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Open Access Repositories
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Open Access Repositories

4.1 Introduction

Scholarly communication is the backbone of the works of academics and other researchers. It has been a continual quest of the scholars to identify and have access to the scientific literature in whatever form it is available. Unfortunately, the publishers, who solely work for profit making, have largely monopolized the scholarly communication. As it happens they, while accepting the manuscripts for publication get the authorization of the copyright from the author of the work in their favor. It is an irony that manuscripts once published cannot be accessed, neither by the author nor by the institution to which it belongs, without subscribing the journal. The rising cost of the journals and shrinking library budgets result in gradually decreasing access to the journals in the world of scholars. The situation is more alarming in the developing world where libraries have to, somehow manage to meet both the ends by inter-library resource sharing and other means.

In a non-open access environment, the time-consuming publication process of scholarly research output involves the submission of research articles to the editors of the journals, the process of peer-reviewing which is followed by publication and subscription by the libraries. This however, takes as many as 36 to 52 weeks before the hard copies of the journal are made available to the library users. The ICT applications in publication have been able to reduce this time frame from 3 to 4 weeks. Open access publishing and scholarly archiving initiatives may further reduce the time of publication. The authors can now publish their findings in a span of a few minutes only or even less than that.

Open Access is the direct consequence of the problems and challenges faced by authors, scientists and libraries as well in publishing and disseminating the results of their research. The term open access aims at the free availability of
the peer-reviewed scholarly journal literature on the Internet so that the users can use the information in any way they like for lawful purposes, transcending the financial, copyright and technical barriers. Open access applies to that material which the authors want to make public and does not apply for which authors expect revenue (say Books, Novels, etc.).

4.2 Open Access: An overview

Open access is the direct consequence of serial crisis emerged during the late 1990s to make public-funded research freely available to all without any geographical boundary. The concept of open access lies in that “An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the internet. The public good they make possible is the worldwide electronic distribution of the peer reviewed journal literature completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds”¹

Years earlier, there were many activists who were working to enlighten the concept of open access, but their dream come true in the meeting held at Budapest. The development of the Open Access and description of other conferences which deal with the OA along with the Budapest Open Access Initiative (BOAI) can be discussed as:

4.2.1 Budapest Open Access Initiative (BOAI)

Budapest Open Access Initiative has been considered being the first meet held on this subject on December 1-2, 2001 in Budapest, Hungry by Open Society institute. This call generally has been described as the ‘birth’ of open access initiative. It is a worldwide initiative and is not confined to European countries. The initiative was to remove access barriers to the peer reviewed journal literature

which in turn will accelerate research, upgrade education, make the literature more and more useful, share the learning of all whether poor or rich and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge. The description of literature which is to be made freely accessible on public internet given by BOAI is as follows:

“The literature for which BOAI secure open access is the scientific and scholarly research text that authors give to the publishers and readers without appealing for any kind of royalty or payment. The public statement of BOAI puts this literature as “primarily, this category encompasses… peer reviewed journal articles, but it also includes any un-reviewed preprints that [scholars] might wish to put online for comment or to alert colleagues to important research findings”\(^1\).

BOAI define open access as follows:

“By ‘open access’ to this literature, 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”\(^2\).

Till date\(^*\) around 5771 individuals and 681 organizations have signed the initiative in support of it.

4.2.2 Bethesda statement on Open Access Publishing

Almost a year after Budapest, a discussion was held on the possibilities of better integrating actors of the publication process on 11 April 2003 in Bethesda,

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Maryland, USA. The purpose of this meet was to stimulate discussion within the biomedical research community. The goal was to agree on significant, concrete steps that all significant parties including the organizations that foster and support scientific research, the scientists that generate the research results, the publishers who facilitate the peer-review as distribution of results of the research, librarians and others who depend on access to knowledge can take part to promote the rapid and efficient transition to open access publishing.

According to Bethesda statement¹ ‘Open Access publication’ (Open Access is a property of individual works, not necessarily journal works or publishers) is one that meets the following two conditions:

1. The Author(s) and copyright holder(s) grant(s) to all users free, irrevocable, worldwide, perpetual rights of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative digital works in any digital medium for any responsible purpose, subject to proper attribution of authorship (Community standards, rather than copyright law, will continue to provide the mechanism for enforcement of proper attribution and responsible use of published work, as they do now) as well as the right to make small numbers of printed copies for their personal use.

2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by academic institution, scholarly society, government agency, or other well established organization that seeks to enable open access, unrestricted distribution, interoperability, and long term archiving (for the biomedical sciences, Pub Med central is such a repository).

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4.2.3 Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities

This is the third major landmark conference hosted by Max Planck society in Berlin from 20-22 October, 2003. The "Berlin Declaration" is in accordance with the spirit of the "Bethesda Declaration on Open Access Publishing" and the "Budapest Open Access Initiative". It marked both an end point and a new start. It represented an end point in the academic policy goals which had been formulated and at the same time, it represented a starting point with regard to technical and organizational questions. The initiative aims to propagate knowledge not only through the classical form but progressively more 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.

Almost exactly in line with Bethesda principles, the Berlin Declaration gives the following definition of an Open Access contribution as:

"Establishing open access as a worthwhile procedure ideally requires the active commitment of each and every individual producer of scientific knowledge and holder of cultural heritage. Open access contributions include original scientific research results, raw data and metadata, source materials, digital representations of pictorial and graphical materials and scholarly multimedia material."

Open Access Contributions must satisfy two conditions:

1. The Author(s) and right holder(s) of such contributions* grant(s) to all users free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works*, in any digital medium for any responsible purpose, subject to proper attribution of authorship(community standards, will continue to

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* Only highlighted words have been changed in Berlin Declaration
provide the mechanism for enforcement of proper attribution and responsible use of published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.

2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above in an appropriate standard electronic format is deposited (and thus published)* in at least one online repository using suitable technical standards (such as the open archive definitions)* that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability and long term archiving.

4.2.4 The International Federation of Library Associations and Institutions (IFLA):-

In 2004, this federation issued a statement on Open Access to Scholarly Literature and Research Documentation as:

"Open access guarantees the integrity of the system of scholarly communication by ensuring that all research and scholarship will be available in perpetuity for unrestricted examination and, where relevant, elaboration or refutation"^1.

4.3 Some other Authoritative Definitions

Suber (2002)^2 defines open access as: "Open access to scientific journal articles means online access without charge to readers or libraries. Committing to open access means dispensing with the financial, technical, and legal barriers that are designed to limit access to scientific research articles to paying customers. It


means that, for the sake of accelerating research and sharing knowledge, publishers will recoup their costs from other sources.”

Morison\(^1\) (2006) defines Open Access as: “Open Access literature is free online for anyone, anywhere to read, download, and use, providing that the author is properly cited, to be freely available as soon as it is published, if not before (as a preprint). Open Access is an obvious choice for works that authors have traditionally given away, such as scholarly, peer reviewed journal articles, the focus of the open access movement. Open Access makes sense for other materials too, such as government documents, theses and conference proceedings”.

Prosser\(^2\) (2003) defines Open Access as “free and unrestricted access on the public Internet to literature that scholars provide without expectation of direct payment. There are many reasons for doing this; it accelerates research, enriches education and shares learning across rich and poor nations”.

According to Association of Research Libraries (ARL)\(^3\) (2004)

- “Open access is a cost effective way to disseminate and use information. It is an alternative to the traditional subscription based publishing model made possible by new digital technologies and networked communications. As used by ARL, open access refers to works that are created with no expectations of direct monetary return and made available at no cost to the reader on the public Internet for purposes of education and research. Open access does not apply to materials for which the authors expect to generate revenue.”

- “Open access operates within the current legal framework of copyright law. Authors own the original copyright in their works. In the process of

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publishing, authors can transfer to publishers to post the work freely on the web, authors can retain the right to post their own work on institutional or disciplinary server. Authors, however, retain control over the integrity of their work and have the right to be properly acknowledged and cited”.

- **Open access is intended to be free for readers, not free for producers.** The costs of producing digital open access literature are believed much lower than the costs”.

4.4 Purpose of Open Access

Open access to knowledge is the technology’s response to serial crisis, a pressing problem which had led to this harmonized and rigorous movement worldwide. The inflation of scholarly journals has been sky rocketing and the dwindling library budgets, which had delivered libraries and the academic community to resort to the substitute of accesses to their own content. The absurdity was that the universities and research institutes who contribute the scholarly content through their researchers had actually no access to the content after it is handed over to the publishers. Authors while submitting the manuscripts to the publishers give away the ‘copyright’ to them and they have literally locked up the content for access.

The purpose of OA is to liberate the scholarly literature, through various infringements from the control of the monopolizing commercial publishers and make it available free to the scientific fraternity worldwide. The underlying principle is that the scientific community publishes their research findings without any anticipation of imbursement. The substantial remunerations they draw from their publications are career prospects, recognition and visibility. The other benefits are merely to give away their wealth of research findings for utilization of the world of science and ultimately the society. In other words, OA is a reshaping of the historic dream concept, the widespread availability of scholarly literature which the researchers have been pondering over the past several decades and centuries.
The OA process is all about assuring the scholarly content to be made available online. This is assumed that the content, especially scholarly content, is to be born in digital and electronic format, which is the existing and upcoming standard of scholarly content authoring.

4.5 **Routes to Open Access**

The way in which researchers can make their work freely available may vary slightly, but generally falls into two groups. BOAI has acclaimed two complimentary strategies to make the peer reviewed scholarly journal literature publicly available. These are

4.5.1 **Open Access journals**: This route is commonly known as the *Gold* open access. Open access journals are scholarly journals that are peer-reviewed as well as openly and freely accessible to its readers via Internet. Directory of Open Access Journals (DOAJ) defines open access journals as “open access journals are journals that use a funding model that does not charge readers or their institutions for access.” By proposing a manuscript in an open access journal the publisher has the liability of making the manuscript open in whatever form and conserving it indefinitely. The journals are financed by research grant or similar as part of the cost of doing research. In very rare cases authors have to pay charge for publishing their articles. Bio Med central is the well-known example of open access publishers. Others are the journals from the Public Library of Science (PLoS) such as PLoS medicine, PLoS biology, DLib magazine, etc. According to Open Directory of Open Access Journals, there are more than 9,709 journals which added till date as of (31-03-2014) out of which 590 Journals are from India.

4.5.1.1 **Types of open access journals**

Bailey (2006) suggested the following taxonomy for journals:

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1. **Open access journals**: These journals provide free access to all articles and utilize a form of licensing that puts minimal restrictions on the use of articles, such as Creative commons Attribution License (This license lets others distribute, remix, tweak, and build upon creator’s work, even commercially, as long as others credit creator for the original creation). Example: Biomedical Digital libraries.

2. **Free access journals**: These journals provide free access to all articles and utilize a variety of copyright statements (e.g., the journal copyright statement may grant liberal educational copying provisions), but they do not use a Creative Commons Attribution License or similar license. Example: The public access computer systems review.

3. **Embargoed Access journals**: These journals provide free access to all articles after a specified embargo period (six months or one year) and typically utilize conventional copyright statements. Example: Learned publishing.

4. **Partial Access journals**: These journals provide free access to selected articles and typically utilize conventional copyright statements. Example: College and Research libraries.

5. **Restricted Access journals**: These journals provide no free access to articles and typically utilize conventional copyright statements. Example: Library Administration and Management. (Available in electronic form in the Database called Library Literature & Information Science Full Text and other databases as well.)

4.5.2 **Open Access Repositories or Archives**: This route is also known as Green open access. Open access repositories or archives are digital collections of scholarly articles that have been self archived by their authors, also called self archiving. Self-archiving simply means increasing the availability of already published work by depositing their articles by the authors themselves. The deposition can be before (**preprint**) or after publication (**post print**).
It is worthy to mention here that a **preprint** is “an article that has been submitted to a scholarly journal for peer review and editorial acceptance that do not conduct peer review and to articles that will never be submitted to any serial” and a **post print** is “the final version of an article which reflects changes made during the peer review and editorial process. It can either be the publisher’s digital version or a preprint that the author has modified to mirror the publisher’s changes”\(^1\).

Main places for self archiving are given below:

- **Institutional repository**: An institutional repository is a digital collection of intellectual output, such as research articles, theses and teaching materials, produced by the members of an institution, stored on the institution’s server. Institutional repositories allow for the free access to these materials and also provide a way of storing and preserving them.

- **Disciplinary repository**: A Disciplinary repository, also known as Cross Institutional Repository, is a freely available digital collection of research output of a particular discipline or related disciplines, which is stored on a centralized server. ‘arXiv’, PubMed central, E-LIS, etc. are the excellent examples of disciplinary repositories.

- **Personal Homepage**: An author can also place their work on their own website or server. For example, Research Gate profile pages are free of charge are included in this category. Self archiving is the cost free way to make publication visible. There are two fold benefits of self archiving “increase in citation rate” and “research cycle” is enhanced and accelerated when results are available on an open access basis.

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Both Gold open access and Green open access are well-matched with each other. An article can be published in an open access journal and also deposited in an open access archive.

Two other key phases of open access are as follows:

- **Gratis open access**: It means removing price barriers only. The items in gratis open access are free to read online but there are restrictions to download or print.

- **Libre open access**: Libre open access means removing both price as well as the permission barriers. The items in the libre open access are free to read, print or distribute. Restrictions are only on their commercial use.

Gratis open access is just removing price barriers but there are many different kinds of libre OA because there are number of permission barriers to remove. Hence libre OA is a range of things. The most important Gratis/ libre dissimilarity is not parallel with the Green/Gold. The Gratis/Libre differentiation is in user’s rights or freedom. On the other hand, the distinction between Green/ Gold is about venues that is where the article is stored say in open access journal or open access repositories.

In addition to the above two routes of open access, there is also a third route which is commonly used to give momentum to the open access environment. This third type is usually known as the special form of Gold Open access. Some publishers such as Oxford University Press and Springer, etc. are allowing the authors to have their work made available on Open Access terms for a fee, along with the publication in their subscription based journal. This is known as the **Hybrid** model or **Hybrid** journal and also called **Author pays model**.

**4.6 Benefits of Open Access**

OA serves the interests of many groups such as:

- **Authors**: OA enlarges their audiences and increases the visibility and impact of their work.
• **Readers:** OA gives them barrier free access (permission as well as price barriers) to the literature they need for their research. It increases their convenience, reach and retrieval power. OA also gives barrier free access to the software that assists in their research. Free online literature is free online data for software that facilitates full-text searching, indexing, mining, summarizing, translating, querying, linking, alerting and other forms of processing and analysis.

• **Libraries:** OA solves the pricing for scholarly journals. It also solves the permission crisis. Librarians want to help users find the information they need, regardless of the budget-enforced limits on the library’s own collection.

• **Universities:** OA increases the visibility of their faculty and institution, reduces their expenses for journals and advances their mission to share knowledge.

• **Journals and publishers:** OA makes their articles more visible, discoverable, retrievable, and useful. For OA journals, citation rate is high and it attracts more submission.

• **Funding agencies:** OA increases the return on their investment in research, making the results of the funded research more widely available, more discoverable, more retrievable and more useful. OA serves public funding agencies in a second way as well i.e., by providing public access to the results of publicly funded research.

• **Governments:** As funders of research, governments benefit from OA in all the ways that funding agencies do. OA also promotes democracy by sharing government information as rapidly and widely as possible.

4.7 **Institutional Repositories (IRs)**

Institutional repositories form the key element of open access movement to bring scholarly research to the world wide audiences. Institutional repositories or simply IRs are to support, disseminate and showcase the scholarly
communications and intellectual life of an institution. Increasingly, IRs are becoming a vital tool for institutions/universities to enhance the visibility of the institution as well as the work of its faculty so that it may be frequently used and cited. The concept of institutional repository proposes the tantalizing possibility of greater library influence over the full cycle of scholarly communication on campus, from research through publications, collections and preservation. Libraries are performing the leading role in shaping the institutional repositories all over the world. The term was coined by the Scholarly Publishing for Academic Resources Coalition (SPARC)\(^1\) and defined as “digital collections capturing and preserving the intellectual output of single or multi-university communities.” Here are some of the definitions given by prominent authors on IRs:

According to Lynch\(^2\) (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 organizational commitment to the stewardship of these digital materials including long-term preservation where appropriate, as well as organization and access or distribution”

Johnson\(^3\) (2002) defines IR as “any collection of digital material hosted, owned or controlled, or disseminated by a college or university, irrespective of purpose or provenance”

Crow\(^4\) (2002) defines IR as “digital collections that capture and preserve the intellectual output of a single or multi-university community”.


Institutional repositories are merely the digital archives of institution's scholarly literature that are made freely accessible to the global audiences and preserved for posterity. The main purpose of institutional repositories is to bring together and preserve the intellectual output of a laboratory, department, university or other entity. Institutional repository is the powerful driving force to bring intellectual prosperity to higher education.

4.7.1 Objectives

Following are the main objectives of Institutional repositories.

➢ To generate global visibility for an institution's scholarly research
➢ To gather contents at a single location for access, storage and preservation
➢ To provide access to institutional research productivity by self-archiving.
➢ To store and preserve other institutional digital possessions.

4.7.2 Benefits

Institutional repository provides wider benefits to all. These benefits vary from community to community as given below:

For global community

• Institutional repository supports research alliance through assisting liberated exchange of scholarly literature.
• Institutional repository assists in open understanding of research endeavors and activities.

For the Institution

• An institutional repository increases the visibility and prestige of the institution.
• An institutional repository preserves scholarly output as well as various other kind of digital materials through the collection of standardized metadata about each item.
• An institutional repository could provide cost savings in the long run provided that significant numbers of digital contents are deposited in them.
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- An institutional repository can interoperate with other university systems and exploit efficiencies between them by sharing information.
- The contents in an institutional repository are readily searchable both locally and globally.

For Learners/general users
- An institutional repository provides access to latest research.
- There is no charge to access the contents of an institutional repository. Also there is no subscription fee in an institutional repository.
- Grey literature or other material such as preprints, post-prints, conference proceedings, etc. which is not easily found through conventional means, can be easily made available and accessible to the user.

For the Contributor (such as Researchers/Faculty)
- Greater citation: Studies have revealed that articles openly accessible on the web are cited more often than their paper counterparts or subscribed ones.
- Speed: Faculty members and Researchers can self-archive their preprints immediately with the possibility of receiving quick feedback.
- Organization: An institutional repository can contain all of the scholarly work by a faculty member, including preprints, post prints, presentations and classroom material. Instead of being scattered in different databases, servers or computer hard drives, this material can be browsed easily at one place by the user and reused easily by the contributor.
- Preservation: In order to make continued access, digital files require being refreshment and migrating on the latest medium. It may be possible that today’s technology becomes obsolete (say, after ten or fifteen years) and its responsibility is placed on the creator of the institutional repository and not on the owner of the file to preserve the technological gadgets for accessing the old files.
• **Ease of use:** Since uploading is permissible in an institutional repository, so authors can self-archive their publications and these can be used without any restriction.

• **Permanent place:** An institutional repository ensures that material deposited in it will stay at one place and will maintain the same URL.

### 4.8 Key Elements of Institutional Repositories

An institutional repository is a digital archive of the intellectual product created by the faculty, research staff and students of an institution. It is accessible to end users both within and outside the institution. Certain essential elements of institutional repository are as follows (Crow, 2002):

#### 4.8.1 Institutionally defined-
Institutional repositories acquire the original research and scholarly product of an institution, is generated by the faculty, researchers and other members of that institution. Institutional repositories, thus, represent an historical and concrete image of the scholarly life and yield of an institution.

#### 4.8.2 Scholarly Content-
An institutional repository may contain any scholarly product created by institution's constituent population active in various fields. The content of institutional repositories include preprints, post-prints, journal articles, monographs, conference papers, electronic theses and dissertations, enduring teaching materials, data sets and other research material. Some repositories also include students' electronic portfolios, classroom teaching material, the institutions' annual reports, video recordings, computer programs, data sets, photographs, art works and other digital material that the institution wishes to preserve.

#### 4.8.3 Cumulative and perpetual:
The content collected in an institutional repository is both cumulative and maintained in perpetuity. It has two roles.

1. Whatever contents are deposited in an institutional repository, it is protected under legal rights to avoid plagiarism and copyright infringement
to maintain perpetuity. The cumulative nature of institutional repository indicates that the infrastructure of the repository is scalable.

2. Institutional repository aims long term preservation and access to digital contents. Both digital preservation and long term access to digital objects are linked with each other and latter become meaningless without the former. Provision of long term access to digital contents requires considerable planning and resource commitments, because institutions crave accepting all the file formats in institutional repositories which after few years can become obsolete when new standards evolve. Institutions should take into consideration the difficulty in migrating those formats or media into the evolving one.

4.8.4 Interoperability and open Access: For the repository to provide access to the intellectual product generated by the institution to the broader research community, users outside the institution must be able to locate and retrieve information from the repository by using common standards and protocols such as OAI-PMH, SWORD, RSS/ATOM feeds, Shibboleth, LDAP/Active Directory, etc. Therefore, institutional repository system must be able to support interoperability in order to provide access via multiple search engines and other discovery tools such as Google, Yahoo, etc. An institution does not necessarily need to implement searching and indexing functionality to satisfy the demand. It could simply maintain and expose metadata allowing other services to harvest and search the contents.

4.9 Contents in Institutional Repositories.

"The real strength of the IR lies in its ability to collect, preserve and protects the scholarly output of the university and makes it available to the people of the state and beyond". Content is the most important element for any type of library and repository. An institutional repository can store a virtually unlimited

and a wide range of content that enhance scholarly communication and support the educational goals of the institution. Institutional Repository allows only e-prints. broadly of two types, preprints and post-prints.

Open DOAR\(^1\) has identified the following content types in institutional repositories that are most common in all type of Institutional Repository System.

- Journal articles
- Bibliographic references (metadata only)
- Books sections and chapters
- Conference and workshop papers
- Theses and dissertations
- Unpublished reports and working papers
- Datasets
- Content packaged learning objects
- Multimedia and audio visual materials
- Software
- Patents
- Other special items

Within a repository's content policy the content type in elaborated form is as follows

**Publications**

- Articles: published in journals, magazines, newspapers, not necessarily peer-reviewed. The article must be in electronic medium such as an online journal or news website.
- Books: complete books or conference volumes.
- Book sections- separately authored chapters or sections in books.

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- Conference or workshop items: papers, posters, speeches, lectures or presentations given at a conference, workshop or other event.

Theses and Dissertations

Student theses and dissertations submitted to an institution as a part of the requirements for a degree, including:

- Doctoral theses: PhD
- Master’s theses & dissertations- M.Sc., M.A., M.B.A., etc.
- Bachelors’ dissertations- B.Sc., B.A., etc.

Resources used to support teaching and learning.

- Curricula and syllabuses.
- Course validation documents
- Course materials – learning resources, lecture notes
- Assignment materials- tests, exam papers.
- Study skills support and revision materials.
- Students- produced work (including all the content types listed here)

Audio visual items

- Images-digital photographs or visual images.
- Video- digital video.
- Audio-sound recording.
- Show/exhibition- an artist’s exhibition or site specific performance based deposit.
- Artifact- an artist artifact or work product could also apply to archaeological finds.
- Performance- performance of a musical event.
- Composition – A musical composition.

Data

- Datasets- bounded collections of quantitative data (e.g. spreadsheet or XML data file).
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- Experiment - experimental data with intermediate analyses and summary results.

Grey literature
- Patents – Patents include only published patents. As yet unpublished patent applications should never be included in a repository because to do so might disqualify the application.

  The following are grouped together by E-prints as monographs, although many people use monograph as a synonym for book.
- Technical reports.
- Project reports.
- Documentation & Manuals.
- Working papers & discussion papers.

Others
Something within the scope of the repository, but not covered by the other categories.

4.10 Open Access Initiative Protocol for Metadata Harvesting (OAI-PMH)

The Open Access Initiative-Protocol for Metadata Harvesting (OAI-PMH) was developed by Open Archives Initiatives (OAI) in January 2001. The current version (i.e. 2.0) was released in June 2002 and updated in 2008. The OAI-PMH is a set of interoperability standards that allow repositories to create metadata for describing the content stored in it and make it available to users. The OAI-PMH was designed to facilitate the technical interoperability among distributed digital repositories and archives. The purpose of OAI-PMH is to transmit metadata from source archive to destination archive. The OAI is based on client server architecture in which harvester request information and update records from repositories. (Rajashekar, 2004)

There are two main components of OAI-PMH. These are as follows

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Data Providers: Data Providers are the entities who possess metadata and are willing to share this with others. These entities provide free access to metadata, and may offer free access to full texts or other resources. One of the goals of OAI-PMH is to provide an easy way to implement a low barrier solution for Data Providers. OAI-PMH is a set of six services, also known as verbs. These are given as under.

1. **Identify**: Its function is to describe data providers or institutional repositories. It provides general information about Data providers and their policies.
2. **List Metadata Formats**: It records metadata formats supported by Data providers as well as their schema location and name spaces.
3. **List Sets**: It gives a hierarchical listing of sets into which records may be organized.
4. **List identifiers**: It files all unique identifiers parallel to records in Data providers.
5. **List Records**: It retrieves metadata for various records.
6. **Get Record**: It returns the metadata for single identifier in the form of an OAI record.

Service providers: Service providers are the harvesters that harvest metadata from data providers.

Some metadata harvesting services are as follows

- OAIster – OAISTER is a union catalog of digital resources. It provides access to digital resources by harvesting their descriptive metadata by using OAI-PMH (the open archives initiative protocol for metadata harvesting). It is available through WorldCat.org at no charge. OAISTER can be searched by Title, Author/creator, subject, language. Entire record searches can also

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be limited by resource type (text, image, audio, video, dataset) and sorted by date and hit frequency by data contributor. It records up to 30 million till date. (OCLC, 2012)

- NCSTRL - Networked Computer Science Technical Reference Library (NCSTRL) is an international collection of computer science research reports made available for non-commercial use. This is a collaborative project of University of Virginia and Virginia Tech and Old Domain University Digital Library research Group. (Networked Computer Science Technical Reference Library, n.d.)

- ARC - ARC is the first federated searching service based on the OAI protocol. It is also a project of Digital Library Research Group. Arc harvests metadata from several OAI compliant archives, normalizes them, and stores them in a search service based on a relational database (MYSQL or Oracle). At present, it has over one million metadata records from over 80 data providers from various domains. (Liu, Maly, Zubair & Nelson, n.d.)

- CASSIR: Cross Archives Search Services for Indian Repositories is the project being jointly carried out at National Center for Science Information (NCSI), Indian Institute of Science (IISc) and Bangalore. The service harvests metadata as per the OAI-PMH protocol from the registered Indian Open Access Repositories. It currently has 207199 records from 33 repositories indexed. (CASSIR, n.d.)

- SDL - Search Digital Library is a harvesting service of Documentation Research and training center (DRTC). It harvests metadata from open digital libraries and e-journals in the area of Library & information science. (Nazim & Devi, 2008)
- SEED: Search Engine for Engineering Digital Repositories, a metadata harvesting service in the field of engineering and technology, was initiated by Indian Institute of Technology, Delhi. (Nazim & Devi, 2008a)

- Open J-Gate: It is an electronic gateway to global journal literature in open access domain. It is hosted by Informatics India Ltd, New Delhi. (Nazim & Devi, 2008b)

4.11 Registry services for repositories

4.11.1 Registry of Open Access Repositories (ROAR)

It is a searchable international Registry of Open Access Repositories which indexes the creation, location and growth of open access institutional repositories and their contents. ROAR was created by E-prints.org network at university of Southampton in 2003. Its aim is to promote the development of open access by providing timely information about the growth and status of repositories throughout the world. The ROAR gives the search interface by Country, Software, Repository type, number of records. It has registered 3621 repositories from all over the world, out of which 100 repositories are from India.

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Figure 4.1: Registry of Open Access Repositories (ROAR)

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4.11.2 Open Directory of Open Access Repositories (Open DOAR)

It is a comprehensive list of institutional and subject-based repositories which is maintained by SHERPA and is based at the Centre for Research Communications at the University of Nottingham. It also lists archives set up by funding agencies like the National institutes of health in the USA or the Welcome trust in the UK and Europe. Open DOAR is a service to enhance and support the academic and research activities of the global community. The users are able to analyze repositories by location, type, the material they hold and other measures. Open DOAR also helps service providers such as search-engines or alert services that need to use tools for developing tailored search services to suit specific users. Open DOAR has listed 26161 Open Access Repositories from all over the world, of which 70 open access repositories are from India.

![OpenDOAR](https://www.opendoar.org)

**Figure 4.2: Open-Directory of Open Access Repositories (Open-DOAR)**

4.12 Services of Institutional Repositories

Institutional repositories are more than just plans to preserve and store content, their value lies in the services they provide to the community. Some of the existing value added services available for repositories are discussed as:

4.12.1 Deposit services: A successful repository regularly receives content from different sources. Self archiving does not require lot of time once an author is familiar with the deposition activity. Some examples showing how to add content in repositories are given below:

- **Mediated deposit services**: This service allows authors to simply e-mail their content to the repository staff, who may then deposit the material on behalf of authors. Eg, E-prints@IIT

- **SWORD (Simple Web Service Offering Repository deposit)**: The SWORD is an automated repository deposit protocol that is supported by a growing number of repositories.

- **Journal publishing workflows**: Repositories planning to host journals can build into the repositories a functionality that allows users to review, compile and publish journals directly in the repositories, for example, Bepress IR software- have a built in publishing workflow. There are 192^1 repositories registered in ROAR that are based on Bepress IR software.

- **Rights checking**: Sometimes authors are unable to understand publishing agreements due to its complexity. These types of services can include everything from checking copyright, permissions, negotiating with publishers, requesting final manuscript versions from faculty and tracking all of this information in a database to eventually upload the document with associated metadata.

4.12.2 Content harvesting: Some repositories are adding content to their repositories by collecting the material themselves. The repository’s staff

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identified those journals and publishers which permit self archiving and then they go through these journal’s and publisher’s websites to find out if authors of their institution had published their articles in them. Then they contact authors to add articles in their repositories. For example University of Glasgow repository, Raman Research Institute, India, etc.

4.12.3 Discovery services: Repositories provide discovery services such as:

- **Search and browse:** These services can include full-text and metadata searching as well as multiple browsing functionality, such as by date, author, community, subject, funding agency, or document types.

- **Alert services and RSS feeds:** Repositories can make things easier for users by enabling them to set up automatic alerts or RSS feeds when new material matching with their profile is added to the repository.

- **Indexing:** Repositories make it easy for search agencies to index their content so that it can be easily searched by external search engines such as Google, Yahoo, Bing, etc.

- **Metadata export:** Repositories that wish to be harvested should ensure that they are OAI-PMH compliant and must be registered with the harvesting service such as ROAR, Open DOAR, OAister, etc.

- **Cross-repositories search services:** Some repositories also provide cross-repositories search services to ease their users in finding out the required content in other repositories. There are a number of cross-repository search services available with the aim to improve the visibility of repository content. Some of them are:
  1. CASSIR – A cross repositories search service in India.
  2. NARCIS – This harvests the content of Dutch repositories etc.

4.12.4 Access services: Access to content is most important for the sustainability of any repository.

- **Embargo Management:** The article should be once accepted for publicity is made immediately accessible with no delays.
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4.12.5 Other services:

- **Preservation**: Institutional repositories are valuable sources for long-term preservation as well as for access to scholarly material. It is the responsibility of the curator that the content of the repository be accessible even when the present technology becomes obsolete.

4.13 Challenges faced by institutional repositories

While establishing an Institutional Repository, certain challenges would have to be faced which are described below:

- **Author's consent**: This is the major issue of concern to fill up the repository because it depends upon the willingness of authors whether they want to self-archive or not. The authors are generally unaware of the value of IRs and they think that depositing their articles or works in an IR will degrade their name

- **Rights management issues**: Authors lack adequate awareness about their own Intellectual Property Rights because they provide all their copyrights to the traditional publishers, who further prohibit them to make use of their own work.
• **Funding issues:** Funding is the key issue that involves the long-term commitment to run a repository. A repository needs constant attention and a continuous funding. There are various sections in IR for which funding is required such as Funds to purchase a Server, Maintenance and sustenance of the system as well as long-term preservation costs.

• **Preservation issues:** Institutional Repositories are meant for long term preservation, but are facing certain issues e.g. Longevity of digital media, Technology obsolescence (such as data migration, data transformation), the hardware and the software needed to store and access digital data, are continuously upgraded, etc. It is the responsibility of the Manager of Institutional repository that a file should be in a state to open and access after a gap of years.

• **Sustainability:** It is also a key factor which is to be taken into consideration for long term preservation and access of the content.

### 4.14 Copyright Issues

It is the most important area of discussion while talking about Open Access to research. Copyright in the open access environment have some modifications. In the present commercial scenario of publishing, authors give all their rights to the publisher which further restrict them to reuse their own work. In case of open access publishing, authors do not provide all their rights to the publishers and can make their work freely accessible.

In order to submit articles in an institutional repository, authors have to be concerned about publishing policies of the publishers where they have previously published their articles. SHERPA (Securing a Hybrid Environment for Research Preservation and Access), sometimes referred as SHERPA project, an organization originally set up to support the establishment of a number of open access institutional repositories based in UK universities, now working at international level. The SHERPA through its RoMEO (Rights Metadata for Open Archiving) service often referred as SHERPA/RoMEO project, a searchable
database of publisher's policies regarding the self-archiving of journal articles on the web and in open access repositories, helps author to clarify the situation that author suffers while making their publications openly accessible as some publishers prohibit authors from using their own articles in this way, some allow it, but only under certain conditions, while others are quite happy for authors to show their work in this way. The project RoMEO provides a colour guide to ease authors in finding the right journal to publish their articles. The colour guide is basically divided into two broad categories i.e. Publishing Colours and Archiving Colours, given in tables 4.1 & 4.2 as under. (SHERPA/ROMEO, 2012)

### Table 4.1
**Publishing Colour**

| Gold | Open Access Publishing |

### Table 4.2
**Archiving Colour**

| Green colour | Can archive pre-print and post-print or publisher’s version/PDF |
| Blue colour  | Can archive post-print (i.e. final draft post-refereeing) or publisher’s |
| Yellow colour| Can archive pre-print (i.e. pre-refereeing) |
| White colour | Archiving not formally supported |

#### 4.14.1 Author’s Addenda

An author is the copyright owner of the work, but while publishing an article in a journal or a book, the author has to transfer all of the rights (consisting of package of licenses called ‘copyright license’) to the publisher of that journal or of the book. This kind of copyright transfer is not always helpful to the author, as the author loses control over his/her own scholarly output. “Assignment of copyright ownership may limit the ability of authors to incorporate elements into future articles and books. Authors may not be able to use their own work in their teaching or to authorize others at the institution or elsewhere to use materials” (Hirtle, 2006). The Author’s addendum is one of the solutions to the dilemma of
Copyright transfer. It is a standardized legal instrument that modifies the publisher’s agreement and allows the author to keep his/her key rights. It affirms the rights that the author will maintain after passing an article to a publisher for publication. There are a number of Addenda and which vary with each other significantly. Therefore, care must be taken to choose an addendum that suits the author or an institution. The SPARC/Science Commons and SURF/JISC are the two widely used Author’s Addenda. These addenda can be affixed with the publishing contracts acknowledged by publishers and are liable to be legitimately binding. These addenda are briefly described as under:

- **SPARC Author Addendum:** Scholarly Publishing and Academic Resources Coalition (SPARC) is an international coalition of Academic and Research Libraries and Organizations, working to create a more open system of scholarly communication. “The SPARC has given the Author Addendum, a legal instrument that modifies the publisher’s agreement and allows them to keep key rights to their articles. The Author Addendum is a free resource developed by SPARC in partnership with Creative Commons and Science Commons established non-profit organizations that offer a range of copyright options for many different creative endeavors” *(SPARC, 2006).* The author can attach this form or addendum with publishing agreement provided by the publisher. According to the addendum given by SPARC¹, Author retains:
  i. The rights to reproduce, to distribute, to publicly perform, and to publicly display the article in any medium for non-commercial purposes
  ii. The right to prepare derivative works from the Article.
  iii. The right to authorize others to make any non-commercial use of the Article so long as the Author receives credit as author and the journal in which the Article has been published is cited as the source of first publication of the Article. For example, Author may make and distribute

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copies in the course of teaching and research and may post the Article on personal or Institutional Websites and in other open access digital repositories.

Science Commons, which is another organization working for the Authors’ Rights, in collaboration with SPARC has developed the Scholar’s Copyright Addendum Engine that includes several varied addenda, including SPARC’s own Author Addendum.

- **SURF/JISC Copyright Toolbox:** It is developed by the SURF Foundation in the Netherlands and the Joint Information Systems Committee (JISC) in the UK. It incorporates a license-to-publish that authors can assign to publishers. This enables them to retain a bundle of rights for themselves over the use of their own work. The Toolkit provides sample wordings that can be used if an author or publisher wishes to amend the standard publishing agreement in the license (Swan & Chan, 2009).

### 4.14.2 Creative Commons (CC) licenses:

Creative Commons licenses are the commonly accepted copyright licenses in the open access environment. These licenses play an important role in protecting author’s right and allow users to grant rights regarding the use of article to any user instead of publisher. The ultimate goal of Creative Commons licenses is to develop a rich repository of high-quality works in a variety of media and to promote an ethos of sharing, public education and creative interactivity. There is a pack of six licenses given by Creative Commons (Creative Commons, 2012).

The description is as follows:

1. **Attribution Non-commercial No derivatives CC BY-NC-ND**

   This license is the most restrictive of all six main licenses, allowing redistribution. It is often called as “free advertising license” because it allows users to download the works of authors and share them with others as long as users mention the author and
link back the author, but users can’t change them in any way or use them commercially.

2. Attribution Non-commercial Share Alike CC BY-NC-SA

This license lets users remix, tweak and build upon the author’s work non-commercially, as long as users credit the author and license their new creations under the identical terms. Users can download and redistribute the author’s work just like the BY-NC-ND license, but they can also translate, make remixes and produce new stories based on the author’s work. All new work based on the author’s work will carry the same license, so any derivatives will also be non-commercial in nature.

3. Attribution Non-commercial CC BY-NC

This license lets users remix, tweak and build upon the author’s work non-commercial, and although users’ new works must also acknowledge the author and be non-commercial, users don’t have to license their derivative works on the same terms.

4. Attribution No Derivatives CC BY-ND

This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to the author.

5. Attribution Share Alike CC BY-SA

This license lets users remix, tweak, and build upon the author’s work even for commercial reasons, as long as the users credit the author and license their new creations under the identical terms. This license is often compared to open source software licenses. All new works based on the author’s works will carry the same license, so any derivatives will also allow commercial use.
6. Attribution CC BY

This license lets the users distribute, remix, tweak and build upon the author’s work, even commercially as long as the users credit the author for the original creation. This is the most accommodating of licenses offered, in terms of what users can do with the author’s works licensed under Attribution

Among all the six licenses, two widely used licenses are Attribution license and Attribution Non Commercial license which are used by major open access journals as well as academics.

Broadly speaking, IR has to deal with copyright issues at two fronts, one is collecting content and the other is distributing content. Typically an Institutional Repository might have the following two licenses:

- **Deposit license**: It is an agreement between the author (or copyright holder) and the institution giving the repository the right to distribute and preserve the work.

- **Distribution license**: It is an agreement between the author (or copyright holder) and the institution governing the uses that can be made of the work.

Beside the above two licenses, IR managers should go through the legal obligations related with the management issues of IR such as content management, authentication, authorization, version control, protection of rights, etc.

4.14.3 Policies and Mandates

There are some policies and mandates that differ from institution to institution. A few of them are as follows:

1. **Harvard Arts & Sciences Faculty Open Access Mandate, USA (February 2008)**: This is the first University mandate in the US and first anywhere to be initiated by Faculty. *(Harvard, 2008).*

2. **Stanford University School of Education Open Access Motion, California (June 2008).*

4. **European Research Council (ERC) scientific council guidelines for Open Access (December 2007)**

5. **Federal Research public Access Act (May 2006)**

6. **Welcome Trust (October 2005)**

### 4.15 Quality assurance

The quality of a publication lies in its accurate correctness, accountability and its communication to the specialist literature. For the documents that have already been published in journals and have undergone peer-review, or evaluation (as is the case of the theses or completion of projects), the quality control has been previously carried out upon the arrival of the repository and therefore, the value of its content will be considered as already guaranteed. While as the rest of the documents, the university or institution should establish scientific committees supported by the university structure itself. The committee could be entirely formed by members of the institution or may include members of other institutions which can also lead to promote the cooperation for scientific development of various research institutions.

### 4.16 Open Access in India

In India the efforts to adopt open access initiatives have already been started, but there are some obstacles and misinterpretation about open access among the Indian research community. These include lack of expertise in every organization to promote creation of open access repositories and encourage scientists to place their papers in them, lack of infrastructural facilities like hardware and high bandwidth, scientists are also uncertain about the quality of preprints and post prints that are submitted to open access repositories.

Indian Researchers also face two major problems that are common to the researchers of other developing countries i.e. Access and Visibility. Due to high costs, Access to information is difficult; therefore scientists have to work in
information poverty environment. On the other hand, other researchers are unable to access the work of Indian researchers which resulted in low visibility and low use of work. Hence, the citation rate of Indian scientists becomes poor as compared to other established countries and it is the Open Access which seems to be the better solutions to overcome the above problems (Arunachalam, 2007).

After Budapest Open Access initiative and Berlin declaration, the M.S. Swaminathan Research foundation (MSSRF) and Indian National Science Academy (INSA) which had signed the Berlin declaration in 2004 took lead in Open Access activities and organized workshops on OA and Institutional repositories at various locations in India. The development of Open access repositories in Indian universities and R & D organizations is a growing phenomenon, with an increasing number of libraries planning to put it into practice. In recent years, Open access is becoming a movement in India and large number of organizations is 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), Govt. of India are also providing assistance for sustainable development of open access institutional repositories in India (Arunachalam, 2007). The Indian Institute of Science, Bangalore, was the first to set up an institutional repository in India, followed by Indian Institute of Management, Kozhikode, Indian Statistical Institute, Bangalore; Indian Institute of Technology, Delhi; National Institute of Technology, Rourkela; National Aerospace Laboratories, Bangalore; National Chemical Laboratory, Pune; Information and Library Network (INFLIBNET), Ahmedabad; National Institute of Oceanography, Goa; and Raman Research Institute, Bangalore (Lone, Rather & Shah, n.d.).

Quite recently, the Open Course-Ware (OCW) movement in India has gained momentum with the announcements of availability of learning resources on the Internet by two important national level organizations, namely IGNOU and NCERT. Indira Gandhi National Open University (IGNOU) produces self-
instructional study materials for various programs and hosts a number of educational broadcasting channels. It has also initiated establishment of a National Digital Repository of OCW. The National Council of Educational Research and Training (NCERT) have initiated a step towards making school textbooks freely available on the Internet for students and teachers through its website. Some institutional repositories, like, Librarian's Digital Library, IIMK Digital Library, also provide access to a number of educational materials, viz., lecture notes, tutorials, etc. (Ghosh & Das, 2006).

University Grants Commission (UGC) and Information and Library Network (INFLIBNET) has taken an initiative for open access and developed an Open Access repository named “Shodhganga” which collects, preserves and disseminates the post prints, preprints, news clippings, CALIBER and PLANNER full text proceedings, training material and other scholarly publications. 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 National database of theses and dissertations to make theses of Indian researchers publicly available (UGC, n.d.). In the same line National Knowledge Commission (NKC), through National Knowledge Network (NKN), is trying to ensure an easy and widespread availability of high quality educational resources to improve collaboration and sharing by connecting all Universities, libraries, laboratories, hospitals and agricultural institutions together.

4.16.1 OA journals and OA repositories (Initiatives by India)

Open access is gaining momentum in India day by day and many publishers and institutions have taken a step forward to publish open access journals and establish open access repositories. Many traditional publishers and institutes are also making their journals open access. Initiatives taken by some Indian institutes and research councils to make their publications Open Access are as follows (Arunachalam, 2007):
Indian National Science Academy (INSA) has made its four journals Open Access. The Academy also signed the Berlin declaration.

The Indian Academy of sciences converted all its ten journals into Open Access.

The Council for Scientific and Industrial Research (CSIR) has also adopted Open Access policy in its laboratories and made around 21 journals as open access journals.

The Indian council of Agricultural Research (ICAR) has made its two journals open access.

The Indian MEDLARS centre at the National Informatics has put out the Open Access version of 40 biomedical journals under its medIND program.

Medknow brings out more than 60 open access journals, on behalf of their publishers.

Three Open Access medical journals are brought out from the Calicut Medical College.

In the coming decades, it is predicted that many Open Access journals may be brought out by India. Many physicists in the better-known institutions use ‘arXiv’, which has mirror site in India, both for placing their post prints and preprints and for reading preprints of others.

For providing open access to scholarly output, different organizations, institutions of higher learning, etc. are taking initiatives and coming up with their own Institutional Repositories.

The Council for Scientific and Information Research (CSIR) has created OAI-PMH compliant National open access periodicals repository for the e-journals and built National Science digital library for e-books.

The International Crops Research Institute for semi-Arid Tropics has also announced to establish Open Access Repository.
Till date 100\(^1\) open access repositories has been registered in
Registry of open Access Repositories (ROAR) and around 70\(^2\) repositories
have been listed in Open DOAR(Directory of Open Access Repositories).

4.16.2 Mandates in India

In January 2006, a special session on Open Access was held at 93\(^{rd}\) Indian
Science Congress, which resulted to ‘Optimal National Open Access Policy’ to
promote Open Access in India. According to the policy, the Government of India
expects authors of research papers resulting from publicly-funded research to
maximize the opportunities to make their results available for free. To meet this
end, the Government:

- Requires electronic copies of any research paper that has been accepted for
  publication in a peer-reviewed journal, and is supported in whole or in part
  by Government funding, to be deposited into an Institutional Open Access
  repository immediately on acceptance for publication;
- Encourages Government Grant Holders to publish in a suitable OA journal
  where one exists; the Government will cover the publication costs, if any;
- Encourages Government Grant Holders to retain ownership of the
  copyright of published papers, where possible.

India at present has six institutional mandates, one proposed funder mandate
and one proposed multi-institutional mandate. These are as follows (ROARMAP,
n.d.):

- **Institutional mandate**
  1. National Institute of Technology, Rourkela
  2. Bharthidasan University
  3. National Institute of Oceanography
  4. University of St. Andrews

\(^1\) Repositories were accessed on 31-03-2014
\(^2\) Accessed on 31-03-2014
5. Madurai Kamraj University Mandate
6. Mahatma Gandhi University, Kerala

- **Proposed funder mandate**

7. National Knowledge commission

- **Proposed multi Institutional Repository Mandate**

8. Council of Scientific & Industrial research (CSIR)

- **Multi-Institutional Repository Mandate**

9. Indian Council of Agricultural Research (ICAR)
10. Global Agricultural Research Consortium (CGIAR)

4.17 **Comparative study of Open Access Repositories of Indian origin**

The comparative study has been divided in two parts, enumerated as below

- University based IRs
- Other Open Access Repositories of Indian origin

4.17.1 **University based IRs**

The Chart given in table 4.3 illustrates the comparative analysis of Institutional Repositories in Indian Universities, registered in ROAR and Open DOAR till date.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the University</th>
<th>Name of the IR (if any) with URL</th>
<th>OSS used</th>
<th>Language of Publications</th>
<th>Subject Coverage</th>
<th>Collection Coverage</th>
<th>Policies</th>
</tr>
</thead>
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<tr>
<td>1.</td>
<td>Guru Gobind Singh Indraprastha Institute(GGSIPU) New Delhi</td>
<td>DSpace@GGSIPU (<a href="http://14.11.39.60:21080/xmlui">http://14.11.39.60:21080/xmlui</a>)</td>
<td>DSpace</td>
<td>English</td>
<td>Multi-disciplinary</td>
<td>Articles, Theses, Learning Objects</td>
<td>Explicitly undefined</td>
</tr>
<tr>
<td>2.</td>
<td>Cochin University of Science &amp; Technology (CUSAT), Goa</td>
<td>Dvuthi(<a href="http://dvuthi.cusat.ac.in/">http://dvuthi.cusat.ac.in/</a>)</td>
<td>DSpace</td>
<td>English</td>
<td>Multi-disciplinary</td>
<td>Articles, Theses, Learning Objects</td>
<td>Explicitly undefined</td>
</tr>
<tr>
<td>3.</td>
<td>Cochin University of Science &amp; Technology (CUSAT), Goa</td>
<td>Digital.library@CUSAT (<a href="http://DSpace.cusat.ac.in/xmlui">http://DSpace.cusat.ac.in/xmlui</a>)</td>
<td>DSpace</td>
<td>English &amp; Malayalam</td>
<td>Multi-disciplinary</td>
<td>Articles, Conferences, Theses, Books</td>
<td>Explicitly undefined</td>
</tr>
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</table>

1 Data has been retrieved during April 1, 2014 to April 30, 2014 from:
(a) ROAR.(n.d.). Retrieved from http://roar.eprints.org/
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<table>
<thead>
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<th><strong>Open Access</strong></th>
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</table>

<table>
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<th><strong>Institution</strong></th>
<th><strong>Repository</strong></th>
<th><strong>Language</strong></th>
<th><strong>Type</strong></th>
<th><strong>OAI-PMH</strong></th>
<th><strong>Notes</strong></th>
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<td>DeepBlue Knowledge Repository@PDPU, (<a href="http://sphinx.pdpu.ac.in:8080/xmlui/">http://sphinx.pdpu.ac.in:8080/xmlui/</a>)</td>
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<td>Multi-disciplinary</td>
<td>DSpace</td>
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<tr>
<td>Delhi Technological University, New Delhi</td>
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<td>DSpace</td>
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<td>DSnapce@ TU, (<a href="http://DSpace.thapar.edu:8080/DSpace/">http://DSpace.thapar.edu:8080/DSpace/</a>)</td>
<td>English</td>
<td>Multi-disciplinary</td>
<td>Articles, Conferences, Theses</td>
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<td>Multi-disciplinary</td>
<td>Articles, Conferences, Theses</td>
<td>Explicitly undefined</td>
</tr>
<tr>
<td>Indira Gandhi National Open University (IGNOU), New Delhi</td>
<td>E-Gyanloksh, (<a href="http://www.egyunkosh.ac.in/">http://www.egyunkosh.ac.in/</a>)</td>
<td>Hindi, English</td>
<td>Multi-disciplinary</td>
<td>Learning Objects</td>
<td>Not stated</td>
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<td>English</td>
<td>Biology and Biochemistry</td>
<td>Articles</td>
<td>Explicitly undefined</td>
</tr>
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<td>Saurashtra University, Rajkot, Gujarat</td>
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<td>English, Gujarati</td>
<td>Multi-disciplinary</td>
<td>Articles, Theses</td>
<td>Defined</td>
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<td>Department of Library &amp; Information Science, University of Kashmir, Kashmir</td>
<td>Knowledge Repository Open Network (KNoor), (<a href="http://DSpace.usk.edu.in:8080/ispui">http://DSpace.usk.edu.in:8080/ispui</a>)</td>
<td>English, Hindi, Urdu, Persian</td>
<td>Science General, Agriculture, Food and Veterinary, Health and Medicine, Technology General</td>
<td>Articles, Conferences, Theses</td>
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<td>Sanskrit, Malayalam, Hindi</td>
<td>Multi-disciplinary</td>
<td>Theses</td>
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</tr>
</tbody>
</table>
### Open Access

#### 4.17.2 Other Open Access Repositories of Indian Origin

The table 4.4 demonstrates the comparative analysis of Open Access Repositories of Indian origin that has been registered in ROAR and Open DOAR till date. It has to be noted that duplications has been avoided.

**Table: 4.4**

<table>
<thead>
<tr>
<th>S. No</th>
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1 Data has been retrieved during April 1, 2014 to April 30, 2014 from:
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| 6 | DSpace at Bangalore Management Academy  
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| 7 | DSpace at NCAOR  
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| National Centre for Antarctic Research, Goa | Research Institutional or Departmental | DSpace | English | Science & Technology General; Earth Sciences | Research Publication s | Explicitly undefined |
| 8 | DSpace@INFLIBNET  
http://ir.inflibnet.ac.in/DSpace  
| Information and Communication Network Center, Ahmedabad | Research Institutional or Departmental | DSpace | English, Hindi | Multidisciplinary | Conference s; Learning Objects; Special | Explicitly undefined |
| 9 | DSpace@IIMK  
http://DSpace.iimk.ac.in/  
| Indian Institute of Management, Kozhikode | Research Institutional or Departmental | DSpace | English | Business and Economics | Articles; Conference s; Theses; Unpublished | Explicitly undefined |
| 10 | DSpace@NCL  
http://DSpace.ncl.ac.in/  
| National chemical Laboratory - Pune | e-Theses | DSpace | English | Chemistry | Thesis & Dissertation s | Explicitly undefined |
| 11 | Institutional repository at MDI  
http://DSpace mdi.ac.in/DSpace  
| Management Development Institute, Gurgaon | Research Institutional or Departmental | DSpace | English | Multidisciplinary | Articles; Conference s; Books; Special such as News Reports | Explicitly undefined |
| 12 | Digital Knowledge Repository of Central Drug Research Institute  
http://dkr.cdri.res.in:8080/DSpace/index.jsp  
| Central Drug Research Institute, Lucknow | Research Institutional or Departmental | DSpace | English | Biology and Biochemistry, Health and Medicine | Articles; Unpublished | Explicitly undefined |
| 13 | EPrints@IARI  
http://eprints.sari.res.in/  
| Indian Agricultural Research Institute, New Delhi | Research Institutional or Departmental | EPrints | English | Agriculture, Food and Veterinary | Articles; Conference s; Theses; Unpublished | Well defined, except preservation policies |
| 14 | DSpace at ICFAI BUSINESS SCHOOL  
http://202.131.96.59:8080/DSpace  
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| 15 | Kautilya Digital Repository <a href="http://eii.iiesdr.ac.in">http://eii.iiesdr.ac.in</a> | Indira Gandhi Institute of Development Research, Mumbai | Research Institutional or Departmental | DSpace | English | Multidisciplinary | Conference Theses, Unpublished | Explicitly undefined |
| 16 | Librarians' Digital Library <a href="https://drsc.iianag.ac.in">https://drsc.iianag.ac.in</a> | Documentation Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore Centre | Research Cross-Institutional | DSpace | English; Hindi; Kannada | Library and Information Science | Articles; Conference Theses, Multimedia | Explicitly undefined |
| 17 | ePrints@IISc <a href="http://eprints.iisc.ernet.in">http://eprints.iisc.ernet.in</a> | Indian Institute of Science, Bangalore | Research Institutional or Departmental | EPrints | English | Chemistry and Chemical Technology; Mathematics and Statistics; Physics and Astronomy | Articles; References; Conference Theses; Unpublished Books; Patents; Special | Well defined |
| 18 | ePrints@CMFRI <a href="http://eprints.cmfri.org.in">http://eprints.cmfri.org.in</a> | Central Marine Fisheries Research Institute, Ernakulam, Cochin | Research Institutional or Departmental | EPrints | English | Agriculture, Food and Veterinary; Biochemistry and Biochemistry; Ecology and Environment; Health and Medicine | Articles; Conference Theses; Unpublished Books; Patents | Well defined except preservation policies |
| 20 | ePrints@MDRF <a href="http://mdri.epints.in">http://mdri.epints.in</a> | Dr. Mohan's Diabetes Specialities Centre, Diabetes, Channai | Research Institutional or Departmental | EPrints | English | Health and Medicine | Articles; Theses, Books | Well defined except preservation policies |
| 21 | ePrints@NML <a href="http://eprints.nml.org.in">http://eprints.nml.org.in</a> | National Metallurgical Laboratory, Jamshedpur | Research Institutional or Departmental | EPrints | English | Chemistry and Chemical Technology; Technology General | Articles; Conference Theses, Books, Learning Objects, Patents | Well defined except preservation policies |
| 22 | Open Access Repository of Indian Theses <a href="http://eprints.csirexplorations.com">http://eprints.csirexplorations.com</a> | CSIR Unit for Research and Development of Information Products, Pune | e-Theses | EPrints | English | Multidisciplinary | Theses &amp; Dissertations | Well defined except preservation policies |
| 23 | ethesis@nitr <a href="http://ethesis.nitrkl.ac.in">http://ethesis.nitrkl.ac.in</a> | National Institute of Technology, Rourkela | e-Theses | EPrints | English | Engineering and Technology | Theses &amp; Dissertations | Well defined except preservation policies |</p>
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4.18 Conclusion

The problem of serial crisis has led to the development of Open Access movement all around the world. Open Access makes the country’s scholarly output freely available to the Research community. The rise of Open Access movement has brought new challenges and opportunities for the dissemination of scholarly literature to the globally dispersed users. The subject of Open Access to scholarly research has reached a pinnacle of discussion in developed countries, but it is still in its infancy in developing countries. India is also facing various challenges in the development of open access to its scholarly output.

There are certain issues such as copyright issues, training issues, skills, etc. which need to be addressed in the installation and maintenance of repositories. India is striving hard to make the Indian research community aware of the benefits of Open Access. Various organizations such as Documentation Research and Training Center (DRTC), Information and Library Network (INFLIBNET) and National Council for Scientific Information (NCSI) are providing workshops and consultations to colleagues all over the country.
References


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