
OPEN ACCESS MOVEMENT AND OPEN ACCESS INITIATIVES IN INDIA

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Abstract

Open access is a new trend in scholarly communication which aims at providing free access to scholarly literature over the internet and has gained enormous momentum in the recent years. Although OA started and has grown from the pockets of regional initiatives in the developing countries, it is appealing to developing countries and is spreading throughout the world quickly facilitated by common technical standards and open source software. OA endeavors to reduce the price and permission barriers to scholarly communication and the scholarly literature are freely accessible now without any hindrance. This paper outlines the OA concept and specific Indian initiatives are mentioned and described. In addition this paper also evaluates the OA movement in India and concludes with suggestions and recommendations for improving the OA scenario in India.

Keywords: Open access; Institutional Repositories; OA Journals; India

1. Introduction

Prior to the advent of the Internet publishers and academic societies dominated scholarly communication, and researchers channeled their research output solely through authoritative publishers and academic societies. Now when Internet has become a part of our lives, it continues to make changes in every aspect of our society and reshapes scholarly communication in many ways. Chan (2004) states that scholarly communication and publishing are increasingly taking place in the electronic environment. With a growing proposition of the scholarly record now existing only in digital format, serious and pressing issues regarding access and preservation are being raised that are central to future scholarship [1]. On the other hand exponential growth of scholarly literature has put a severe hindrance on their accessibility, and the libraries, particularly in the developing countries is vexed with the problem of providing access to the vast amount of literature. In addition, the increase in the prices of academic journals by their publishers has posed a major threat to libraries which support academic researcher's research activities. Today journals are being published electronically and distributed in bundled databases controlled by large commercial publishers and libraries and users are facing restrictive licensing terms on their access and usage. Therefore in words of Ramachandran (2004) 'even though the bundling includes a very large number of indifferent and low-impact journals, institutions around the world, including many in India, have entered into such agreements to gain access to a large number of journals. But the price rise in these bundling schemes seems to have outpaced inflation [2]. These journal bundling deals, while being profitable from the publisher's perspective do not meet the specific needs of the libraries. Therefore to overcome

what is often termed as 'commercialization of scholarly publication' or 'serials crisis' and to communicate the fruits of scholarly literature to a world wide community of researchers and scientists the open access (OA) initiative emerged as a revolutionary movement that promotes free access to scholarly publications over the Internet, removes the price and permission barriers and ensures the widest possible dissemination of research. OA literature and journals are expected to be read more often than those with subscriptions thereby having a higher impact rate. Additionally OA significantly accelerates the publication and use of new research by reducing the time lag between the actual completion of a piece of research and its publication.

2 Open Access

Open Access (OA) was initiated in the developed countries and was marked by three notable declarations known as Budapest Open Access Initiative (BOAI) in 2002, (<http://www.soros.org/openaccess/read.shtml>), Bethesda statement in June 2003 (www.earlham.edu/~peters/fos/bethesda.htm), and the Berlin declaration in October 2003 (<http://www.zim.mpg.de/openaccess-berlin/berlin.declaration.html>) and since then the issue is spreading through the world and many developing countries including India have joined the effort. OA has made significant progress in the area of public policy and support, copyright, publisher alliance and technology standards. Most OA definitions have key features in common i.e. open access exists where there is free, immediate and unrestricted availability of digital content. According to Suber (2006) 'Open access to scientific article 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' [3]. Bjork (2004) defines OA as that a reader of a scientific publication can read it over the Internet, print it out and even further distribute it for non-commercial purposes without any payments or restrictions. At the most the reader is in some cases required to register with the service in question, which for instance can be useful for the service providers in view of the production of readership statistics. The use of the content by third parties for commercial purposes is, however, as a rule prohibited [4]. Thus OA is simply the free online availability of digital contents, scholarly journal articles, research results, which authors publish without expectation of payment and is based on 'an ethical argument that research funded by the public should be available to the public' [5]. OA operates within the legal framework and own the original copyright for their work. Authors can transfer the rights to publishers to post the work on the web or else can retain the rights to post their work on the archives. Open access requires several enabling technologies and metadata interoperability protocols like open source software for establishing and managing digital archives (e.g. dspace, e-prints, Greenstone), open source software for online journal publishing (e.g. OJS system from public knowledge project, University of British Columbia, Canada), metadata schemas and OAI Protocol for Metadata Harvesting (OAI-PMH) which collects the metadata and enables it to be searched.

3. Open Access Mechanisms

There are various mechanisms by which the open access is achieved. Harnard and et. al (2004) identified two main roads to OA 'gold' and 'green'. The gold road refers to OA journals which are openly accessible immediately on publication. The green road refers to OA self archiving. The green road is faster and cheaper, whereas the gold road is more costly, but better maintained and managed [6]. The OA mechanisms can be classified as:

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- Open access periodicals providing complete and unrestricted access to web based OA journals, e.g. journals such as D-lib, PLoS Biology.
 - Domain-specific, subject-specific institutional and digital repositories where the authors or authors institutions or institutions administered by an organization or scholarly society make publications available free online e.g. Arxiv.
 - Limited access i.e. conventional journals that allow open access to certain sections of their issues e.g. Nature.
 - Delayed OA version is another mechanism i.e. periodicals going OA after a specified period of time from the date of publication, e.g. Highwire press journals.
 - Dual mode is subscription based print on paper edition along with OA online edition, e.g. British Medical Journal.
 - State of economy based access is a mechanism where conventional periodicals are made available as OA periodicals to countries based on economic criteria, e.g. HINARI, AGORA.

4. Open Access Models

OA is free for users of scholarly, but it is not free for publishers. It facilitates a few OA operational models such as the author pays model in which publication fee is paid by the author, author's institution or research program. But this model is disliked by the authors and there is a possibility of low quality literature being provided. Another model is external funding i.e. seeking financial support from external sources like private foundations, corporate funds, governmental and institutional grants. For e.g. 10 % of DOAJ journals (<http://www.doaj.org>) are supported totally or partially through external funding. Institutional repositories are often supported by academic or research institutions e.g. the repository ArXiv (<http://arxiv.org/>) is funded by Cornell University and National Science foundation, USA. The third model is fee-based support model, whereby the publishers fund OA project through additional services or products for sale online including advertising, e-commerce, off-line media and software etc. BioMed Central (<http://www.biomedcentral.com>) offers advertising services on its website. This model makes use of the media and technological resources to generate revenues to support OA. The voluntary work is another model where the volunteers with relevant knowledge and expertise contribute to the OA projects without expectation of any monetary rewards. It is supposed to lack rigorous accountability. Finally, personal websites of author publications, which is the most common OA channel today. However it is widely scattered on the web and it is very difficult to search and locate information from them, metadata is seldom assigned and it may not be updated regularly thus lacking quality.

5. Open Access Initiatives in India

In India poor access to international journals and the low visibility of research papers are the major problems facing Indian researchers. O A is viewed as a solution to remedy this. Rajshekar (2003) explained that India's challenge is to reciprocate the information flow and improve access and thereby the impact of Indian research. To meet this challenge and to generate a national R&D resource base, an open access approach in line with the Budapest Open Access Initiative is being promoted [7]. Various Indian R&D organizations, leading scientific research institutions (such as Indian Institute of Science, IITs, ISI, institutes under the CSIR and Indian Council of Medical Research etc.) are now taking part in the open access movement by establishing institutional and digital

repositories to provide worldwide access to their research literature. Several Indian publishers have already adopted the open-access philosophy for the electronic versions of their journals. Unlike some open-access journals in other countries, in which authors pay to publish their papers, Indian open-access journals use government grants and subscriptions to their print version to cover publishing costs [8].

5.1 Institutional Repositories

The first Institutional Repository endeavor to be successfully implemented in India is the e-prints repository of research outputs from the Indian Institute of Science, IISc, Bangalore. The archive is maintained by National Center for Science Information (NCSI) and it supports self-archiving by IISc's scientists of research publications and supports metadata for browsing and searching through subject, year, author, keywords and by the latest addition. E-prints@IISc is well populated with almost 3645 publications which are growing. Not all publications are available for open access, some are for registered users only, and others are linked to publisher's websites. NCSI allows deposits by e-mail with attachments. Another endeavor of IISc, is the e-theses repository ETD@IISc which covers 153 records of theses and dissertations at present, mainly in the area of science and technology. It offers theses templates in both MSWord and Latex. It also has a browse function by guide and by subject which has been customized for local use by NCSI.

Librarian's Digital Library (LDL) at DRTC offers search Digital Libraries (SDL), a selective harvester for archives and e-journals in library and Information sciences. Archives including E-LIS and DLIST can be browsed individually or searched together. It includes about 236 items basically research papers, articles, reports and provides access to papers published in DRTC conference and seminar proceedings.

INFLIBNET, an Inter-University Centre of UGC that serves towards modernization of libraries through a National Network of Libraries in around 264 Universities, Colleges and R & D Institutions across the country created OAI repository Dspace@INFLIBNET for its post prints, preprints, new clippings, CALIBER and PLANNER full text proceedings, training material and other scholarly publications. Repository of INFLIBNET annual reports and IRTPLA (Inflibnet Regional Training Programme on Library Automation) course material is also maintained.

Another subject specific repository of Indian Medlars centre (IMC) caters to the information need of the Indian Medical community is the e-print archive OpenMed@NIC which stores and provides access to biomedical literature. It has value added features such as MESH classification and offers RSS feeds to its users. Another Significant document type repository Vidyanidhi Project of the University of Mysore, is designated to act as a national repository for e-theses providing support to universities which may not have resources to manage their own repositories. Apart from the wider dissemination of research particularly among Indian researchers, the project hopes to improve the quality of theses and to protect duplication of research. There are other repositories from national level institutes and various Management Institutes and IIT's have joined the tally. The Indian repositories are summarized in table 1.

Table 1: Open Access Institutional repositories in India

Repository name	Hosting Institution	No. of rec.	Software	subject
Eprints@IISC http://eprints.iisc.ernet.in	Indian Institute of Science, Bangalore	3645	E-prints	Science & Technology
ETD@IISC http://etd.ncsi.iisc.ernet.in	IIS	153	D-space	Theses & dissertations
Librarians Digital Library-LDL- http://drtc.isibang.ac.in/	DRTC, Bangalore	236	D-space	Library & Information Science
Dspace at INFLIBNET- http://dspace.inflibnet.ac.in	INFLIBNET Centre, Ahmedabad	428	D-space	Library & Information Science
IIA Repository http://prints.iiap.res.in/	Indian Institute of astrophysics, B'lore	725	D-space	Astronomy & astrophysics
Dspace at INSA http://61.16.154.195/dspace	Indian National Science Academy	818	D-space	Member publication, events, images etc.
ISI Library http://library.isibang.ac.in:8080/dspace	Indian Statistical Institute, Bangalore	10	D-space	Mathematics & Statistics
OpenMED@NIC Science http://openmed.nic.in	Indian Medlars Centre, Delhi	1035	E-prints	Health Sci. MESH Classif.
Eprints at NCL http://dspace.ncl.res.in/	National Chemical Laboratory (NCL), Pune	290	D-space	e-theses, chemistry & biological science
Dspace@IIMK http://dspace.iimk.ac.in	Indian Institute of Management, Kozhikode	133	D-space	Management Disciplines
Eprints@IIMK http://eprints.iimk.ac.in	Indian Institute of Management, Kozhikode	25	E-prints	Research papers, Articles etc
NAL Institutional repository http://nal-ir.nal.res.in/	National Aerospace Laboratories	418	E-prints	Aerospace Sciences, NASA Classification
Eprints@IITA http://eprints.iita.ac.in	Indian Institute of Information Technology, Allahabad	22	E-prints	Articles, Reports Conference Reports

Repository name	Hosting Institution	No. of rec.	Software	subject
Dspace at NCRA reports, http://ncra.lib.ncra.tifr.res.in/dspace	National Centre for radio Astrophysics	22	D-space	Proceedings conference proceedings
Dspace@NITR http://dspace.nitrkl.ac.in/dspace/	National Institute of Technology, Rourkela	223	D-space	Engineering, Physical & natural sciences
Repository of RRI http://dspace-rri.res.in/	Regional Research Institute	1064	D-space	Physics and Astronomy
Eprint@IITD http://eprints.iitd.ac.in/dspace	Indian Institute of Technology, Delhi	1296	D-space	Engineering sciences
Vidyanidhi National E-theses Repository http://www.vidyanidhi.org.in	University of Mysore	1835	D-space	Multidisciplinary, Theses, access by Registration (Under Dev.)
Dspace at GBPUAT reports, http://202.141.116.205/dspace	G.B. Pant Univ. of Agriculture and Tech., Pantnagar	82	D-space	Articles, conference proceedings
Digital Repository NIO reports, http://drs.nio.org/drs/dspace	National Institute of Oceanography	55	D-space	Articles, Reports Conference Proceedings

5.2. Open Access Journals

As far as the Journals are concerned there are a few open access journals providers in India. The prominent open access journal initiatives have come various institutes like Indian National Science Academy, Indian Academy of Sciences, Indian Medlars Center, Medknow Publications and other smaller ventures.

Indian National Science Academy (INSA): (<http://www.insa.ac.in>), INSA's project, "Building Digital Resources: Creating Facilities at INSA for hosting S&T Journals Online" has strengthened the open archive movement at the national level. The National Information System for Science & Technology funds the project. It facilitated digitizing S&T journals published by INSA and hosting them on a web server. At present INSA publishes 4 journals including the proceedings of INSA. It launched the OA versions of their journals in December 2003 in PDF format. User registration is required to access the journals. INSA also encourages other professional societies having their own web sites to get a link on INSA's site to facilitate a single point of access.

Indian Academy of Sciences (IAS): (www.ias.ac.in/pubs/journals/) publishes 11 journals in all front-line scientific disciplines which are open access and the full text is available as PDF. Indian Academy of Sciences does not charge authors for publishing their papers. The cost of publishing is met by government funding and subscriptions to their print journals. Current Science, published by the current science association in collaboration with the IAS, has entire back volumes from 1932 and has been online since 1999. Many other journals including the Journal of Chemical science, Sadhana, Pramana, Journal of Biosciences etc. have back volumes online.

Indian Medlars Center of NIC: (<http://medind.nic.in/>) National Informatics Center (NIC) and Indian Council of Medical Research (ICMR) has initiated INDMED @NIC that indexes 77 biomedical peer reviewed journals since 1985. Another recent project MEDIN@NIC (<http://medind.nic.in/>) provides full text contents of 38 biomedical journals which are indexed in IndMED.

Medknow Publications: (<http://www.medknow.com/journals.asp>), a company based in Mumbai, has helped 29 peer-reviewed scholarly biomedical journals, including the Journal of Post Graduate Medicine and Neurology India, make the transition from print to electronic open access. These journals provide immediate free access and do not charge the author or author institutions for publication of the articles. These journals also permit authors self archiving by the online submission of manuscripts through their respective websites. Medknow e-journals offer a professional interface with many value-added advanced linking features. Full text is available in both HTML and PDF. They have adopted the Open URL standard making it easy for libraries to link users from the citation to full text of the article, and DC metadata for easy retrieval linking of eponyms in the text to sources that provide origin of the terminology, linking of scientific names to species databases, citation information and PubMed links from references cited are other enhancements provided. Searching for medical images, multiple journal search and table of contents alerts are offered as options. 15 Medknow journals are archived in the OAI compliant Bioline International e-prints archive hosted at the University of Toronto (<http://bioline.utsc.utoronto.ca>)

There are other isolated efforts from learned societies such as the Indian Statistical Association which provides full text access of its journal Sankhya (<http://sankhya.isical.ac.in/>). The Journal of the Indian Institute of Science is also available online. Indianjournals.com (<http://www.indianjournals.com>) provides access to multidisciplinary journals published by different Indian Societies and Institutions. Another Delhi based publisher Kamla-Raj enterprises (www.krepublishers.com/KRE-New-J/) provide access to 8 social science journals which are OAI compliant. The publication wing of CSIR (Council of Scientific and Industrial Research); NISCAIR (<http://www.niscair.res.in/>) brings out 11 research journals in different S&T disciplines. Though full text is not currently available online, bibliographic information and abstracts can be accessed and searched. In addition, some Indian open-access journals are using international agencies such as JournalServer.org, an online library of academic journals, to gain greater visibility.

6. Indian Open Access Scenario: Progress and Future

Various institutions in India have established open access institutional repositories to disseminate research outputs of their institutions as the technical infrastructure for setting them is now in place with minor costs. This is because there are a number of free open source software applications for setting up the archives. The most widely used software in India is e-prints (www.eprints.org) made

available by the unit of Southampton and Dspace by MIT (www.dspace.org). At present OA to full texts is uneven in Indian repositories and in some cases access is only available on the intranet or by registration. Copyright ownership is a subject that is under intense discussion [9]. Recent growth in India research repositories are covered by ROAR-Registry of Open Access Repositories (<http://archives.eprints.org/>) and (OpenDOAR)-Directory of Open Access Repositories (<http://www.opendoar.org/>). The number of Indian repositories registered in ROAR is 20 at present and India is placed at 8th position in the list of countries with OA repositories registered on ROAR. USA tops the list with 184 repositories, followed by 69 in UK, 63 in Germany, 42 in Brazil, 31 in France, 25 in Australia, 25 in Sweden, 20 in India, 5 in China, 4 in South Africa. Both ROAR and OpenDOAR do not completely represent open access initiatives in India as they depend on voluntary registration. ROAR also includes archives in testing or developmental phase which may not be openly accessible. Though India is placed at the 12th position for overall number of journals among the top 25 publishing countries, its position falls down to 18th for its scientific journals with online content. Surprisingly, its position in the list of open access journals is 5th, well ahead of countries such as the Netherlands, China, Germany, Australia, and so on [10]. No matter the number or quality of OA journals and repositories in India, it has shown a great commitment amongst the developing world.

India has set up some OA operational examples and methodologies for the developing countries. OA movement has made the Indian journals reach the target audience of the world's communities and now more than hundred Indian journals provide free access to full-text contents. For example the Journal of Post Graduate Medicine which has been made open access from Medknow publication, has not only increased the visibility of papers published but there has also been a steady rise in number of submission of articles. The journal is indexed by Abstracting and Indexing services including PubMed, and is OAI compliant through the Bioline International e-prints archive. Statistics showing the number of visitors and downloads can rival some of the better known international medical journals. Moreover the number of citations to articles published in JPGMonline has been increasing every year and so has its projected impact factor [11]. Now even outside submissions from outside India are publishing in JPGM. Some journals have insisted free user's registration (e.g. INSA) whereas some have browsing facilities without user registration (e.g. IMC journals). Another significant development in open access scenario has been the Open Course Ware (OCW) which has gain momentum with the announcement of availability of learning resources on the Internet by two important national level organizations, namely IGNOU and NCERT [12].

There have been efforts to popularize OA archives through various conferences and seminars and workshops in India over the past two years. A special session on OA was held at 93rd Indian Science Congress in January 2006, which came up with the following recommendations for 'Optimal National Open Access Policy' Government of India including DST, DSIR, CSIR, DBT, DoD, DAE, DRDO, ICAR, ICMR, UGC, IITs, IISc and NITs) (<http://inx2.arl.org/lists/SPARC-OAforum/message/2713.html>) expects authors of research papers resulting from publicly-funded research to deposit electronic copies of any research paper into an institutional open access repository immediately upon acceptance for publication. Grant holders are encouraged to publish in OA journals and the grant will cover the publication costs.

Journal indexing services, index metadata, search engine harvest are being experimented. A metadata harvesting service harvests metadata from OAI compliant archives through harvesting software that supports OAI-PMH. Ghosh & Das (2006) mentions a few metadata harvesters installed in various

archives in India such as Search Digital Libraries (SDL) (<http://drtc.isibang.ac.in//sdl/>) of DRTC which harvests library science subject specific open access archives and repositories. The SDL currently has 6816 papers from 13 archives indexed. Knowledge Harvester@INSA (<http://61.16.154.195/harvester/>) harvests metadata from 3 archives and currently has 2011 papers indexed. SJPI Cross Journal search service (<http://144.16.72.144.harvester/>) is a recent initiative from NCSI at the IISc that harvests metadata from 13 Indian OA journals and has currently 1047 papers indexed. IIT, Delhi has initiated a metadata harvesting service called SEED (<http://eprint.iitd.ac.in/seed/>). It currently has 5019 papers from 4 archives indexed. The entire 4 metadata harvester in India use a harvesting system that is PKP Harvester, developed by public Knowledge Project (PKP) from Canada. Informatics has recently launched Open J-Gate OA journal indexing service which covers 3, 000 OA academic, research and industry journals. Out of the 1500 are peer reviewed scholarly journals.

These OA initiatives need to be vastly expanded. The future of the OA movement is to fill up repositories, providing open access to full-text and diversification of content where it does not exist. There is a long term commitment to maintaining repositories with the robust systems having back-up facilities. The expansion of content through an extension of the INDEST consortium is being pursued. IISC is committed to put its entire publication online for its centenary year 2009 [13]. E-journal publishing is also expected to increase. INFLIBNET mandates to improve computer and networking facilities in Indian libraries. Further the DRTC plans to include open access journals in library science [14]. CSIR plan to set up a national digital repository of research literature which include theses and dissertations [15] and various other initiatives are likely to arise in future which is supposed to establish a strong OA scenario in India.

7. Overcoming the Barriers

In spite of various institutions having initiated and set up institutional repositories, the response from the community of authors has been far from encouraging. Although OA has gained popularity in the library profession, it is relatively a new concept among the scholarly communities. Probably there are reasons for this, which need to be addressed if the movement has to grow and succeed.

- Authors have limited familiarity with the concept of OA publishing and surrounding issues and OA policies have little impact on author's decision for submitting papers. There is a misconception that it will be difficult to assess the impact of research if it isn't published in conventional journals. Some unawareness also lies in the fact that the attitude of the journals is changing and renowned journals also permit the authors to archive both preprints and post prints.
- Intellectual property issues continue to dominate the OA landscape. As a result many archives are either in the development stage or on the intranets pending clarification of IPR issues.
- There are copyright violations concerns. Fears to be stolen of the preliminary research ideas might prevent author submissions and there exists the perception that research in smaller institutions may plagiarize the work of the premier institutions
- Barriers to the widespread implementation of IR at universities include a lack of leadership and poor infrastructure. Many universities and research institutions in India lack both computers and high bandwidth Internet connectivity.

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- At present there is not much support for adopting a national approach to e-prints archives in India and distributed repositories are being favored.
 - Lack of expertise and training issues in organizations for the promotion, installation and maintenance of repositories

To a significant extent these problems could be overcome if universities and research organizations are encouraged to develop Institutional repositories with the software and technical support. Well known authors should be targeted to archive their papers which will set good examples in supporting OA. Showing value to authors, convincing them on OA's value and wide applicability and the increased visibility it provides and creating public opinion and mandating deposits by funding agencies such as UGC, CSR, DBT, ICSSR, DAE etc, self-archiving support from top levels of administration and increasing training opportunities among staff by holding workshop and providing education to open access will surely boost the OA landscape in India. Research visibility can be provided by registering repositories with open access registries such as ROAR, Open DOAR and federated services such as OAIster, (<http://Oaister.umdl.umich.edu/o/oaister/>). OAIster is a cross-archive search tool, which facilitates (using OAI-PMH) to search e-print collections in almost 300 institutions worldwide. Further academic and research libraries should be encouraged to join such coalitions as SPARC (The Scholarly publishing and Academic Resources Coalition) that promote OA.

8. Conclusion

A large number of open access developmental projects are underway with the active support of government funding agencies, learned societies and publishers to make the fruits of scientific progress equally available to all. These efforts are to be consolidated and other important Indian organizations and funding agencies which have a strong research base with a large output of science and technology papers can set up institutional archives and provide subscription free journals. Arunachalam (2004) states that as research originating in India often go unnoticed, even by other researchers in India, therefore creating institutional archives and providing open access journals would help to reduce the isolation of our scientists [16]. Raja Simhan (2004) says that OA archiving should be given much higher attention in policy circle so that they would raise the profile of Indian research. Open access to scientific journals is beneficial to scholars and has wide support as a concept, but it needs viable revenue models and great commitment among its promoters. Therefore the emphasis should be primarily on setting up open archives rather than on persuading journal publishers to make their journals open access [17]. While we realize the importance and value of expanding OA to scholarly research, it is equally important to address the many questions that are being raised about the prospects of OA. Its principal strength will continue to derive from technology that enables accessing and sharing distributed resources by the community of scientists [18]. Though the OA concept is still debated and there is no consensus within the scientific community or a proven model, indeed, the benefits of open access to results of research cannot be denied.

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