

Access Policies in Institutional Digital Repositories: Analysis of Global Trends

Bijan Kumar Roy

Associate Prof., Department of Library and Information Science,
University of Calcutta, West Bengal, India.
Corresponding Author: bkroylis@gmail.com
ORCID ID: <https://orcid.org/0000-0001-9735-9586>

Subal Chandra Biswas

Professor [Retd.], Library and Information Science,
the University of Burdwan, West Bengal, India.
scbiswas_56@yahoo.co.in
ORCID ID: <https://orcid.org/0000-0002-6047-369X>

Parthasarathi Mukhopadhyay

Professor, Department of Library and Information Science University of Kalyani, West Bengal, India.
psmukhopadhyay@gmail.com
ORCID ID: <https://orcid.org/0000-0003-0717-9413>

Received: 01 February 2021

Accepted: 25 December 2022

Abstract

This paper compared and contrasted the open access (OA) self-archiving policies of different organizations registered in OpenDOAR, ROAR and ROARMAP databases. It highlights and discusses key policies along with several issues to suggest an institute-specific model policy framework in the line of recommendations and best practises of IDRs (Institutional Digital Repositories) listed in global tertiary sources in green open access ROARMAP, OpenDOAR and ROAR. This paper focuses on IDR policy issues concerning rights, access, and user interfaces. A total of 66 repositories have been selected after overlap checking and based on the selection parameters mentioned in the methodology section. It has been discovered that most IDRs lack policies in the four areas mentioned. Several policy issues are missing, and some of the policy issues used by these repositories are still being developed and improved. Based on the study, some suggestions for the development of IDR policies have been made. It has implications for administrators, funding agencies, policymakers, and professional librarians in developing repository policies of their own.

Keywords: Open access repository, digital library, Copyright & Licensing Policy, Embargo Policy, self-archiving policy.

Introduction

In a general sense, an IDR can mean many things. A library, an archive, or even a warehouse that stores an organization's records falls under the broad definition of an IDR. There is no shared vision of a digital repository; its formal definition has changed over the last 25 years. Institutional Digital Repository (IDR) is an archive where intellectual outputs created by the organisation's members (basically academicians) are kept in digital format for perpetual access. In a 2002 SPARC position paper, Crow (2002) defined an institutional repository (IR) as *"a digital archive of the intellectual product created by the faculty, research staff, and students of an institution and made accessible to end users both within and outside of the institution, with few if any barriers to access"*.

He further extends the definition by referring to IRs as ‘... digital collections capturing and preserving the intellectual output of a single or multi-university community’. Crow’s definition also focuses on a service rather than a physical storage area. This definition is one of the earliest in the literature and is considered influential. Another open-access advocate, Lynch (2003) defines IR as follows:

“[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 organizational and access or distribution”.

Several institutions have already developed Institutional Digital Repositories (IDRs) as it increases the organisation's visibility and prestige and provides global access to local research outputs. Still, many IRs are well beyond the conceptual stage in their implementation, and many operate with a limited scope. But the problem is that the majority of the repositories do not have a stated policy which is reflected in the literature. In a survey for the OpenDOAR (Directory of Open Access Repository) database in early 2006, Millington (2006) discovered that about two-thirds of IDRs did not have publicly stated self-archiving policies. So devising IDR policies is an important, necessary, and complex activity during IDR implementation. Setting policies is one of the most challenging and often overlooked aspects of developing IDRs (Barton & Waters, 2004; Jones, Andrew, & MacColl, 2006). A policy is crucial in setting the parameters of the IDR system. Rieh, Jean, Yakel, Markey & Kim (2008) cautioned that policies must consider stakeholder needs and existing research practices.

This study consulted the ROARMAP (Registry of Open Access Repository Material Archiving Policies) database, a site created and maintained by the University of Southampton in England as an online location for policy registration. Swan, Gargouri, Hunt & Harnad (2015) reported that the ROARMAP database covers approximately 70% of the policy documents while the remaining 30% are in the draft stage, planned for the future, or the institution in question has no policy at present. Though 5% of the policies within ROARMAP are in draft format. This study also consulted other relevant sources like OpenDOAR and ROAR (Registry of Open Access Repository) databases to improve accuracy.

This research paper has identified several areas where the proper policy documentation is essential for the smooth running of a repository system. This paper addresses some of the policies (e.g. *Copyright and Licensing Policy, Access Policy, Embargo Policy, User Interface Policy*) along with several issues associated with those policies (Table 1). The first policy addresses copyright and licensing issues for academic, research, and funding institutes; the second addresses data access; the third addresses embargo management; and the fourth addresses user interface management. The purpose of this paper is twofold: first, *to provide an overview of the policy documentation in the following four areas based on existing literature*, and second, *to suggest best practices in the line of global recommendations*.

Table 1
Policies and Issues

Policies	Issues related to Policy
Copyright and Licensing Policy	Legal holders; Rights management; licensing pattern
Access Policy	Access to items; degree/level of openness, access pattern; re-use of items
Embargo Policy	Retention period; Length of time (i.e. the length of permitted embargoes)
User Interface	Unicode-compliant multilingual interfaces; mechanisms for browsing & searching multilingual resources; provision for performing administrative operations

Background and Objectives

Jones et al. (2006) traced the first development of the idea of a repository of scholarly publications to the early 1990s. It was Paul Ginsparg, a physicist at Los Alamos National Laboratories in the USA who, for the first time, founded the Internet's first scientific preprint service, arXiv (<https://arxiv.org/>) in 1991, allowing scientists to share ideas before publication. It (arXiv) provides open access to e-prints in Physics, Mathematics, Computer Science and Quantitative Biology. Now, almost all the countries in the world maintain repositories. At present, there are about 4500 repositories in the world. But the majority of the repositories started functioning without supporting policy documentation. But the OpenDOAR database covers only five policies viz. *Metadata Policy* (stating the access rights and permissions for information describing items in the repository, and the minimum metadata requirements), *Data Policy* (stating the access rights and (re-)use permissions for full-text and other full data items), *Content Policy* (stating the types and versions of documents and datasets held), *Submission Policy* (concerning eligible depositors, quality control and copyright statements), and *Preservation Policy* (concerning the long-term retention, migration, and withdrawal protocols). Much has been written about OA self-archiving policy implementations. However, thousands of universities, research institutes, and research funding agencies worldwide still have not yet implemented an OA self-archiving policy. Our objectives are- i) *to identify different policy issues from the three tertiary sources*, ii) *to discuss those policies against best practice guidelines*, and iii) *to recommend a standard policy proposal against each parameter based on existing literature*.

Statement of problem

At present, there are more than 4500 repositories all over the world. But the majority of repositories do not have publicly stated OA policies. As stated earlier that about two-thirds of IDRs did not have publicly stated self-archiving policies (Roy, Biswas & Mukhopadhyay, 2022a, 2022b). However, many open-access advocates stress the significance of having an IDR with an open-access policy. Given the stated objectives, the primary goal is to find out the policies of individual repositories after analysing the three global repository databases as stated and to suggest a set of recommendations against each policy covered here based on global best practises and existing literature. The research questions are – i) How to identify repository sources for obtaining OA policies for OARs? ii) What global databases can serve this purpose? iii) How to develop a framework to record OA policies as available from selected datasets iv) Is it possible to develop best practice guidelines related to OA policies from the analyzed

datasets? v) Is it feasible to identify SWOT areas in the domain of OA policies across the globe?

Literature review

This section includes a set of papers dealing with different generic facets of OA policies such as their need and importance, the roles of OA policies in the OA movement, a list of parameters important as OA policy components, and so on. The specific and technical papers related to the facets identified by these generic papers are discussed in detail under the respective subsections that focus on given policy parameters.

Devising policies for repositories is very important and has been discussed in the literature (Ware, 2004b; Barton & Waters, 2004; Rieh et al., 2008; Shearer, 2005). The authors (Roy, Biswas & Mukhopadhyay, 2016) surveyed almost all the COPAI (Coalition of Open Access Policy Institutions) members OARs and compared their policy documentation against selected criteria such as archiving policies, deposit policies, metadata policies, preservation policies etc. Another study (ibid) examined the open access (OA) self-archiving policies (such as Version Archiving Policy, Content Ingest Policy, Standards Support Policy, Preservation Policy etc.) of different open access repositories (OARs) affiliated with the COAR (Confederation of Open Access Repositories) as partner institutes.

Generally, IRs hold items that may be owned by the institution, the author or the publisher (Gadd, Oppenheim & Proberts, 2003). So, it is desirable to have rights management mechanisms in place to allow or restrict access to content (Crow, 2002). But studies (Gadd et al., 2004; Xia et al., 2012) recommended using Creative Commons (CC) licences to express the rights attached to individual research papers. IRs are usually designed to be open and interoperable, and a primary goal is to link up with other similar archives (Crow, 2002). Several studies (Alipour-Hafezi, Horri, Shiri & Ghaebi, 2010; Eaton, 2008; Genoni, 2004; Ginsparg, Luce & Van de Sompel, 1999; Horwood, Sullivan, Young & Garner, 2004) have advocated establishing OAI compliant repositories to provide access to the content.

Standardized or good-quality metadata is important for describing and managing digital objects of different formats (Moulaison Sandy & Dykas, 2016; Ochoa & Duval, 2009; Park, 2009; Robertson, 2005). But repositories differ widely in the handling of metadata schema (Gibbons, 2004), and the qualified Dublin Core (DC) has been the choice of researchers for organizing and harvesting open knowledge objects (Gibbons, 2004; Teli, 2015; van der Graaf & van Eijndhoven, 2008). Additional or extended metadata schemas may be adopted to describe domain-specific datasets such as learning objects, ETDs, and cultural and museum objects (DINI, 2007; Green, Macdonald & Rice, 2009).

Preservation policy ensures continued access to digital materials for as long as necessary (Hockx-Yu, 2006), as one of the features of IR is that it must be cumulative and perpetual (Crow, 2002). Generally, repositories accept many open file formats, and PDF is the common choice of almost all repository managers due to its suitability for long-term preservation (Cervone, 2004; Pinfield, 2002; Rimkus, Padilla, Popp & Martin, 2014). Studies strongly discourage the withdrawal of items (Proberts & Jenkins, 2006; Ware, 2004a) because one definition of IRs is that items should be cumulative and perpetual (Johnson, 2002).

Materials and Methods

This work intends to investigate implementations of a set of open-access self-archiving policies related to data access at the international level. This paper has discussed the four

policies—copyright and licencing policy, access policy, embargo policy, and user interface policy—and every issue associated with these policies has been critically analyzed. This methodology has two parts – a) *investigation of experts' opinions as recorded in the literature against each of the parameters mentioned earlier*, and b) *identification of policies of global repositories registered in three databases viz. OpenDOAR, ROAR and ROARMAP*.

The focus of the research is to study the open-access policies covering these four areas: *Copyright and Licensing Policy, Access Policy, Embargo Policy, and User Interface Policy*. After studying these three datasets of three repository databases (i.e. OpenDOAR, ROAR and ROARMAP), we attempt to find only those repositories that support at least one of these three policies discussed here. After doing overlap checking, we finalize 66 repositories for further study.

The first part of this study's literature review spans from 1996 to 2022, covering 71 papers, most of which are journal articles. And the second part is the actual study of global OARs. Basically, the second part (i.e. *practice point of view*) deals with implementing policies by the listed OARs at the practical level.

At the first stage, data have been collected from the three global databases viz. OpenDOAR, ROAR and ROARMAP (up to December 2020). After duplicating the respective databases, a unified list was created. After collecting the data, it was analyzed against selected policy issues with supporting scholarly literature. Finally, recommendations against each policy have been made per the global standards to devise institute-specific institutional digital repository (IDR) policies.

The proposed methodology covers the following major steps:

1. Three existing global databases are investigated to discover repositories that support at least one open access policy as covered in this section.
2. Following thorough duplication checks of selected global databases, a unified list of IDRs is generated.
3. Collection of policy data sets for individual OpenDOAR repositories.
4. Study of individual IDR to collect policy data in case it is not available in the OpenDOAR database.
5. Developing a data-set of pre-defined policy issues based on steps 3 and 4. Finally, the data is tabulated for analysis and interpretation.

In addition, the following steps are also part of the methodology.

Data collection: The information was gathered from the three global databases mentioned above.

Data size: Content types are different as well as different repositories cover different data sets. Even, their collection strength is different. Most repositories have good collections of objects and, of course, are from elite organizations. On the other hand, some other repositories have minimum collections.

Data validation: After preliminary level data curation, 4500 OARs are unique in the merged dataset (a combination of data from the global data repository index). The details of OA policies are then recorded in a spreadsheet based on the policy data capturing record structure designed for the purpose.

Data analysis: No software is used. It is checked manually by visiting individual repositories.

Policy Issues: Analysis and Findings

This section discusses above mentioned four policies (see table 1) along with related issues *under two broad headings viz. researcher's point of view and practice point of view.*

Copyright and Licensing Policies: Need and Importance

One of the difficulties for those maintaining institutional repositories is that many of the most valuable items, i.e. articles published in peer-reviewed journals, are owned not by the academic, but by the publisher. Authors must usually sign a copyright transfer agreement, which defines and restricts their rights to re-use their work (Adolphus, 2014).

The copyright and licencing policies in the digital library environment are extremely complex and unsettled. Understanding copyright and licencing issues is vital to the success of any IDR project because it is an important legal building block for the scholarly communication process. An Open Access (OA) licence is usually a standard licence generally offered by a third party. For an IDR system, rights management generally refers to how contents are distributed under copyright rules and to indicating who owns the copyright for the contents deposited to the IDR or which licencing model is to be followed to determine the level of use and reuse, i.e. how open is it? Generally, an IDR system deals with copyright issues on two fronts: *in collecting content from researchers or academicians*, by which they must secure the rights to distribute and preserve the contents, and *in distributing those contents to end users*, by which they must explicitly advertise their data-reuse copyright policies.

Most of the IDRs have covered two important issues: '*legal copyright holder or rights holding*' and '*licensing model*' in their policy documentation. The first two sections cover the first issue, i.e. '*legal copyright holder or rights holding*', and the next two are concerned with the second one, i.e. '*licensing model*'. *These two issues have been discussed under two broad headings: researcher's point of view* (concerning the review of existing literature) and *the practice point of view* (concerning the analysis of the ROARMAP database).

Rights Holdings: Experts' Views

Jones (2007) has given a practical guide to current institutional repository (IR) issues, focusing on both gaining and preserving content and what cultural issues, including copyrights, need to be addressed to make a successful IR. Gadd et al. (2003) showed that 90% of the authors still assign copyright in exchange for publication, with 50% doing so reluctantly. The first RoMEO (Rights Metadata for Open Archiving) survey results showed that only 3% of authors insisted on retaining copyright, with 49% assigning copyright to publishers reluctantly, 41% assigning it freely, and 7% indicating that publishers did not retain copyright (Gadd et al. 2003). In another study (Swan & Brown, 2005) examined the knowledge and attitudes toward copyright of 1,296 authors. They found that 22% did not know who retained the copyright, 35% reported that they retained the copyright, 37% said that the publisher was the copyright holder, and 6% indicated another party as the copyright holder. Another study (Ware, 2004a; DINI, 2007) reported that most IDRs require the depositing author to grant (non-exclusive) electronic rights to the IDR and warrant their right to do so. The other group of experts (Gadd et al., 2003; Morgan & Team IDR, 2006; Swan & Brown, 2002; Kling & McKim, 2000; Bennett, 1999)

recommended that the author or depositor would own copyrights. Apart from this, several model authors' addenda (such as the SPARC Author Addendum - <https://sparcopen.org>) have been developed for use by authors to ensure that they retain the right to deposit and reuse their research articles (SPARC, 2006). In addition, the appendices from Science Commons (<http://scholars.sciencecommons.org/>) and SURF/JISC (<http://copyrighttoolbox.surf.nl/copyrighttoolbox/authors/>) are also commonly used by the academic community. After reviewing all COAR member repositories, it is found that 35 (68.6%) repositories have mentioned this policy, and twenty-three (23) repositories have suggested authors retain the key rights (Roy, Biswas & Mukhopadhyay, 2018).

Rights Holdings: Implementations in IDRs

Roy (2014), in his research study, reviewed 439 (as of June 2013) IDRs registered in the ROARMAP database and reported that not a single repository mentioned who would hold the copyrights of the objects deposited in the IDR. Now the database shows 1063 repositories (as of September 2020), and only 294 (27.65%) repositories have stated that authors will retain the copyrights of the documents submitted to the IDR (Table 2). Though almost half of the repositories have not mentioned this issue.

Table 2

Legal copyright holder (Source: ROARMAP, 2020)

Copyrights holder/Rights holding	No. IDRs
Author grants key rights to institution	142
Author retains key rights	294
Institution or funder retains key rights	42
None of these	137
Not Mentioned	445

Licensing Model: Experts' Views

Generally, most IDR systems follow the same licence specified by the IDR software (ROAR, 2018; OpenDOAR, 2018). Another study (Gadd, Oppenheim & Proberts, 2004; Xia et al., 2012) put focused on the licencing model and reported that many institutions ask for copyright-free licences on items, such as the Creative Commons (CC) non-commercial licence (CC-BY-NC).

Contributors of open access advocates follow different variants of Creative Commons licencing models. Creative Commons (<https://creativecommons.org/licenses/>), a non-profit organization, has developed several types of public open licenses with varying purposes that authors and publishers can use. It enables the free distribution of an otherwise copyrighted work and is used when an author wants to give people the right to share, use, and build upon a work they have created (Roy et al., 2018). The study, after reviewing all COAR member repositories, also reported that only seven (7) repositories have clearly stated their licensing model, e.g. CC (Creative Commons)-BY or equivalent, and another seven (7) repositories require an open license but did not mention its type. This CC license is used when authors wish to give access to the content in the public domain, and users can modify, re-use, and re-distribute the licensed

work, even for commercial purposes, subject to proper acknowledgement.

RECODE (2014) recommended extensive open licensing and implementing technical solutions for legal and ethical issues. SPARC (n.d.) discussed four levels of openness related to different Creative Commons licenses. Another group of authors (Carroll, 2013; Gulley, 2013; Hrynaszkiewicz & Cockerill, 2012) focused on the degree of openness and the CC licenses. Many other authors (Hrynaszkiewicz & Cockerill, 2012; Hrynaszkiewicz, Busch & Cockerill, 2013) reported that research funders require licenses (such as CC-BY) that allow reuse, including commercial exploitation.

Pujar (2014), after analyzing LIS journals, reported that most of the publishers follow the Creative Commons (CC) licensing model. Suber points out, '*there are many non-equivalent open licences; however, the CC open licences are the best-known, most widely used*' (Suber, 2012). Another study (MedOANet, 2013) reported that Creative Commons (CC) licenses were the most widely used worldwide and clearly explained users' rights and obligations to humans and machines. In a research study, Roy (2014) analyzed the copyright policies of all repositories registered in the ROARMAP database and found that most repositories did not follow any open licensing model. In another work, the author recommended using the CC license as it is presently the most comprehensive off-the-shelf licensing format for OA repositories. For example, repositories widely use CC-BY-SA (Roy, 2015).

Licensing Models: Implementation in IDRs

Generally, in an IDR system, copyright is maintained and managed by license (i.e. BSD (Berkeley Software Distribution) license, MIT license, Common Public License, Creative Common (CC) License, Apache Software License, STM's sample licences, the GNU Public Documentation License and so on). Anybody can use the default license that comes with the repository software or other licenses or make their own license. If necessary, it could be modified as per the institution's requirements.

It was found in the ROARMAP database that only 9 (2%) (out of 439 repositories) institutional digital repositories (IDRs) mentioned the licensing model (Table 3) in June 2013 (as reported by Roy in 2014). Still, the same ROARMAP database lists that around 454 (42.70%) IDRs (out of 1063 as of September 2020) have mentioned the use of an OA license in one form or another (see Table 4). Interestingly, almost all the IDRs (except one out of nine) in June 2013 (ibid) reported the use of the Creative Commons (CC) License (Table 3), whereas in 2020, more than 50% of the IDRs listed in ROARMAP show use of an open license framework other than CC (Table 4). Only 197 (18.53%) IDRs follow any CC license.

Table 3
Licensing Policy

Name of the Repository	Licensing Model
Universidade Aberta	Creative Commons
California Digital library (CDL)	Creative Commons
Queensland University of Technology	Creative Commons
University of Birmingham Research Archive	Creative Commons
University of Melbourne EPrints Repository	Own
University of Porto	Creative Commons
University of South Australia	Creative Commons

University of Utah's institutional repository	Creative Commons
Wellcome Trust	Creative Commons

Table 4

Licensing model

(Source: ROARMAP, 2020)

Open licensing conditions	No. of IDRs
Does not require any re-use license	291
Requires an open license without specifying which one	118
Requires CC-BY or equivalent	132
Requires CC-BY-NC or equivalent	65
Requires a different open license	19
Not Specified	318
Others (indicates institution's own OA license)	120

Copyright and Licensing Policies: Summary of Findings

A set of recommendations may be drawn as to copyright and licensing policy based on the discussion made in this particular section:

1. *Unless an author expressly grants it to a third party, an author retains the copyright to their work.*
2. *Items deposited in the repository retain all original intellectual property rights;*
3. *The author will grant a non-exclusive distribution and deposit license to the repository;*
4. *The repository may prefer to use the license as adopted by the software or may adopt any other open-source license with some modifications if required;*
5. *The license may also be used in the case of multiple authors;*
6. *If research is generated as a result of collaboration between multiple authors, the repository may accept an author's signature on behalf of his or her co-author (s) in good faith;*
7. *Depositors or contributors are not permitted to sell or authorise others to sell articles for profit.*
8. *Theses, dissertations, and other intellectual research works are subject to the rules and regulations in the Thesis Deposit Agreement as proposed by the organization; and*
9. *Where copyright has been assigned to a publisher, a license shall be required from the publisher permitting the work to be available in the repository.*

Embargo Policies: Need and Importance

The embargo or retention period is another aspect to consider before making contents open to the public domain. These policies protect the author from violating standard traditional publishing policies. Embargo management becomes more important when repositories contain articles or papers published in subscription-based publications or copyrighted or restricted materials. Some conditions may be imposed upon authors by publishers or funding bodies, and different publishers have different policies relating to preprints and post-prints of journal articles. Publishers may request embargo periods during which a published work may not be

publicly available in the repository. Different funding bodies have different requirements for outputs from the work they have funded. Some researchers may put an embargo on accessing full-text theses or other knowledge objects like technical reports or project reports for a certain period. One question may arise: can the maximum allowable embargo length be waived?

As a result, this policy must be related to copyrights and other rights management because it will form part of legal contracts with other organisations (such as academics, research, or funders) or individuals. The most important question in this domain is '*length of permitted embargoes*', which has been discussed under two sections under two broad headings: the *researchers' and practitioners' points of view*.

Embargo Policies: Experts' Views

Johnson (2002) stated that some departments regarding the access of the file for political, commercial or industrial reasons impose an embargo. Some repository infrastructure systems have the technical capacity to embargo or sequester data access until the contents are approved for release to the public (Green et al., 2009). Although a few repositories suggest depositing six (6) months after publication, others encourage depositing at the time of publication, upon institutional request, or after a publisher's embargo period (typically six months following publication) (Xia et al., 2012). The most common time for an embargo period is six (6) months, although some publishers will insist upon one year (Sale, 2006). Another UK funding world's largest private funder of medical research (Wellcome Trust Position Statement, 2003-2004) recommends a six-month embargo period. A recent study by Poynder (2014) reported that the norm for funder embargoes seems to be moving towards 12 months for STEM subjects and two years for HSS subjects.

The retention period varies considerably from publisher to publisher and discipline to discipline. It may be as short as three (3) months for some science journals or as long as 24 months in the humanities and social sciences (OpenAIRE, 2011). In science, publisher embargoes usually are 6–12 months though most funder policies currently allow short embargo periods of six (6) months (Swan, 2012). Suber (2009) supports and concludes that all medical funders except the NIH use a 12-month embargo, whereas the European Research Council (ERC) currently uses a six-month embargo. Many publishers—but certainly not all—stipulate an embargo period before an article can be made OA, and it is found that most of the publishers follow a 6–12 month embargo period, and most of the articles are deposited within this period (SHERPA/RoMEO, 2011). Some publishers allow self-archiving of the final version of an article but require an embargo period during which OA is not allowed. It was found that 66% of publishers on their list formally allow some form of self-archiving (SHERPA/RoMEO, 2011). Björk et al. (2010) showed that 62% of journals permit immediate self-archiving by their authors, 4% impose an embargo of 6 months and 13% an embargo of 12 months, and almost 80% of articles could already be openly available within a year of publication.

Another researcher (Roy, 2014) reported that more than 90% of the repositories registered in the ROARMAP, OpenDOAR and ROAR databases had no official policies, and the most common retention period suggested by repositories was six (6) months. And access restrictions on contents and the time limit for the restricted access are generally determined by the individual publisher, journal policies (for articles) or research funders (for funded research) and not by the repository. In another work, he stated that items (full-text) would be made publicly available only after the embargo period; otherwise, abstracts may be available in the public

domain (Roy, 2015). Though the retention period varies from discipline to discipline, from object to object, and subject to subject within the same discipline. In the same work, the author recommended adopting the "IDOA" ("*IDOA- Immediate Deposit with Optional Later Access*") OA policy model due to its popularity in the academic world. Another OA advocate, Harnad proposed self-archived papers to be accessible on request (i.e. work is made available on a secure access basis - "Almost-OA" (<http://www.ecs.soton.ac.uk/people/harnad>)).

Embargo Policies: Implementation in IDRs

Roy (2014), after reviewing the ROARMAP database, reported that only 36 (8.2%) IDRs (out of 439 as of June, 2013), mentioned a retention period (Table 5). Many suggested six months as an embargo period, while others suggested no delay. A few suggested three months as an embargo period, depending on the subjects and content type.

Table 5

Embargo Policy

Name of the Repository	Policy related to Embargo Period
Anglia Ruskin Research Online	within two years (in case of thesis)
Arthritis Research	not later than 6 months after publication
Australian Research Council	within 6 month after project completion
British Heart Foundation	within 6 months after publication
California Polytechnic State University	within 1-year after publication
Canadian Institutes of Health Research	within 6 months after publication
Canadian Breast Cancer Research Alliance	within 6 months after publication
Canadian Cancer Society	not later than 6 months after publication
Canadian Health Services Research Foundation	within 6 months after publication
Chalmers University of Technology	within 6 - 12 months after publication
Chief Scientist Office	within 6 months after publication
Department of Health	within 6 months after publication
Duke University	within 6 months to 2 years after publication
Dunhill Medical Trust	within 6 months after publication
European Commission	within 12 months after publication
European Heads of Research Councils	within 6 months after publication
European Research Advisory Board	Author-requested embargo, or 6 months, whichever comes first
European Research Council	within 6 months after publication
European University Association	within 6 months after publication
Fonds de la recherche en sante Quebec	not later than 6 months after publication
Genome Canada	within 6 months after publication
Institute of Education Sciences	not later than 12 months after publication
Joint Information Systems Committee	within 6 months after publication
Madrid Autonomous Community of Spain	6 months for Technology & Bio-sciences and 12 months for Social Sciences & Humanities
Medical Research Council	within 6 months after publication
Michael Smith Foundation for Health Research	within 6 months after publication
National Institutes of Health	not later than 12 months after publication
San Jose State University	within 6 months after publication
United States Department of Agriculture	within 3 months after publication

Name of the Repository	Policy related to Embargo Period
University of Abertay Dundee	within 3 months after publication
University of Barcelona	not exceeding 6 months after publication
University of Helsinki	after stipulated by the publisher or the funding body
University of Maryland	within 1- 6 years after publication
University of Surrey	not later than 6 months after publication
University of Tasmania	within 6 months after publication
Wellcome Trust	not later than 6 months after publication

Now ROARMAP lists 1063 IDRs (as of September 2020) all over the world, and it is found that the retention period varies by discipline (Table 6). The most common embargo period followed by IDRs is 12 months (Table 6), irrespective of discipline, whereas about 80% of IDRs have no stated policy.

Table 6

Embargo period

(Source: ROARMAP, 2020)

Embargo period	Policy's permitted embargo length for	
	<i>Science, Technology and Medicine</i>	<i>Humanities and Social Sciences</i>
6 months	157 (15.16%)	45 (4.33%)
12 months	93 (8.98%)	153 (14.72%)
24 months	15 (1.44%)	35 (3.36%)
Not Specified	744 (71.88%)	781 (75.16%)
Longer	26 (2.51%)	25 (2.40%)
Total	1035	1039

Embargo Policies: Summary of Findings

Based on the discussion in this section, a set of recommendations for embargo policy may be developed:

1. *The embargo period may be fixed at six months in case of necessity or the author's demand;*
2. *The embargo period may be fixed irrespective of discipline; and*
3. *Articles will be made publicly accessible (full text) only after the embargo period has expired.*

Access Policies: Need and Importance

Access management typically combines users' authentication and authorization, access permission operations, policies for license agreements and digital material authentications or digital rights management (Shoeb & Sobhan, 2010). Access management and control is one of the major concerns for content providers on the Internet (Ray & Chakraborty, 2006). Shoeb (2009) discusses digital repositories' current practises and access management issues. The access policy states the ways users may use the resources they find in the IDR. This policy

specifies which users have access to which content and may specify when restricting access to content is appropriate.

So questions arise about whether repositories should always contain only full text or metadata-only records. Whether the repository would impose any access restrictions to its contents? If yes, will the repository follow different rules and standards for different groups of documents? Will the repository provide access only to full text or metadata or both? What forms of access to full-text records are offered by the repositories? Will access be managed at the institutional/departmental level, user registration level, or data set level? Will registration be compulsory before downloading or accessing data? Will a local registration system be implemented, or will it support interoperability with other systems? The data access policy has covered two important issues: 'access restriction and level of access control' and '*authentication measures/mechanisms*'. The first two sections discuss the first issue, i.e. '*access restriction and level of access control*', and the second issue, i.e. '*authentication measures/mechanism*', is discussed in the following two sections.

Access restriction and level of access control: Experts' Views

IDRs have been built on the concept of "*open*". So there should not be any access restrictions. However, some publishers provide immediate access to content and promise to do so in the future, while others allow access after a certain period. By default, items should not have any access restrictions to disappoint users. Crow's short definition of institutional repositories says that they should be "*accessible to end users both within and outside of the institution, with few if any barriers to access*" (Crow, 2002). Most of the repositories offer OA accessibility.

Prost and Schöpfel (2014) reported that OARs are less open than they should be and contain a growing number of metadata without links to the full text or with full text only for authorized users. Only a small percentage of the items returned are open access. Schöpfel and Prost (2013a) reported the research results in the field of electronic theses and dissertations, which showed that a significant part of the "unknown access" content is indeed not freely available but under embargo, available only for authorized users and/or on the academic campus or via the institutional intranet. Some of them are available only on a publisher's platform. Another study reported that out of 26% of deposited PhD theses with limited access, 17% are embargoed for six months to two years or longer, and 9% can only be accessed on campus (Schöpfel & Prost, 2013b). Lee, Burnett, Vandegrift, Baeg & Morris (2015), after surveying 170 articles deposited in the Florida State University repository- DigiNole Commons, reported that only 60% were open access. Poynder (2014) reported that a large amount of the content is not freely available but on "dark deposit" or otherwise inaccessible ("login wall").

The question of access becomes much more complex when subscription-based publications or copyrighted or restricted materials are included in the IDR. Authorization is to be granted to successfully authenticated users according to their rights information available in the Access Management System (AMS) (Lynch, 1998). According to Shoeb and Sobhan (2010), access management is especially important for commercial digital content because access is restricted to subscribers or licenced users. Swan et al. (2015), in the PASTEUR4OA project, showed that the average deposit rate (full text) in IRs was 15.5% and 12.4% for OA material. More than three-quarters (76.4%) of articles from institutions are not deposited, and a further 8% are Metadata-Only (MO) deposits. There may be certain circumstances when control is necessary.

However, various legitimate circumstances might require an institution to limit access to particular content to a specific set of users (Johnson, 2002). The repository may be required to restrict access to data for some reason (Dulong de Rosnay, 2008). The University Grants Commission, India (2005) supports access control to the contents deposited in the repository. Gibbons (2004) reported that there might be some situations when depositors need to restrict access to items in IDR, and it (access control) depends on the types of potential documents. He concluded that where and how access control levels are determined is another feature to consider. Another expert (Johnson, 2002) argued that implementing these policy-based restrictions requires robust access and rights management mechanisms to allow or restrict access to contents and, conceivably, to parts of digital objects - by a variety of criteria, including user type, institutional affiliation, user community, and others. Roy (2014), in his research work, suggested checking SHERPA/RoMEO (for journal articles) and SHERPA/Juliet (for funded research) databases before depositing objects in any IDR. In another work, he reported that policymakers should weigh/consider campus culture heavily when making this decision (Roy, 2015). Another study (Crow, 2002) advocated limiting access to particular contents to a specific set of users. The other study (Green et al., 2009) advocated access control based on user type and status (general public, research organization, membership, administrative staff).

Access restriction and level of access control: Implementation in IDRs

Roy (2014), in his research work, reviewed 439 IDRs (as of June 2013) and reported that only 21 (4.7%) IDRs mentioned a variety of legitimate circumstances that might require an institution to limit access to certain contents to a specific set of users. Most IDRs support this view and suggest different access rules for different collections for different users (Table 7). The database lists 1063 IDRs (as of September 2020), but data regarding this issue is unavailable.

Authentication measures/mechanism: Experts' Views

There is a lack of published literature regarding this authentication measure or mechanism issue. DINI (2007) suggested applying an advanced electronic signature for this purpose. Login ID and password-based access are the most common and well-known authentication methods (Anton, Jones & Earp, 2007). As per the OpenDOAR (OpenDOAR, 2018) and ROAR (ROAR, 2018) databases, most repositories use user name and passwords to identify valid users in the system. Another popular authentication process is IP filtering or IP authentication (Tiemo, Bribena & Nwosu, 2011). Another study (Green et al., 2009) recommended controlling access based on location, with access restricted to a specific IP (Internet Protocol) location or physical location. Other experts (Hombal & Prasad, 2012) suggested access control by license and encryption methods. Winslett, Ching, Jones & Slepchin (1997) developed a credential-based security and privacy-related system for enforcing access control over the digital contents of a repository or system. Johnson (2002) stated that the repository could control access to some or all items based on user type, status, and location. Roy (2014), after analyzing three databases viz. OpenDOAR, ROAR and ROARMAP reported that most IDRs follow '*login and password*' to identify valid users. In another work, he showed that repositories follow different access policies for different types of users and different types of documents (Roy, 2015).

Authentication measures/mechanism: Implementation in IDRs

It was found in the ROARMAP database that only 21 (4.7%) IDRs (out of 439 as of June 2013) stated this policy (as reported by Roy in 2014) (Table 7). Generally, it was found that IP authorization and user authorization (login and password) were the two most common methods of identifying valid users on a system at that time. Apart from this, it was also reported that repositories follow different access patterns depending on the nature of the contents and the type of user. It was also found that all IDRs offer some mechanisms by which access to the documents can be controlled. Now ROARMAP lists 1063 IDRs (as of September 2020), and no information is available regarding this issue.

Table 7
Access Policy

Name of the Repository	Policy related to Access Control /Access Pattern
Anglia Ruskin Research Online	<ul style="list-style-type: none"> • File contains confidential or commercially sensitive information; • publisher imposes restrictions on the use of pre- and/or post-prints • Restriction on access for specific items comply with intellectual property or copyright agreements (i.e. publisher embargoes)
Archive ouverte UNIGE	<ul style="list-style-type: none"> • Full text items are available only to community members and may not be distributed to anyone. • Some closed full items may be available only to their authors
Arizona State University Digital Repository	<ul style="list-style-type: none"> • Access restrictions must be defined when an item or collection is submitted. • Follows three levels of access (i.e. all users can access the work (default); all users can access the work after a designated embargo period; requests for limited, campus-only access on a case by case basis)
Aston University Research Archive	<ul style="list-style-type: none"> • Restriction on access to works, whether in part or in full comply with intellectual property or copyright agreements (i.e. publisher embargoes)
Brandeis Institutional Repository	<ul style="list-style-type: none"> • For special circumstances, arrangements can be made to place a temporary embargo on distribution or to restrict access within the community
California Institute of Technology	<ul style="list-style-type: none"> • Restriction on access to full text for specific cases for specific items for a certain period • Licensing agreements with publishers or pending patents. Each file can have its access level independently set • Follows three type of access (i.e. Anyone; Caltech Users Only; Repository Administrators Only)
Concordia University Research Repository	<ul style="list-style-type: none"> • In some cases, access to content may be limited to the community members only • Restriction on access to the community members on special circumstances
Cornell University Library	<ul style="list-style-type: none"> • Access to the full text may be restricted to members of the community
Goddard Library Repository	<ul style="list-style-type: none"> • Handle a variety of access restrictions
Illinois Digital Environment for Access to	<ul style="list-style-type: none"> • Access restrictions to be imposed at the collection or item level comply with intellectual property or copyright agreements (i.e.

Name of the Repository	Policy related to Access Control /Access Pattern
Learning and Scholarship	publisher embargoes)
Massachusetts Institute of Technology (MIT)	<ul style="list-style-type: none"> • Limit access to content at the item level either to members only or to specific individuals or groups
Natural Environmental Research Council	<ul style="list-style-type: none"> • Access to some full text items are controlled
University of Abertay Dundee	<ul style="list-style-type: none"> • Some material is reserved for internal use and accessible to staff only • Embargoed items are withheld from public view
University of Hawaii at Manoa	<ul style="list-style-type: none"> • Restrict or limit access to content at the item level
University of Kansas	<ul style="list-style-type: none"> • Restriction on access to groups of registered users at the item, collection, or community level • Communities are responsible for establishing access control policies for content in their collections
University of North Texas	<ul style="list-style-type: none"> • Follows three levels of access (i.e. open access to the public; limited access in either time or to specific groups; closed, no Access)
University of Pittsburgh	<ul style="list-style-type: none"> • Restriction of access to community members for an optional embargo period
University of Rochester	<ul style="list-style-type: none"> • Restriction on access at the file level, not just deposit level
University of Southampton Research Repository	<ul style="list-style-type: none"> • Full items are available only to members
University of Sydney	<ul style="list-style-type: none"> • Restriction on access at the community level
Victoria University Institutional Repository	<ul style="list-style-type: none"> • Restriction on access to full text for specific cases for specific items

Access Policies: Summary of Findings

Based on the discussion in this section, a set of recommendations for an access policy may be developed:

1. *Follow different access policies for different collections or different types of content (read, remove, add, or write);*
2. *Follow different access rules for different groups or users (students, research scholars, faculty, local, distant etc.);*
3. *Allow access restrictions to be imposed at the collection or item level, as it depends on the types of documents. Communities are responsible for establishing access control policies for the contents of their collections;*
4. *Authentication is to be done by requesting the username and password of registered users; and*
5. *In the case of the exact published version, the article may be made publicly accessible only after the embargo period has expired. It (the articles) can be deposited at any time, but no access is permitted during that time. Abstracts may be available during this period.*

User Interface Policies: Need and Importance

The user interface is critical in any online digital repository system. It is the front-end layer for the entire software framework. The user interface must include features like a regional or local language-based interface, integration of browsing and searching facilities, access to resources arranged under different communities and collections, and access to communication tools. The main challenge of designing a user interface is to combine the entire user-oriented features and facilities of the system in a single window of limited size. So, a Unicode-compliant multilingual user interface for browsing, searching, and retrieving IDR resources is essential and a mandatory parameter for any repository software framework.

This policy covers only one technical issue, i.e. availability of a Unicode-compliant interface. It has been discussed in the following two sections under two broad headings, namely the *researcher's point of view* and *practice point of view*.

User Interface Policies: Experts' Views

The published information in this area is limited, and several technical issues remain. Several studies (Barton & Waters, 2004; Pappalardo, Fitzgerald, Fitzgerald, Kiel-Chisholm, O'Brien & Auston, 2007; DINI, 2007; University Grants Commission, India, 2005; Gibbons, 2004) recommended that the user interface ought to be attractive, easy-to-use, customizable and well-documented. Clobridge (2010) explained how to strategically select projects tied to your institution's goals, create workflows to support a fully-functioning program, and creatively utilize existing resources.

Another study (Markey, Rieh, Jean, Kim & Yakel, 2007) reported that user interfaces need serious reworking. The other researchers (Hunter & Day, 2005; Feijen, Horstmann, Manghi, Robinson & Russell, 2007) advocated for customization to implement a multilingual interface (Peters & Picchi, 1997). *Several others have emphasised the importance of designing a local language-based interface for any communication system (Del Gado & Nielsen, 1996; Head, 1999; Rskin, 2000)*. Roy (2014) demonstrated the development of an indic-script-based interface (such as Bengali) in his research work. In another work, the author recommended a comprehensive, unitary, and well-designed interface and also reported that user interfaces in local and regional languages need serious reworking (Roy, 2015).

User Interface Policies: Implementation in IDRs

After reviewing the issue, Roy (2014) concluded that most repositories and research/funding organisations had ignored it. Only a few IDRs have a customized user interface that supports the searching and browsing of multilingual objects. In another work, the author concluded that most of the IDRs support and follow the interface(s) as specified by the software and include the following basic three interfaces: (i) one for submitters and others involved in the submission process; (ii) one for end-users looking for information; and (iii) one for system administrators to perform different system level operations (Roy, 2015). The database currently lists 1063 IDRs (as of September 2020), but no data on this issue is available.

User Interface Policies: Summary of Findings

A set of recommendations may be drawn as user interface policy based on the discussion made in this particular section:

1. *Study proposes web-based, Unicode-compliant multilingual interfaces with provision for switching interfaces through browser settings;*
2. *Apart from the default English language, the study proposes a multilingual script-based user interface for managing resources and providing services.*
3. *In addition to the default English language, the study proposes a multilingual script-based interface for performing various administrative operations at the system level.*
4. *The study also proposes that it (the user interface) should be easy to understand and use, and there should be a provision for customization for adding themes for different communities, collections, items etc.*

Findings

OA policies based on global recommendations and existing best practice guidelines are key to the success of any OAR system. The key findings are:

In copyrights and licensing policy, many IDRs did not respect this policy. Repositories should mention who will hold copyrights to the items deposited and the desired retention period for the objects deposited in OARs. Authors unknowingly transfer copyrights to publishers or institutions for articles to be published. Some of the authors hold copyrights.

Even so, most IDRs did not specify a licensing model or did not require any re-use license. This study suggests authors should follow the Creative Commons Attribution (CC-BY) license to retain key rights so that they can re-use, re-mix or distribute it as per the Creative Commons (CC) license. In this context, it may be noted that the ‘author addendum’ that allows modification of the publisher’s agreement with the authors also allows authors to keep key rights to their works, which may help achieve the more significant objectives of the OA movement.

An embargo/retention policy has been neglected by most of the repositories. This study tolerates ‘embargo’ of any form imposed by publishers or any other organizations. This embargo period varies depending on the subject, the object, and the discipline. The organisation has no uniqueness regarding the length of the embargo period. But it is suggested to follow the ‘Immediate Deposit/Optional-Access’ (IDOA) policy to ensure 100% deposition of contents into the repositories.

In their data access policies, repositories should mention whether they provide full text access or metadata only, even if it is unclear whether they follow different access policies for different types of users depending upon the documents.

Studies have neglected user interface policy. More than 90% of repositories possess objects written in the English language. But there is no solution regarding non-English knowledge objects. So, a multilingual user interface is essential to cover vernacular languages.

Discussion

As can be seen from the findings, after searching all published scholarly literature related to this domain, most OARs are lacking when concerned policy matters (Roy, Biswas & Mukhopadhyay, 2022a, 2022b). Even so, it is also true for elite organizations. Here, issues such as licensing models, access control mechanisms, re-use of data, embargo management for textual objects, related to the policies (Table 1) have been discussed. But important issues concerning these policies, such as the legal copyright holder, licensing pattern, permitted embargo period, level or degree of access, and user interface for non-textual objects and non-

English-speaking people, are not covered in IDR's policy sites. According to the findings, embargo policy goes against open access philosophy, restricting immediate access to scholarly content. So it should be as short as possible to provide free access to open knowledge resources. But there are no guidelines for how it will be managed in the case of non-textual objects. Our study emphasized understanding journal policies, and academicians should have sound knowledge regarding publishers' policies (SHERPA/RoMEO) before publishing any article. So, we need to check the journal's policy to understand what and when content is permissible.

The copyright issue needs to be adequately treated for objects other than text. In choosing a licensing model, it is difficult to follow a particular type of CC licenses and quite confusing as it has several variants. The choice should be based on the minimum restriction of contents, ensuring maximum permission to read, use, re-use, re-distribute, and remix the published works, subject to the proper acknowledgement of the author.

In the data access policy, access should be maximized for the users to access content immediately after the publication (i.e. *Immediate Deposit Immediate Access*). Access must be permitted as per copyright laws. User interfaces should support many vernacular languages to hold objects other than English. The purpose is to support the searching, retrieving, and processing of open knowledge resources in different languages. But the majority of IDRs hold objects published only in English. The result of the study is also significant because all issues restrict depositing objects in IDR. However, remember that the success of IDR depends on the number of high-quality full-text objects it possesses. This indicates that there should be a sufficient number of full-text objects in IDR so that users can search full-text objects effectively and efficiently without any restriction per the open access philosophy.

The results show a significant difference among IDRs on policy-related issues. Considering the obtained results, it can be concluded that all these issues discussed above are not properly framed by most of the IDRs, and there is no specific directive. One reason may be the lack of scholarly literature in this domain. Another reason is the lack of datasets in selected databases. It may be due to a lack of awareness of open access literature's benefits or reluctance in this area. So, promotional and advocacy programmes (Roy, 2021; Chan, Kwok & Yip, 2005; Dill & Palmer, 2005; Morgan & Team IDR, 2006) are required to be organised from time to time to promote open access culture, as the emphasis is on free access to publicly funded research outputs. So, all the issues must be carefully formulated and made available in the public domain to develop a model IDR policy roadmap that will be applicable to all domains, irrespective of the size and nature of the organization.

Conclusion

Enhancing the mandate policy is essential to increasing scholars' awareness of and participation in the open-access repository movement. There is a misconception among academicians that such mandates will restrict their publication opportunities. But it is evident from our study that OA mandates positively impact the growth of repository content and smooth access to such objects.

This study provides ample evidence that there is a compelling need to formulate institute-specific OA self-archiving policies that would support the information needs of community members by providing free full-text access to publicly funded research outputs. The majority of the IDRs suffer from policy issues because this area has been neglected and given low priority to recent and more glamorous developments in the area of technology. This repository

movement needs more support for open-access publication in theory than in practice. As a result, such a mandate policy is still not the "magic bullet" that many mandate proponents have claimed it to be. So their policy documentation will have to be developed alongside them. All these issues require further improvement, as they may affect the formulation of self-archiving policy documentation. The recommendations based on existing best practice guidelines made in this paper are expected to be a guiding tool for policymakers and administrators responsible for IDR policies, procedures, and guidelines.

References

- Adolphus, M. (2014). *Institutional Repositories (Part 1)*. Emerald Group Publishing, Bingley. Retrieved from www.emeraldgrouppublishing.com/librarians/info/viewpoint
- Anton, A.I., Jones, L.A. & Earp, J.B. (2007). Towards understanding user perceptions of authentication technologies. In *Proceedings of the 2007 ACM Workshop on Privacy in Electronic Society* (pp. 91- 98). New York: ACM. <https://doi.org/10.1145/1314333.1314352>
- Alipour-Hafezi, M., Horri, A., Shiri, A. & Ghaebi, A. (2010). Interoperability models in digital libraries: An overview. *The Electronic Library*, 28(3), 438–452. <https://doi.org/10.1108/02640471011052016>
- Barton, M. R. & Waters, M. M. (2004). *Creating an institutional repository: LEADIRS Workbook*. Cambridge, M. A: MIT. Retrieved from https://dspace.mit.edu/bitstream/handle/1721.1/26698/Barton_2004_Creating.pdf?sequence=1&isAllowed=y
- Bennett, S. (1999). Authors' Rights. *The Journal of Electronic Publishing*, 5(2). <https://doi.org/10.3998/3336451.0005.203>
- Carroll, M.W. (2013). Creative commons and the openness of open access. *The New England Journal of Medicine*, 368(9), 789-791. <https://doi.org/10.1056/NEJMp1300040>
- Cervone, H.F. (2004). The repository adventure. *Library Journal*, 129(10), 44-46. Retrieved from <https://www.libraryjournal.com/story/the-repository-adventure>
- Clobridge, A. (2010). *Building a digital repository program with limited resources*. Oxford: Chandos Publishing.
- Crow, R. (2002). *The Case for Institutional Repositories: A SPARC Position Paper*. Washington, D. C: The Scholarly Publishing & Academic Resources Coalition. Retrieved from https://ils.unc.edu/courses/2014_fall/inls690_109/Readings/Crow2002-CaseforInstitutionalRepositoriesSPARCPaper.pdf
- Del Gado, E. M. & Nielsen, J. (1996). *International user interface*. Chichester: John Wiley and Sons.
- DINI. (2007). *DINI-Certificate for Document and Publication Services*. Retrieved from <http://nbn-resolving.de/urn:nbn:de:kobv:11-10075687>
- Dulong de Rosnay, M. (2008). Check your data freedom: A taxonomy to assess life science database openness. *Nature Proceeding*. <https://doi.org/10.1038/npre.2008.2083.1>

- Eaton, J. (2008). Using the open archives initiative protocol for metadata harvesting. *Program: Electronic Library and Information Systems*, 42(4), 450-452. <http://dx.doi.org/10.21083/partnership.v3i1.450>
- Feijen, M., Horstmann, W., Manghi, P., Robinson, M. & Russell, R. (2007). DRIVER: Building the network for accessing digital repositories across Europe. *Ariadne*, 53, 1-4. Retrieved from <http://www.ariadne.ac.uk/issue/53/feijen-et-al/>
- Gadd, E., Oppenheim, C. & Proberts, S. (2003). RoMEO studies 1: The impact of copyright ownership on author-self-archiving. *Journal of Documentation*, 59(3), 243-277. <https://doi.org/10.1108/00220410310698239>
- Gadd, E., Oppenheim, C. & Proberts, S. (2004). RoMEO studies 6: Rights metadata for open archiving. *Program: Electronic Library and Information Systems*, 38(1), 5-14. <https://doi.org/10.1108/00330330410699036>
- Genoni, P. (2004). Content in institutional repositories: A collection management issue. *Library Management*, 25(6/7), 300-306. <https://doi.org/10.1108/01435120410547968>
- Gibbons, S. (2004). Establishing an institutional repository. *Library Technology Reports*, 40(4), 1-68. <http://dx.doi.org/10.5860/ltr.40n4>
- Ginsparg, P., Luce, R. & Van de Sompel, H. (1999). The Open Archives Initiative aimed at the further promotion of author self-archived solutions. Retrieved from <http://www.openarchives.org/meetings/SantaFe1999/ups-invitation-ori.htm>
- Green, A., Macdonald, S. & Rice, R. (2009). *Policy making for research data in repositories: A guide*. Retrieved from <http://www.disc-uk.org/docs/guide.pdf>
- Gulley, N. (2013). Creative commons: Challenges and solutions for researchers; a publisher's perspective of copyright in an open access environment. *Insights: The UKSG Journal*, 26(2), 168-173. <http://dx.doi.org/10.1629/2048-7754.107>
- Head, A. J. (1999). *Design wise: A guide for evaluating the interface design of information resources*. Medford, N. J.: Cyber Age Books.
- Hockx-Yu, H. (2006). Digital preservation in the context of institutional repositories. *Program: Electronic Library and Information Systems*, 40(3), 232-243. <https://doi.org/10.1108/00330330610681312>
- Hombal, S. G. & Prasad, K. N. (2012). Digital copyright protection: Issues in the digital library environment. *DESIDOC Journal of Library & Information Technology*, 32(3), 233-239. Retrieved from <https://publications.drdo.gov.in/ojs/index.php/djlit/article/view/2380/1271>
- Horwood, L., Sullivan, S., Young, E. & Garner, J. (2004). OAI compliant institutional repositories and the role of library staff. *Library Management*, 25(4/5), 170-176. <https://doi.org/10.1108/01435120410533756>
- Hrynaszkiewicz, I., Cockerill, M.J. (2012). Open by default: A proposed copyright license and waiver agreement for open access research and data in peer-reviewed journals. *BMC Research Notes*, 5, 494. <https://doi.org/10.1186/1756-0500-5-494>
- Hrynaszkiewicz, I., Busch, S. & Cockerill, M.J. (2013). Licensing the future: Report on BioMed central's public consultation on open data in peer-reviewed journals. *BMC Research Notes*, 6, 318. <https://doi.org/10.1186/1756-0500-6-318>
- Hunter, P. & Day, M. (2005). *Institutional repositories, aggregator services and collection development*. UKOLN, University of Bath. Retrieved from <https://purehost.bath.ac.uk/ws/files/492359/eprintsuk-coll-development.pdf>

- Johnson, R. K. (2002). Institutional repositories: partnering with faculty to enhance scholarly communication. *D-Lib Magazine*, 8(11). Retrieved from <http://www.dlib.org/dlib/november02/johnson/11johnson.html>
- Jones, C. (2007). *Institutional repositories: Content and culture in an open access environment*. Oxford: Chandos Publishing.
- Jones, R., Andrew, T. & MacColl, J. (2006). *The Institutional Repository*. Oxford: Chandos Publishing.
- Kling, R. & McKim, G. (2000). Not just a matter of time: Field differences and the shaping of electronic media in supporting scientific communication. *Journal of the American Society for Information Science*, 51(14), 1306 -1320. [https://doi.org/10.1002/1097-4571\(2000\)9999:9999%3C::AID-ASII047%3E3.0.CO;2-T](https://doi.org/10.1002/1097-4571(2000)9999:9999%3C::AID-ASII047%3E3.0.CO;2-T)
- Lee, J., Burnett, G., Vandegrift, M., Baeg, J. H. & Morris, R. (2015). Availability and accessibility in an open access institutional repository: a case study. *Information Research: An International Electronic Journal*, 20(1), n1. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1060495.pdf>
- Lynch, C.A. (2003). Institutional repositories: Essential infrastructure for scholarship in the digital age. *portal: Libraries and the Academy*, 3(2), 327-336. <https://doi.org/10.1353/pla.2003.0039>
- Lynch, C. (1998.). *A white paper on authentication and access management issues in cross-organizational use of networked information resources*. Retrieved from <https://www.cni.org/publications/cliffs-pubs/white-paper-authentication-access-mgt-issues>
- Markey, K., Rieh, S. Y., Jean, B. S., Kim, J. & Yakel, E. (2007b). *Census of institutional repositories in the united states: Miracle project research findings*. USA: Council on library and information resources. Retrieved from <https://www.clir.org/pubs/reports/pub140/contents/>
- Millington, P. (2006). Moving forward with the OpenDOAR Directory. Paper presented at the 8th International Conference on Current Research Information Systems. Retrieved from <https://slideplayer.com/slide/4189/>
- MedOANet. (2013). *Guidelines for implementing open access policies for research performing and research funding organizations*. Retrieved from http://www.medoanet.eu/sites/www.medoanet.eu/files/documents/MED2013_GUIDELINE_dp_EN_ws.pdf
- Morgan, E. L. & Team IDR. (2006). *Institutional digital repository*. Retrieved from <http://www.library.nd.edu/idr/documents/idr-final-report.pdf>
- Moulaison Sandy, H. & Dykas, F. (2016). High-quality metadata and repository staffing: Perceptions of United States-based OpenDOAR participants. *Cataloging & Classification Quarterly*, 54(2), 101–116. <http://dx.doi.org/10.1080/01639374.2015.1116480>
- Ochoa, X. & Duval, E. (2009). Automatic evaluation of metadata quality in digital repositories. *International Journal on Digital Libraries*, 10(2/3), 67–91. <https://doi.org/10.1007/s00799-009-0054-4>
- OpenAIRE. (2011). *The OpenAIRE guide for research institutions*. Retrieved from <https://www.openaire.eu/openaire-guide-for-research-institutions-2/download>
- OpenDOAR. (2020). *Directory of Open Access Repositories*. Retrieved from <https://v2.sherpa.ac.uk/opensoar/>

- Pappalardo, K. & Fitzgerald, A. Fitzgerald, B. F., Kiel-Chisholm, S. D., O'Brien, D. & Auston, A. (2007). *A guide to developing open access through your digital Repository*. Retrieved from <https://eprints.qut.edu.au/9671/1/9671.pdf>
- Park, J. (2009). Metadata quality in digital repositories: A survey of the current state of the art. *Cataloging & Classification Quarterly*, 47(3/4), 213–228. <https://doi.org/10.1080/01639370902737240>
- Peters, C. & Picchi, E. (1997). Across languages, across cultures: Issues in multilinguality and digital libraries. *D-Lib Magazine*, 3(5). Retrieved from <http://www.dlib.org/dlib/may97/peters/05peters.html>
- Pinfield, S. (2002). Creating institutional e-print repositories. *Serials*, 15(3), 261-264. <https://doi.org/10.1629/15261>
- Poynder, R. (2014). *Open access, almost-OA, OA policies, and institutional repositories*. Retrieved from <http://www.richardpoynder.co.uk/Almost-OA.pdf>
- Proberts, S. & Jenkins, C. (2006). Documentation for institutional repositories. *Learned Publishing*, 19(1), 57-71. <https://doi.org/10.1087/095315106775122556>
- Prost, H. & Schöpfel, J. (2014). Degrees of openness: Access restrictions in institutional repositories. *D-Lib Magazine*, 20(7/8). Retrieved from <http://www.dlib.org/dlib/july14/prost/07prost.html>
- Pujar, S. M. (2014). Open access journals in library and information science: A study. *Annals of Library and Information Studies*, 61(3), 199-202. <http://op.niscair.res.in/index.php/ALIS/article/view/7068>
- Ray, I. & Chakraborty, S. (2006). A framework for flexible access control in digital library systems. In E. Damiani & P. Liu (Eds.), *Data and Applications Security* (pp. 252–266). Springer, Heidelberg. https://doi.org/10.1007/11805588_18
- RECODE. (2014). *Policy recommendations for open access to research data*. Retrieved from <http://www.gsrt.gr/EOX/files/Policy%20recommendations%20for%20open%20access%20to%20research%20data.pdf>
- Rieh, S. Y., Jean, B.S., Yakel, E., Markey, K. & Kim, J. (2008). Perception and experiences of staff in the planning and implementation of IR. *Library Trends*, 57(2), 168-190. <http://doi.org/10.1353/lib.0.0027>
- Rimkus, K., Padilla, T., Popp, T. & Martin, G. (2014). Digital preservation file format policies of ARL member libraries: an analysis. *D-Lib Magazine*, 20(3/4). <https://doi.org/10.1045/march2014-rimkus>
- ROAR. (2018). *Registry of open access repositories*. <http://roar.eprints.org/>
- ROARMAP. (2020). *Registry of open access repositories mandatory archiving policies*. <https://roarmap.eprints.org/>
- Robertson, R.J. (2005). Metadata quality: Implications for library and information science professionals. *Library Review*, 54(5), 295-300. <https://doi.org/10.1108/00242530510600543>
- Roy, B. K., Biswas, S. C. & Mukhopadhyay, P. (2022b). Archiving policies in institutional digital repositories: A global scenario. *International Journal of Information Science and Management*, 20(2), 101-126. <https://dorl.net/dor/20.1001.1.20088302.2022.20.2.7.2>

- Roy, B. K., Biswas, S. C. & Mukhopadhyay, P. (2022a). Collection development and organization in institutional digital repositories: From policy to practice. *International Journal of Information Science and Management*, 20(1), 15-39. <https://dorl.net/dor/20.1001.1.20088302.2022.20.1.2.5>
- Roy, B. K. (2021). *Institutional Digital Repository: Towards developing a policy framework*. Germany: LAP Lambert Academic Publishin.
- Roy, B. K. (2014). *Designing institutional digital repository for the university of burdwan: a floss based prototype*. Ph.D. Thesis, Library and Information Science Department, The University of Burdwan, Burdwan.
- Roy, B. K. (2015). *Institutional Digital Repository: From Policy to Practice*. Germany: LAP Lambert Academic Publishin.
- Roy, B. K., Biswas, S. C. & Mukhopadhyay, P. (2018). Towards an open access policy framework: A case study of COAR. *Liber Quarterly*, 28(1), 1-33. <https://doi.org/10.18352/lq.10227>
- Roy, B.K., Biswas, S.C & Mukhopadhyay, P. (2016). The COAPI cats: The current state of open access repository movement and policy documentations. *International Journal of Knowledge Content Development & Technology*, 6(1), 69-84. Retrieved from <http://ijkcdt.net/xml/06466/06466.pdf>
- Rskin, J. (2000). *The human interface: New directions for designing interactive systems*. Reading, M.A.: Addison Wesley.
- Sale, A. (2006). The acquisition of open access research articles. *First Monday*, 11(10). Retrieved from <https://firstmonday.org/ojs/index.php/fm/article/view/1409/1327>
- Schöpfel, J. & Prost, H. (2013a). Degrees of secrecy in an open environment. The case f electronic theses and dissertations. *ESSACHESS - Journal for Communication Studies*, 6(2/12), 65-86. Retrieved from <file:///C:/Users/Reza/Downloads/214-627-1-PB.pdf>
- Schöpfel, J. & Prost, H. (2013b). Schöpfel, J., & Prost, H. (2013, December). Back to grey: Disclosure and concealment of electronic theses and dissertations. In *The Fifteenth International Conference on Grey Literature: "The Grey Audit: A Field Assessment in Grey Literature"*, Bratislava, 2-3 December 2013. Text Release. Retrieved from <https://itlib.cvtisr.sk/%c4%8c1%c3%a1nky/clanek2686/>
- Shearer, K. (2005). *Institutional repositories: The evolution of scholarly communication*. http://www.carl-abrc.ca/projects/institutional_repositories/ppt/CACUL2-Apr05.ppt
- SHERPA/RoMEO. (2011). *Home page of SHERPA/RoMEO*. Retrieved from <https://v2.sherpa.ac.uk/romeo/>
- Shoeb, Z. H. (2009). Access management for digital repository. *DESIDOC Journal of Library & Information Technology*, 29(4), 21-27. <http://dx.doi.org/10.14429/djlit.29.257>
- Shoeb, Z. H. & Sobhan, M. A. (2010). Authentication and authorization: Security issues for institutional digital repositories. *Library Philosophy and Practice (e-journal)*. 377. Retrieved from <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1389&context=libphilprac>
- SPARC. (2006). *Author rights: Using the SPARC author addendum to secure your rights as the author of a journal article*. Retrieved from <https://sparcopen.org/our-work/author-rights/brochure-html/>

- SPARC. (n.d.). *How open is it? A guide for evaluating the openness of journals*. Retrieved from https://sparcopen.org/wp-content/uploads/2015/12/hoii-guide_V2_FINAL-1.pdf
- Suber, P. (2009). *Open access policy options for funding agencies and universities*. Retrieved from <https://dash.harvard.edu/handle/1/4322589>
- Suber, P. (2012). *Open Access*. Cambridge: The MIT Press.
- Swan, A. (2012). *Policy Guidelines for the development and promotion of open access*. France: United Nations Educational, Scientific and Cultural Organization. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000215863>
- Swan, A. & Brown, S. (2002). *Authors and Electronic Publishing: The ALPSP Research Study on Authors' and Readers' Views of Electronic Research Communication*. Worthing: ALPSP.
- Swan, A. & Brown, S. (2005). *Open access self-archiving: An author study*. UK: Key Perspectives Limited. Retrieved from <http://cogprints.org/4385/1/jisc2.pdf>
- Swan, A., Gargouri, Y., Hunt, M. & Harnad, S (2015). *Open access policy: Numbers, analysis, effectiveness*. PASTEUR4OA Project. Retrieved from <http://eprints.soton.ac.uk/375854/1/PASTEUR4OA3.pdf>
- Teli, S. (2015). Metadata harvesting from selected institutional digital repositories in India: A model to build a central repository. *International Journal of Innovative Research in Science, Engineering and Technology*, 4(4), 1935-1942. Retrieved from <https://doi.org/10.15680/IJRSET.2015.0404018>
- Tiemo, P. A., Bribena, E. & Nwosu, O. (2011). Internet usage and regulations in Niger delta university libraries. *Chinese Librarianship: an International Electronic Journal*, 31.
- University Grants Commission, India. (2005). *UGC (Submission of Metadata and Full-text of Doctoral Theses in Electronic Format) Regulations*. Retrieved from http://www.ugc.ac.in/new_initiatives/etd_hb.pdf
- van der Graaf, M. & van Eijndhoven, K. (2008). *The European repository landscape*. Amsterdam: Amsterdam University Press.
- Ware, M. (2004b). Institutional repositories and scholarly publishing. *Learned publishing*, 17(2), 115-124. <https://doi.org/10.1087/095315104322958490>
- Ware, M. (2004a). *Publisher and library/learning solutions (pals): Pathfinder research on web-based repositories*. Mark Ware Consulting Ltd. Retrieved from <https://dokumen.tips/documents/pals-report.html?page=1>
- Wellcome Trust Position Statement. (2003-2004). *Open access policy*. Retrieved from <http://www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm>
- Winslett, M., Ching, N., Jones, V. & Slepchin, I. (1997, May). Assuring security and privacy for digital library transactions on the web: Client and server security policies. In *Proceedings of ADL'97 Forum on Research and Technology. Advances in Digital Libraries* (pp. 140-151). IEEE.
- Xia, J., Gilchrist, S. B., Smith, N. X., Kingery, J. A., Radecki, J. R., Wilhelm, M. L., ... & Mahn, A. J. (2012). A review of open access self-archiving mandate policies. *Portal: Libraries and the Academy*, 12(1), 85–102. <https://doi.org/10.1353/pla.2012.0000>.