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Global Access to Indian Research: Indian STM Journals Online

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ABSTRACT

India has a strong research and development base, both in the governmental and private sectors, in science and technology. This has led to an impressive quantity of research publications. But the Indian scientific community has noted with great concern that Indian research findings, especially those reported in Indian journals, are under represented in the global knowledge base. This is of concern not only for India but for other developing nations as well. A global effort is on the way to make scientific information affordable by bypassing the profit-making commercial scientific journal publishers. Internet has created the possibility of establishing alternative models for the dissemination of information. The above problems may be addressed by facilitating free access to scientific information in electronic form to users worldwide. In India, many science, technology, and medical journals are now available online for a global audience through the initiatives of government and private non-profit publishers. The paper outlines these international efforts with special focus on Indian initiatives.

Keywords: Indian research, STM journal, J-stage, self-archiving, open access

1. INTRODUCTION

India has a strong institutional science and technology framework with more than 2,900 research and development (R&D) organisations including many labs in the government and private domains, science agencies in industry, defence, health care, biotechnology, information technology, space, and many other centres of learning. India is now identified as an emerging hub for collaborative and outsourced R&D in drug development, biotechnology, and chemicals[1]. The scientific output of all these agencies is quite substantial with India occupying the 13th rank among the top 146 countries in the world[2]. *Web of Science* indexed around 20,400 Indian publications (2.09 per cent of the world's share) in 2002 of which 5,900 were from 46 Indian S&T journals[3]. But it is of great concern to the Indian scientific community and to developing nations in general, that a great imbalance exist with regard to participation in the global information exchange. The escalating cost of scientific journals has turned into a stumbling block for easy access to current information. The phenomenal changes in digital technology and communication networks have

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blurred geographical and time boundaries and have raised the hopes of the scientific community of developing nations. Internet has had a profound impact on scientific publishing. But there is a wide gap in Internet usage as revealed by the Science & Engineering Indicators. In 2000, Internet penetration rate in North America was 540 times more than in Africa. Recent statistics show that India, with its strong fleet of software developers and IT infrastructure, still has a penetration rate of 3.7 per cent compared to 75.6 per cent in Sweden and 69.5 per cent in the USA[4].

2. RECENT DEVELOPMENTS IN INFORMATION ACCESSIBILITY

The past few years have seen tremendous developments in information production, acquisition, and dissemination. During the period budgetary restrictions in research libraries have led to a period known as the serial cutting era. Data compiled by the Association of Research Libraries (ARL)[5] show that from 1986 to 2001 though the research library spending increased by 210 per cent but the purchase of serial titles decreased by 5 per cent. There were apprehensions also that electronic journals would force small publishers out of business, and mergers and high cost of acquisitions would eliminate the competition. The new millennium has also ushered the concept of virtual library with seamless access to an integrated collection of print, electronic, and multimedia resources regardless of their physical location or ownership. Scientists, policy makers, and reference librarians world over are coming together to introduce reforms to make scientific knowledge affordable. The concept of free access to information in electronic formats is also gaining momentum for the advancement of scientific knowledge. The trend is to liberate scientific publishing from the clutches of commercial profit-making bodies and make it easily available to the generators of the knowledge and rightful users. Leary[6] argued that: "Legislation should be introduced to make results of federally funded research available to public" and thus efforts are afoot around the world to evolve methodologies to bypass commercial publishers. Several international groups are now using the power of Web to disseminate scholarly information free and with minimal barriers of copyright and licensing, while the cost of publication being met out of research grants, rather than subscriptions to scientific journals[7]. Following are some of the approaches that have been widely accepted:

2.1 Open Archives Opportunities—E-print Archive

Open archiving (OA) may be defined as the "deposition of scholarly research papers into network servers accessible over Internet"[8]. OA allows scientists of the developing countries twin advantage of access to front-line high-impact research from developed nations, and visibility of their own research by way of contribution to global knowledge base. One method of OA is the creation of e-print archives. This offers open access to the self-archived refereed research literature online through author/institution. The pioneering and most successful self-archiving model is ArXiv, the e-print archive set-up at Los Alamos National Research Laboratory, New Mexico[9]. It is a full-text physics archive containing 1,40,000 research papers with more than 15 mirror sites around the world. ArXiv has removed the cost barriers and monopoly of priced journals.

2.2 Open Access Journals

With the support and encouragement of advocates of free information of science and technology a large number of free full-text online journals, especially of medical science, are accessible through the Internet. To track down these journals easily, the Directory of Open Access Journals (DOAJ) was created through the efforts of Lars Bjorshauge of the University of Lund, Sweden, in 2003[10]. To dispel the misconception that anything distributed freely over the Web is of low intellectual value, DOAJ has set very high standards in compiling its directory. Currently, the list includes 2,833 journals published by non-commercial agencies such as universities and R&D centres, the largest being Biomed Central with 100 journals.

2.3 Free Medical Journals

The Amedeo group serves the needs of health care professionals by facilitating free full-text online access to a number of high

impact international medical and biomedical journals[11]. The group believes that "access to free scientific knowledge will have a major impact on medical practices and would attract Internet visitors to these journals. Journals that restrict access to their websites will lose popularity". There are around 1,380 journals at this site including many Indian medical journals, with a wide range of policies for permitting free online access after the print version of the journals has been published. For many journals the access is permitted from six months to three years after print publication.

2.4 J-STAGE

With a view to disseminate outstanding R&D results electronically and instantaneously to the global scientific community, the Japan Science and Technology Corporation (JST) developed J-STAGE[12] to computerise the bulletins of academic societies, and current printed publications of member organisations. It has set-up the necessary hardware and software for electronic release of journals via Internet. J-STAGE includes full-text and partially full-text of electronic journals, proceedings, and reports from Japanese scientific societies in the fields of biology, chemistry, engineering, medicine, physics, science, and zoology.

2.5 Highwire Press

Highwire Press at Stanford University is the largest and fastest growing full-text archive of journals in the field of life and medical sciences. These journals offer free online access to developing countries. Each journal has its own policy regarding availability of free access to the online version after publication of the printed journal. Highwire Press makes many high impact titles available to the scientific communities of developing nations[13].

3. INDIAN INITIATIVES

Citation studies have shown the alarming fact that research published in Indian sources is poorly cited compared to research published in international journals. Low accessibility and circulation rates lead to obscurity of the research communicated in the Indian journals. This ultimately translates into failure to attract international funding and collaboration. Rajshekhar (2003) has explained that India's challenge is to reciprocate the information flow and improve access and thereby the impact of Indian research[14]. To meet this challenge and to generate a national R&D resource base, an OA approach in line with the Budapest Open Access Initiative is being promoted. To provide free access to scholarly journal/literature, the initiative has recommended the complementary strategies of self-archiving and OA journals[15].

4. SELF-ARCHIVING

Researchers and scholars need tools and assistance in order to upload their refereed articles in open electronic archives, a practice commonly called self-archiving. This is to lift these research communications from obscurity. A model has been proposed to set-up interoperable institutional digital research repositories. By self-archiving and by adopting the interoperability framework, these institutional repositories (IR) can make themselves available on Internet.

The first successful endeavor in this area is e-Prints, an IR of research output from the premier Indian research institute, the Indian Institute of Science (IISc), Bangalore[16]. The archive is maintained by the National Centre for Science Information (NCSI) and supports self-archiving various file formats (PDF, MS Word, HTML, etc.). E-Prints facilitates seamless access and international visibility. India, with its large R&D base of federally funded organisations, has a great potential for OA publishing[14]. This activity has now been initiated in other institutions also. Presently there are about 20 institutional archives including that of Council of Scientific & Industrial Research (CSIR) laboratories.

5. OPEN ACCESS JOURNALS

A number of Indian publishers are taking advantage of the improved communication networks and technologies to initiate an OA policy for their journals. These initiatives are happening as isolated efforts by both societies and private publishers. Some of these are:

5.1 Indian Academy of Sciences (http://www.ias.ac.in)

The learned scientific society with its aim of promoting progress and upholding the cause of science in pure and applied branches is publishing 11 journals in all front-line scientific disciplines. The academy has taken the lead in India in providing OA to Indian research by making available the electronic versions of its journals over Internet. It feels that OA to research literature achieves a quick impact and makes quality articles much more visible. Unlike the OA journals of some of international publishers, the Academy does not charge authors for publishing their papers, and unlike Biomed Central (where authors pay article processing charges) the cost of publishing is met by government funding and subscriptions to their print journals.

5.2 Indian National Science Academy (http://www.insa.ac.in)

In order to strengthen the open archive movement at the national level, the Indian National Science Academy (INSA) proposed a project, Building Digital Resources: Creating Facilities at INSA for hosting S&T journals online. The National Information System for Science & Technology funds the project; it facilitated digitising S&T journals published by INSA and hosting them on a web server. INSA wishes to promote a cadre of OA experts in Indian higher educational institutions and federally funded laboratories. It also encourages other professional societies having their own websites to get a link on INSA's site to facilitate a single-point access.

5.3 BioLine International (http://www.bioline.org.br)

It is an OA repository and is a collaborative initiative of scientists and librarians of the University of Toronto Libraries, Canada, Brazil, and BioLine, UK. It is a non-profit electronic publishing service committed to providing OA to quality bioscience research published in developing countries.

It makes available published information from peer-reviewed journals from Brazil, Cuba, India, Indonesia, Kenya, South Africa, Uganda, and Zimbabwe via Internet.

5.4 Indian Medlars Centre (http://indmed.nic.in/)

This is an initiative by the National Informatics Centre (NIC) and Indian Council of Medical Research (ICMR), two government of India agencies. NIC has developed indMED, a bibliographic database of peer-reviewed Indian biomedical journals. MedIND is a full-text archive of 28 peer-reviewed Indian biomedical journals indexed in indMED.

NIC also has an OA international archive (OpenMED@NIC) for medical and allied sciences,. Authors/owners can archive their peer-reviewed documents like pre-prints, refereed journal papers and accepted theses on the site.

5.5 NISCAIR Journals

This is an effort by the government-funded Council of Scientific and Industrial Research (CSIR). The publication wing of CSIR, NISCAIR, brings out 16 research journals in different S&T disciplines. Though full text is not currently available online, bibliographic information and abstracts can be accessed and searched. There are other isolated efforts from learned societies such as the Indian Statistical Association which provides full text access to its journal *Sankhya* (http://sankhya.isical.ac.in).

6. CONCLUSION

Within India a wide gap exists between haves and have-nots, and the urban/rural divide. A large number of developmental projects are underway to strengthen the infrastructure backbone of the country to make the fruits of scientific progress equally available to all. This will also ensure that the scientific knowledge need no longer be confined to economically strong institutions or regions as electronic dissemination replaces physical format. The open archives and open access initiatives in India are sporadic efforts which have a long way to go and needs consolidation. Though scientists have some apprehensions regarding copyright issues and clear

understanding of OA, still it is heartening to see that Indian scientific community with the active participation of governmental funding agencies, learned societies, and publishers, has taken a step in the right direction.

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Dr G Lalitha Kumari has a doctorate in Life Sciences from Panjab University, Chandigarh. She joined Indian Institute of Chemical Biology, Calcutta as Information Scientist and later shifted to Indian Institute of Chemical Technology, Hyderabad. Her areas of interest include scientomeric analysis and science policy studies. She has around 40 publications in these area and presented papers in National and International conferences..

Appendix 1

Publisher/Promoter	Content	Web Address
Los Alamos National Research Laboratory, Nw Mexico	Full-text physics archive (140,000 research articles	http://arxiv.org
University of Lund, Sweden Directory of Open Access Journals	2,833 STM journals	http://www.doaj.org
Amedeo Group	1,380 medical and biomedical journals	http://www.freemedicaljournals.com
J-STAGE	Contributions of Japanese scientific societies from e-journals, proceedings, and reports	http://www.jstage.jst.go.jp
Highwire Press	787 full-text life sciences and medical research journals	http://highwire.stanford.edu

Appendix 2

Publisher/Promoter	Content	Web Address
Indian Institute of Science (IISc) Bangalore	Repository of IISc Publications	http://eprints.iisc.ernet.in
Indian Academy of Sciences, Bangalore	Full-text of 11 journals in all disciplines of science & technology	http://www.ias.ac.in
Indian National Science Academy, New Delhi	4 S&T journals	http://www.insa.ac.in
Collaboration of University of Toronto Libraries, Canada, Brazil and Bioline, UK.	15 medical and bioscience journals	http://www.bioline.org.br
Indian Medlars Centre-Combined efforts of National Informatics Centre(NIC) and ICMR	Bibliographic Database of prominent Indian biomedical Journals.	http://indmed.nic.in/
Same as above	Full text of 38 biomedical journals	http://medind.nic.in/
National Informatics Centre(NIC)	International archive for Medical and Allied Sciences	http://openmed.nic.in/
National Institute of Science Communication and Information Resources (NISCAIR), CSIR	16 research journals (bibliographic only)	http://www.niscair.res.in/ScienceCommunication/ResearchJournals/rejour/rejour1.htm
Indian Statistical Association Sankhya	An Indian journal of statistics	http://sankhya.isical.ac.in