ICMR and ICAR are also interested in establishing open access institutional repositories. A few ICAR and ICMR journals are also available in open access channel. Still, official open access mandate of these research councils are missing.

Indian institutions of national importance such as Indian Institute of Science (IISc), Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), Indian Statistical Institute (ISI) all have experimented with open access institutional repositories. Some of them have stable institutional repositories as listed in Table 03.07.04. These institutions are also members of INDEST-AICTE Consortium that helps in capacity development of information professionals for setting up digital repositories in their respective institution.

Indian digital repositories, as listed in Table 03.07.04, were created using mainly one of the two free and open source software (FOSS), namely DSpace and Eprints. These FOSS-based content management systems help in self-archiving of full-text contents with standardized metadata entry. A moderator of each repository usually approves submission of scholarly items and ensures quality of metadata and full-text contents. These two software also support OAI-PMH (Open Access Initiative Protocol for Metadata Harvesting) so that metadata harvesters or search engines' web crawlers can harvest metadata from an open access repository; and cross-search facility is made available with metadata harvesting services. Examples of Indian metadata harvesting services are: Open Harvester Systems at ISI Bangalore (<http://drtc.isibang.ac.in/sdl/>), SEED at IIT Delhi (<http://eprint.iitd.ac.in/seed/>), Open Index Initiative at IGIDR Mumbai (<http://oii.igidr.ac.in/>) and OA harvester at URDIP, Pune (<http://oa.csirexplorations.com/>).

Table 03.07.04: Important OA knowledge repositories in India*

Name of IRs	Host Institution	Parent/ Funding Body	No. Of Records/ Items	Coverage/ Resources	Web Address
Official Debates of Rajya Sabha	Parliament of India	MPA	593257	National	http://rsdebate.nic.in
Publications of IAS Fellows	Indian Academy of Sciences	DST	91182	National	http://repository.ias.ac.in/index.html
ePrints@IISc	IISc, Bangalore	MHRD	34777	Institutional	http://eprints.iisc.ernet.in/
eGyanKosh	IGNOU	MHRD	26549	Institutional	http://www.egyankosh.ac.in/
Nisair Online Periodical Repository (NOPR)	NISCAIR	CSIR	14513	National	http://nopr.niscair.res.in/
IR @ IIT Bombay	IIT Bombay	MHRD	14096	Institutional	http://dspace.library.iitb.ac.in/jspui/
DR @ WBPLN	W.B. Public Library Network	State Govt.	10196	State-level	http://dspace.wbpublibnet.gov.in:8080/jspui/
Eprints@CMFRI	CMFRI, Mumbai	ICAR	8931	Institutional	http://eprints.cmfri.org.in/
OA Repository at ICRISAT	ICRISAT, Hyderabad	CGIAR	8798	Institutional	http://oar.icrisat.org/
DSpace@NEHU	NEHU, Shillong	UGC	7541	Institutional	http://dspace.nehu.ac.in/jspui/
ShodhGanga: A Reservoir of Indian Theses	Inflibnet Centre	UGC	6139	National	http://shodhganga.inflibnet.ac.in/
ePrints@ CFTRI	CFTRI, Mysore	CSIR	5940	Institutional	http://ir.cftri.com/
IIAP Repository	Indian Institute of Astrophysics	DST	5772	Institutional	http://prints.iiap.res.in/
DSpace@ISI Kolkata	ISI Kolkata	MHRD	5260	Institutional	http://library.isical.ac.in/jspui/

Eprints@NML	NML	CSIR	5536	Institutional	http://eprints.nmlindia.org/
Vidyanidhi Digital Library, Indian ETD Collection	University of Mysore	UGC	5482	National	http://dSPACE.vidyanidhi.org.in:8080/dSPACE/
NAL Institutional Repository	NAL, Bangalore	CSIR	5371	Institutional	http://nal-ir.nal.res.in/
Digital Library @ CUSAT	Cochin Univ. of S&T	UGC	5295	Institutional	http://dSPACE.cusat.ac.in/jspui/
RRI Digital Repository	Raman Research Institute	DST	5182	Institutional	http://dSPACE.rri.res.in/
Digital Repository Service (DRS@NIO)	NIO, Goa	CSIR	4230	Institutional	http://drs.nio.org/drs/index.jsp
DSpace@ISEC	ISEC, Bangalore	ICSSR	3622	Institutional	http://203.200.22.249:8080/jspui/
OpenMED@NIC	National Informatics Centre	MCIT	2866	National	http://openmed.nic.in/
DSpace at IUCAA	IUCAA, Pune	UGC	2516	Institutional	http://www.iucaa.ernet.in:8080/jspui/
Dyuthi: CUSAT Digital Repository	Cochin Univ. of S&T	UGC	2297	Institutional	http://dyuthi.cusat.ac.in/xmlui/
Etheses@NITR	NIT Rourkela	MHRD	2192	Institutional	http://ethesis.nitrkl.ac.in/
Eprints@IIT Delhi	IIT Delhi	MHRD	2141	Institutional	http://eprint.iitd.ac.in/dSPACE/
etd@IISc	IISc, Bangalore	MHRD	1886	Institutional	http://etd.ncsi.iisc.ernet.in/
Catalysis Database	IIT Madras	MHRD	1882	Institutional	http://catalysis.eprints.iitm.ac.in/
Digital Archive of NITR	NIT Rourkela	MHRD	1807	Institutional	http://dSPACE.nitrkl.ac.in/dSPACE/
Inflibnet's Institutional Repository	Inflibnet Centre	UGC	1274	Institutional	http://ir.inflibnet.ac.in/
Bhagirathi digital repository	IIT Roorkee	MHRD	1043	Institutional	http://bhagirathi.iitr.ac.in/dSPACE/
MGU Online Theses Library	Mahatma Gandhi Univ, Kerala	UGC	1130	Institutional	http://www.mgtheses.org/
Etheses at Saurashtra University	Saurashtra University	UGC	1010	Institutional	http://etheses.saurashtrauniversity.edu/
ShodhGangotri: Repository of Indian Research in Progress	Inflibnet Centre, Ahmedabad	UGC	876	National	http://shodhgangotri.inflibnet.ac.in/
Knowledge Repository Open Network (KNoor)	University of Kashmir	UGC	688	Institutional	http://dSPACE.uok.edu.in:8080/jspui/
E-Repository@IIHR	IIHR, Bangalore	ICAR	481	Institutional	http://www.erepo.iihr.ernet.in/
Librarian's Digital Library (LDL)	ISI, Bangalore	MHRD	465	Institutional	http://drtc.isibang.ac.in:8080/
Kautilya Digital Repository	IGIDR, Mumbai	RBI	207	Institutional	http://oii.igidr.ac.in:8080/jspui/
*Data as on 11 March 2013					

Sustainability of OA Repositories

Sustainability of OA initiatives is major issue in India. A number of OA repositories went offline or became non-functional in recent years as respective institutions could not maintain them for different reasons. Examples of OA repositories went offline are institutional repositories of National Chemical Laboratories (DSpace@NCL), Indian Institute of Petroleum (DSpace@IIP), Icfai Business School Ahmedabad (DSpace@IBS), although they were earlier listed in ROAR or OpenDOAR and in a UNESCO report [[Das, 2008]. On the other hand, most of the institutions have successfully transferred ownership of OA repositories to their respective scientific community, initially from the KM Division or Knowledge Resource Centre of the respective institution to the institutional community. Thus, these OA repositories could achieve a short to medium-term sustainability. A long-term sustainability and succession plan usually includes details plan for long-term preservation of e-contents, continuous upgradation of content management software, extending interoperability to newer applications, new apps for mobile devices, etc. Running a

24x7 OA portal also requires a dedicated team of ICT professionals. The institutions having stable OA repositories also deploy a dedicated team of ICT professionals and other resources for successfully keeping their repository updated and correcting for any problem.

Conclusion

After achieving medium to long-term sustainability, the major task of Indian open access repositories is to focus on getting them listed and harvested by major indexing services for open access repositories, such as OpenDOAR (www.opendoar.org), OAIster (<http://oaister.worldcat.org/>), BASE – Bielefeld Academic Search Engine (www.base-search.net), SCIRUS (www.scirus.com), and Google Scholar (www.scholar.google.com). When these stable Indian OA repositories get indexed in such databases, research publications originated from India will get more global visibility, citations and international recognition.

Box 03.07.01: CSIR Open Access Mandate – highlights

- All research papers published from all CSIR laboratories and supported by a grant from CSIR will be made open access either by depositing the full-text and the metadata of each paper in an institutional repository or by publishing the papers in an open access journals in the first place.
- Each CSIR laboratory will set up its own interoperable institutional open access repositories for research papers, electronic thesis and dissertations. CSIR-URDIP will set up a central harvester which would harvest the full-text and metadata of all these papers/documents.
- CSIR and its constituent laboratories publish number of journals. All the CSIR journals published by NISCAIR have been made open access. Progressively, all CSIR publications will be made open access.
- CSIR will lead the Open Access movement within the country and take on board other scientific agencies to form a National Open Access Policy including legislation if necessary to mandate the availability of output of publicly funded research in public domain.
- Every year each CSIR laboratory will celebrate “Open Access Day” during the International Open Access Week (<http://www.openaccessweek.org/>) by organizing sensitizing lectures, programmes, taking new OA initiatives, publicizing the statistics of downloads, etc.

Source: http://oasis.csir.res.in/utube/CSIR_OPEN_ACCESS_MANDATE.pdf

References:

- BioMed Central. 2012. *Funder Policies*. Available at <http://www.biomedcentral.com/funding/funderpolicies>
- Das, Anup Kumar & Chakraborty, Susmita. 2014. *Collaboration in International and Comparative Librarianship*. Hershey, PA: IGI Global.
- Das, Anup Kumar. 2008. *Open Access to Knowledge and Information: Scholarly Literature and Digital Library Initiatives – the South Asian Scenario*. New Delhi: UNESCO.
- Das, Anup Kumar. 2009. Open Access to Research Literature in India: Contemporary Scenario. *ISSI Newsletter*, 5(1), 9-14.
- Das, Anup Kumar. 2011. Emergence of Open Educational Resources (OER) in India and its Impact on Lifelong Learning. *Library Hi Tech News*, 28(5), 10-15.
- Das, Anup Kumar; Arora, Praveen; Bhattacharya, Sujit. 2012. Webliography of STI Indicator Databases and Related Publications. *Journal of Scientometric Research*, 1(1), 86-93.
- Das, Anup Kumar; Dutta, C; Sen, BK. 2007. *ETD Policies, Strategies and Initiatives in India: A Critical Appraisal*. Presented in ETD 2007 Symposium, Uppsala, Sweden, June 2007.
- Das, Anup Kumar; Dutta, C; Sen, BK. 2007. Information Retrieval Features in Indian Digital Libraries: A Critical Appraisal. *OCLC Systems & Services: International Digital Library Perspectives*, 23(1), 92-104.
- Das, Anup Kumar; Giri, RS. 2011. Indian Citation Index: A New Web Platform for Measuring Performance of Indian Research Periodicals. *Library Hi Tech News*, 28(3), 33-35.
- Das, Anup Kumar; Mishra, Sanjaya. 2014. Genesis of Altmetrics or Article-level Metrics for Measuring Efficacy of Scholarly Communications: Current Perspectives. *Journal of Scientometric Research*, 3(2): 82-92.
- Ghosh, SB; Das, Anup Kumar. 2007. Open Access and Institutional Repositories - a Developing Country Perspective: A Case Study of India. *IFLA Journal*, 33(3), 229-250.
- NISCAIR. 2011. *CSIR and DST Institutes Gear Up to Adopt Open Access*. Available at <http://blog.niscair.res.in/?p=481>
- NKC. 2007. *Open Access and Open Educational Resources: Working Group Report*. New Delhi: National Knowledge Commission.
- UNESCO Global Open Access Portal. 2012. *India Country Profile*. Available at <http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/access-by-region/asia-and-the-pacific/india/>

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