DESIDOC Journal of Library and Information Technology, Vol. 28, No. 1, January 2008, pp. 41-48

Open Access to Publicly Funded Research Information: the race is on

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ABSTRACT

Without access to current international research information and without the ability to contribute national research findings, researchers in the developing countries have struggled to make an impact and to develop a strong and independent national science infrastructure. The cost of journals has continued to rise and the situation within this conventional access structure continues to deteriorate. However, a window of opportunity has opened wide since the establishment of the open access (OA) movement. The paper outlines the problems facing scholarly communication in developing countries and describes ways in which OA can provide a solution. The progress in developing countries regarding adoption of OA is discussed in detail focusing on various parameters. The current status shows that developing countries are beginning to recognise the value to their academic communities and to their national economies of free access to published research articles.

Keywords: Open access, developing countries, BOAI, IRs, DOAJ

1. INTRODUCTION

There is a growing recognition that to solve the world's problems such as climate change, environmental stability and conservation, agricultural sustainability, infectious diseases, or HIV/AIDS, research carried out in the developing nations needs to be part of the global knowledge base. Yet, without access to current international research information and without the ability to contribute national research findings, researchers in the developing countries have struggled to make an impact and to develop a strong and independent national science infrastructure. Without this, the economy of a country will remain reliant on others, dependent on their priorities, and defenceless against possible exploitation.

A survey[1] carried out by the World Health Organisation in 2003 quantified this problem. It showed that the medical institutes in the poorest countries, those located in the 75 countries with GNP/capita/yr less than $1000, 56 per cent had not subscribed to any journals over the last five years. The situation of the countries with GNP/capita/yr of $1000-3000, was little better. In this group, 34 per cent had not subscribed to any journals and a further 34 per cent had an average of two

subscriptions/year. It is difficult to see how these organisations could develop any kind of research vigour under such circumstances. Since 2003, the cost of journals has continued to rise and the situation within this conventional access structure must be further deteriorating.

2. OPEN ACCESS

A window of opportunity has opened with the establishment of the OA movement and the recommendations of the Budapest Open Access Initiative[2]. Throughout the world, international academic communities are steadily developing improved mechanisms for the exchange of research publications and data. Both the establishment of interoperable institutional repositories (IRs), which hold the research output of an organisation, and new OA journals promise to reform the existing system and provide equality of access regardless of ability to pay.

This is an unprecedented opportunity for developing countries to both access research publications they have been unable to afford in the past, and to ensure the incorporation of their own research output into the global knowledge base.

Funding organisations, institutes, universities and information specialists are working in all parts of the world to take advantage of the new opportunities offered by the World Wide Web. About 1000 IRs are already registered in the Registry of OA Repositories[3], and some 850 OA journals are listed in the Directory of Open Access Journals[4]. Of these, some 20 per cent of OA journals are published in developing countries and about 16 per cent of IRs have been established in these regions. Research information from these resources is now free for all to use, to copy, and to build on.

At the same time, governments, institutes, and universities as well as funding bodies are asking their fundees and employees to ensure that the research arising from their support is made as widely known as possible in order to make the greatest public impact. Research organisations are noting that the wealth of research output from organisations around the world with established IRs are attracting better academic recognition and more funding. They wish to see the maximum benefit, both intellectual and economic, from their investment and are now recognising that OA will provide the greatest visibility and impact[5].

Though this requirement has been broadly agreed in principle, until recently it has seldom been enforced. It has been assumed that academic authors will wish to make their published results as widely known as possible. While authors acknowledge this, experience has shown that they are engaged more in their next research project than in taking action to promote their publications by archiving in their institute's repository, even though depositing papers takes only a few minutes, once familiarisation with the process has been made.

Studies made by Key Perspectives[6] show that when authors are asked if they would willingly archive their publications if asked by their institutes to do so, over 80 per cent agree that they would comply (see Fig. 5 at page No. 22).

Encouraged by these findings and the urge to showcase their institute's or country's research strength, a growing number of organisations have issued mandates requiring authors to archive publications arising from their support in order to gain maximum exposure and to ensure others build on the work they have financed. A list of these mandates, as at September 2007, is cited at Roarmap[7] and is summarised below:

Funder mandates: 17 (Australia 2, Belgium 1, Canada 1, EU 1, and UK 12).

Institute mandates: 12 (Australia 2, Belgium 1, India 2, Portugal 1, Russia 1, Switzerland 2, Turkey 1, and UK 2).

Departmental mandates: 3 (Australia 1, France 1, and UK 1).

Proposed mandates: 7 (including NIH mandate, approved by House of Representatives, still to be ratified by Senate).

The list includes six of the seven UK Research Councils, the Wellcome Trust, the European Research Council and many other significant organisations. A list of academic organisations supporting OA to publicly-funded research findings, but who may yet be considering the development of a mandate, can be found from the OA petition sponsored at the start of 2007 by major scholarly European organisations (DEff, SURF, JISC, SPARC), and signed by about 26,500 individuals and nearly 1300 academic organisations is available at http://www.ec-petition.eu/index.php? p= signatories&show_institute=1/.

3. PROGRESS IN DEVELOPING COUNTRIES

Developing countries have begun to recognise the value of free OA to published articles, and the numbers of OA journals and IRs is increasing steadily. However, this growth, particularly in the establishment of low-cost IRs does not yet reflect the awareness-raising efforts being carried out in some regions. In spite of the publication of many papers by OA advocates, and presentations at conferences and meetings, institutes are still delaying the establishment and filling of IRs. It is important to understand the reasons for this.

It may be because policy makers think it is a high-cost and difficult activity. But those that have already established IRs report that they have used existing resources, or at most needed to pay for some extra staffing. Furthermore, online help is available to set-up a repository and the software and online support are free of cost. So it cannot be the cost that is delaying OA in some countries.

It is perhaps the fear that it is against publishers' policies to allow the archiving of the author's final version of a published paper? But over 60 per cent of publishers agree to authors archiving their final accepted papers, though sometimes with a restricted access period of a few months (SHERPA Romeo database of publishers' policies)[8]. If there are uncertainties about this, institutes can require immediate deposit by authors into their IRs, setting OA to take account of any embargo period that some publishers may require. The IR software allows depositors to insert the date of the end of any embargo period at the time of deposit, and the article is automatically converted to full OA after that date. Even during an embargo period, interested readers may request an e-mailed copy of the article by clicking a 'Request Copy' button on the abstract, the activation of which sends an e-mail copy immediately on receiving the author's agreement to do so. Creative Commons and OA licenses are now being adopted more widely by authors so that the whole issue of ownership is changing.

4. USAGE OF OA RESOURCES BY DEVELOPING COUNTRIES

4.1 Usage of OA Journals published by Developing Countries

Usage statistics from Bioline International[9], a non-profit Brazil/Canada service that distributes some 60 journals published in developing countries on an OA basis, show very high usage of OA journals by both developing and developed countries (Table 1), reflecting both an interest and a need for the information from these regions. In 2006, 2.5 million requests for full-text papers were made to Bioline International. Figure 1, a Geo Map overlay, shows the extent of usage [of OA] by developing countries. Statistics from the MedKnow Publications[10] service, Mumbai, India, which

Table 1. Usage of the Brazil/Canada Bioline system since 2002

Year	Total hits (Adjusted)	TOC	Articles titles	Abstract requests	Full-text requests	Journal info requests	Search results
2002	224137		44548	105189	26961	7682	
2003	445679		116364	149211	45944	26315	
2004	854467		121546	288548	157809	33895	
2005	2723472	46859	86097	434935	1100615	34204	33637
2006	5749179	75537	162622	1097370	2496511	79334	66318

provides publication support for journals from India and other developing countries, show an increase in monthly visits and download of articles from its *Journal of Postgraduate Medicine (JPGM)* (Figs. 2 & 3) since providing open access.

Figure 4 shows increased submissions from Indian and non-Indian authors to MedKnow journals after they became OA. Figure 5 demonstrates the gradual increase of the impact factor of MedKnow's *JPGM* journal.

Figure 6 shows an increase in the number of subscriptions to MedKnow journals since becoming OA. It is clear from these statistics, and similar figures from the Scientific Electronic Library Online (SciELO)[11] service which distributes journals published in Latin America and Caribbean regions, that OA greatly increases usage of the journals, which benefit in terms of quality and impact.

4.2 Usage of Material Archived in IRs

Statistics for the usage of material archived in IRs are only just becoming available, but it is clear from the information provided by some of the IRs, that developing countries are commonly downloading full-text articles. China and India are listed among the most frequent users after the USA and the UK, with Brazil, South Africa and Malaysia also rated within the top 15 countries. Most other developing countries are also using the IRs though to a lesser extent. The usage facility

Figure 1. Geo Map showing significant usage by developing countries.

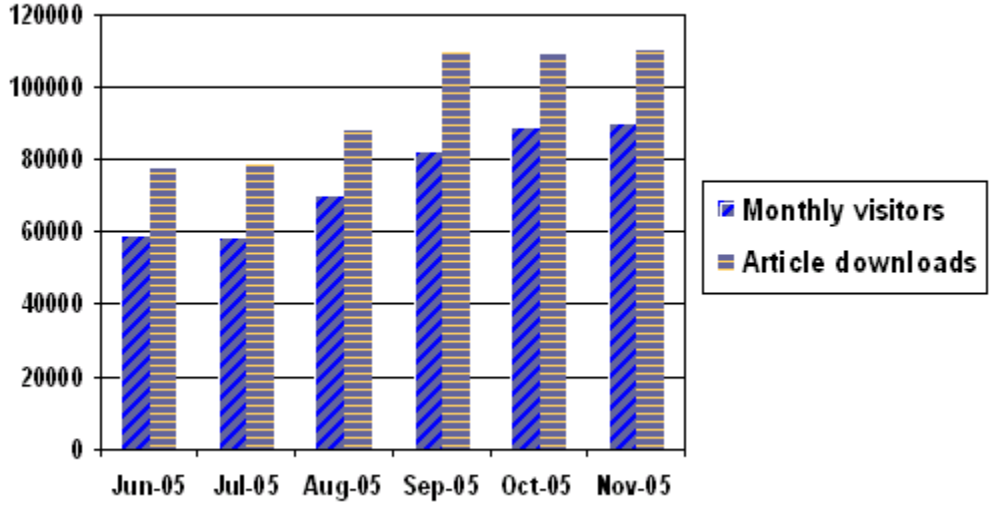

Figure 2. Usage of JPGM.

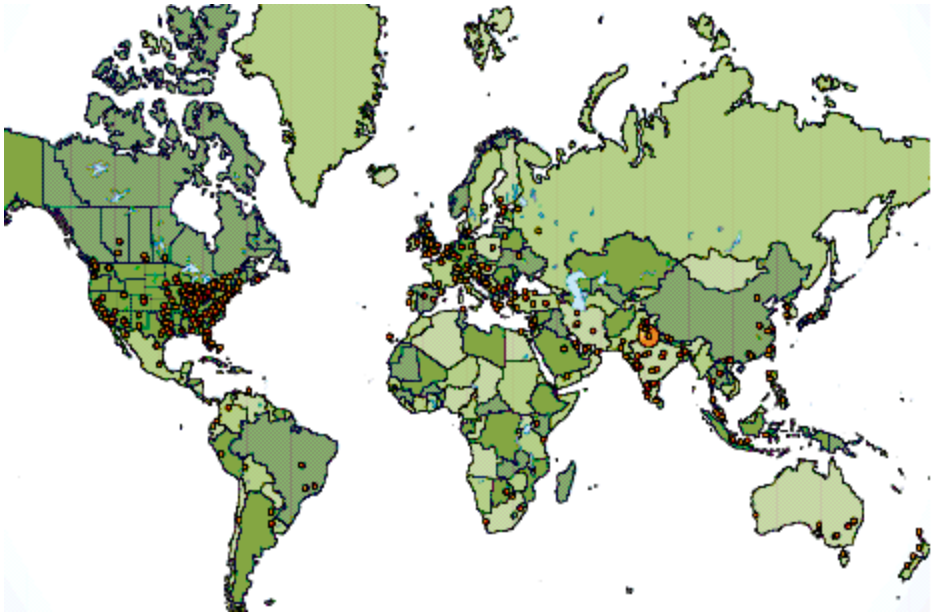

Figure 3. Geo Map of usage of the JPGM, showing global interest.

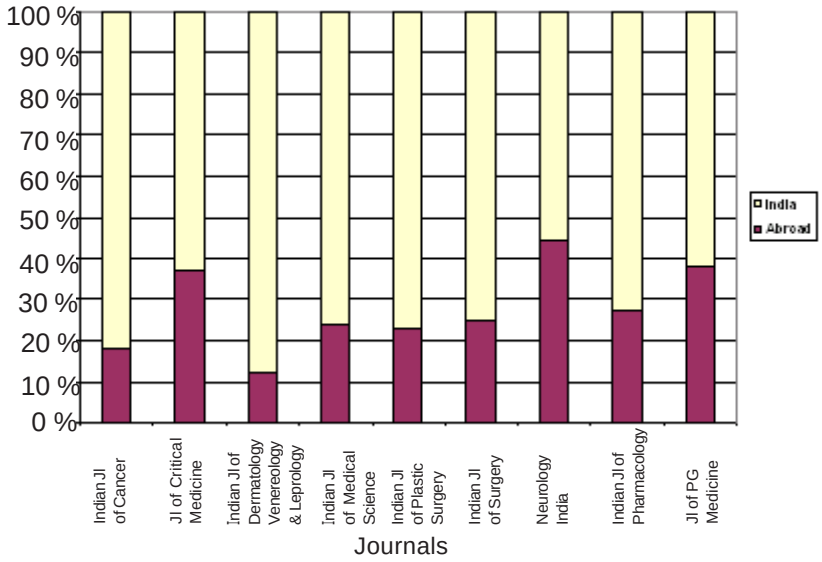

Figure 4. Submissions from Indian and non-Indian authors to nine MedKnow journals.

associated with a number of IRs also lists the most read articles for separate countries, providing an interesting insight about the information most frequently sought by researchers.

4.3 IRs Infrastructure Support

Meanwhile, as the numbers of IRs increase, regional infrastructure projects and support services are underway. For example, in Europe, the EU has funded the DRIVER programme[8] to support and coordinate EU IRs, and in Australia and the UK other support programmes are underway. In Brazil, the IBICT teams are developing a toolbox of software, instruction manuals, links and other infrastructure mechanisms to establish IRs in institutes in Latin America and the Caribbean. Debate has moved on from 'whether' to 'how', and research is being supported to develop improved search programs and analysis tools.

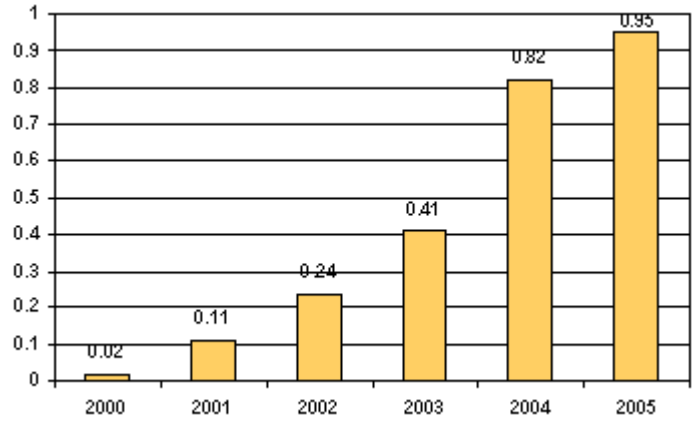

Figure 5. Increased impact factor of JPGM.

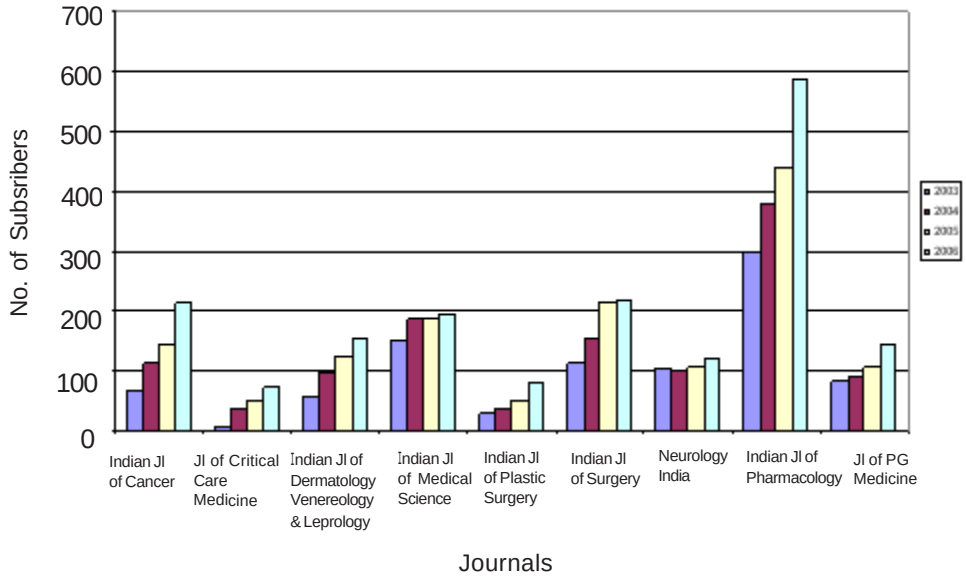

Figure 6. Increased subscriptions to MedKnow journals since becoming OA.

The statistics above show that both OA journals and IRs are receiving significant usage, and the 'most aware' countries such as India are using this access route to essential research information almost as much as developed countries.

5. CONCLUSION

The adoption of OA by prestigious organisations and Nobel laureates has not been enough to persuade immediate global acceptance by all. Certainly, there are large swathes of unawareness about the reality of OA, and not only in the developing regions. So there is an on-going need for focused advocacy, articles, lectures, blogs, workshops, and technology transfer about OA.

OA is trying to reform a well-established professional practice that happens to be past its sell-by date. As the World Wide Web and global communications are revolutionising every aspect of people's lives, it will take some time for human nature to adapt and accept new mechanisms. In addition to natural caution, academic communities need to assess inaccurate information being dispersed by sections of the commercial publishing industry. The recent appointment of high-paid consultants and the establishment of commercial lobbying organisations have lead to the use of inappropriate language and arguments to try to unhinge the OA movement.

This is sad, as the wisest publishers understand that the establishment of OA journals can be economic (as MedKnow Publications is demonstrating—covering costs and increasing subscriptions to printed copies without charging authors to publish—and as BioMedCentral and HINDAWI are also showing, using different business models). Further, there is evidence that IRs currently hold no threat to the future of printed journals—the long-established *ArXive* repository has existed in harmony with physics journals for over a decade, with no apparent loss of subscriptions; indeed two major physics journal publishers mirror the *ArXive* site. The American Society of Cell Biology has seen no loss in subscriptions since converting to OA some six years ago. The gloomy forecasts of the demise of the serials publishing industry are currently conjecture and not substantiated by evidence.

Even if there should be a rocky transition from the traditional to the digital distribution of research publications and associated data, the enormous benefits to the planet greatly outweigh any difficulties that entrenched members of the publishing industry may face. The benefits from OA are not only academic (accelerated research), but economic, as access to the information necessary for the progress of improved health, agriculture, environmental protection and engineering developments will lead inevitably to significant economic growth. Furthermore, it is now better recognised by development agencies that if the research output generated in regions experiencing major health and environmental problems is missing from the global knowledge pool, then research information on which development programmes are based is incomplete, and inappropriate programmes may be set-up.

So the race is on! Which country will be the first to establish a national OA policy (of the kind agreed at a Bangalore workshop, attended by participants from China, India, Brazil and South Africa in 2006[12])? The transition to OA is unstoppable. Just as it is impossible to think of a world without Ipods, mobile phones or satellite communication, the free exchange of research information will never return to pre-OA mechanisms and the inequalities it brought.

I hope this issue of *DESIDOC Journal of Library and Information Technology* will help resolve remaining uncertainties, provide encouraging statistics about progress in OA, and accelerate the adoption of institutional mandates and national policies. Perhaps, as someone recently said, we need a pandemic to focus our minds on the urgent need for free, rapid, reliable exchange of research information. I do not see any hope of reaching some of the Millennium Development Goals (to eradicate extreme poverty and hunger, improve maternal health and reduce child mortality, combat HIV/AIDS, malaria and other diseases, ensure environmental stability) without global sharing of research information.

ACKNOWLEDGEMENTS

The author is greatly indebted to statistics provided by the MedKnow and Bioline International services and the helpful comments by EPT trustee, Subbiah Arunachalam.

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About the Author

Dr Barbara Kirsop was the founder of Bioline Publications (now Bioline International and managed at the University of Toronto) and is the secretary and co-founder of the Electronic Publishing Trust for Development (EPT), UK, which supports the electronic distribution of scientific information generated in developing countries. She began her career as a microbiologist, was President of the World Federation for Culture Collections, and Executive Director of the Microbial Strain Data Network. Her interest in electronic publishing grew from her concern at the difficulties experienced by scientists in the developing world in gaining access to scientific literature and in making widely known research from their own countries.