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Improving access to research literature in developing countries: challenges and opportunities provided by Open Access

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Abstract:

The Open Access movement has grown from pockets of regional initiatives to an increasingly coordinated world wide movement, facilitated by common technical standards and open source software. While debates on open access have focused on the so-called "serial crisis" and copyright issues, relatively little attention has been paid to the myriads of benefits OA provide, particularly to researchers in the developing countries. In this paper, we highlight important developments and experimentations in knowledge sharing enabled by different modes of open access, and point to collaborative and sustainable models that will be highly beneficial to research institutions in the developing world in the long term. The recommendations in this

paper will have important implications for library and information professionals working in resource poor countries.

Outline:

1.0 Introduction

The importance of access to the world's research information is indisputable, leading as it does to scientific (would it be better to use 'scholarly' instead of 'scientific'? More general) progress and economic strength. The well-publicised 'journals crisis' is a reality that must be addressed if the information poverty currently experienced in the developing world – where it is needed most - is to be resolved and a level playing field achieved for all. Open Access to essential scientific and technical knowledge is now a practicable option and the availability of interoperable networking software a reality. This paper describes the current status of scientific publication in the developing world and how open access can transform the research scene from one of isolation and inadequacy to one of inclusion and international cooperation.

In this context, it is fitting to start with The Budapest Open Access Initiative (BOAI)[1], which recommends a two-pronged approach to achieving open access:

1. Self-archiving, the practice of depositing eprints (published papers and preprints) into open electronic archives—preferably ones set up by research and higher education institutions. *Eprint archives* and *institutional repositories* are common terms that are used to refer to Open Access Archives.
2. Open access journals, which do not charge for subscription or access fees, but instead rely on other methods for covering the publishing expenses.

In this paper, we have focused primarily on the Open Access Archiving (OAA) route, since this is relatively inexpensive, easy to set up, and can have the greatest immediate impact on science and development. Emphasis is placed on access to the refereed, published academic wealth that is currently outside the reach of most of the world's academic community.

1.0 Science and technology in developing countries – the current status

Developing nations today face many major problems. Jawaharlal Nehru, India's first prime minister, said, 'It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy…. Who indeed can ignore science today? We need it at every turn'. Indeed, it has long been recognized by international agencies such as the UNESCO (UNESCO 1982) that "assimilation of scientific and technological information is an essential precondition

for progress in developing countries." To alleviate these difficulties, access to the world's collective knowledge, primarily in agriculture, medicine and technology, are essential in order to create the strong social, economic, and technical infrastructures crucial to the development process.

However, the capacity to absorb scientific and technical knowledge is often weak in developing countries, leading to low levels of scientific output and further under-development. Science in the less advanced countries are characterized by weak institutional infrastructures, poor funding, the absence of a critical mass of scientists to form a viable research community, the consequent isolation and insularity of a research community against which ideas can be exchanged, leading to a poor contribution to the world's knowledge pool. It follows that new knowledge is largely created in the richer countries, where spending on research and development are highest.

In a recent study of the comparative performance of the world's major science producing countries, King (King 2004) found that researchers in eight countries – led by the United States, the United Kingdom, Germany and Japan – produce almost 85 percent of the world's most cited publications, while another 163 countries, mostly developing countries, account for less than 2.5 percent. An example of this highly uneven output is that only 10 per cent of the global health research is undertaken in the developing world (Research 2003) and only 2 per cent of the 3000 journals indexed on Medline are from developing countries (Smith 2002). To put this in another way, 80% of the world's population contributes 13% of the 140,000 titles listed in Ulrich's Directory of Scientific Serials.

In efforts to contribute scientifically the developing countries need access to essential global research findings. However, researchers in these regions often have little or no access to the published research literature due to the high cost of journal subscriptions and inadequate and expensive distribution mechanisms (Arunachalam 2000; Arunachalam 2003). According to a recent survey conducted by the World Health Organization (WHO), of the 75 countries with a GNP per capita per year of less than USD $1000, 56% of medical institutions have had no subscriptions to journals over the last five years; of countries with a GNP between USD $1 - 3000, 34% have had no subscriptions and a further 34% have an average of 2 subscriptions per year (Aronson 2003). Under these circumstances it is clear that progress in science and development in low-income countries can be made only with very great difficulty. As long as this asymmetry in research output and access to up-to-date information remains, research scientists in the developing world will remain isolated and their research will continue to have little impact.

While it is easy to imagine the consequences of the information famine on the scientific community in the countries so affected, it is seldom recognised that the international scientific community is similarly impoverished. Without the input of knowledge from the disadvantaged regions, development initiatives may suffer from inappropriate programs. An example of this can be seen in the case of tuberculosis. It is now known that the *Mycobacterium tuberculosis* isolates from India show different copies of certain sequences (IS6110 and H37Rv) from isolates taken in the west, and different again from those isolated in China, so that BCG vaccines developed in the west have reduced efficiency. Similarly, it has been shown that in diabetes, what works in the UK may not work in India (Arunachalam and Gunasekaran 2002) and vice versa, as environmental and genetic factors have been shown to play a part.

However, to increase the visibility of research from the less advanced countries is difficult. Publication in mainstream journals faces the problems of over-subscription and recorded prejudice against submissions from developing country scientists (Cetto 2000); local journals

struggle to survive and have very poor visibility due to the high costs of publication and distribution. Few 'local' journals are indexed by Science Citation Index, and those that are have low impact factors (Coura and Willcox 2003), so that scientists in developing countries are understandably reluctant to publish locally. Until the imbalance in access and distribution of scholarly literature is redressed, science in the developing world will continue to lag behind and since global outbreaks of infectious diseases and climate catastrophes are currently increasing, societies in the developed world too will continue to be affected adversely.

The advent of electronic publishing over the Internet has provided an opportunity to improve distribution of research from developing countries. For example, Bioline International – a Brazil/Canada initiative to raise the visibility of developing country journals – distributes over 30 bioscience journals without charge to the publishers; a search on the web site (http://www.bioline.org.br) for 'malaria', for example, demonstrates the wealth of local knowledge of international importance that is mostly missing (Sahu and Chan 2004).

3.0 Open Access Archiving

The advent of Information and Communications Technologies (ICTs), and in particular the WWW, holds great promise for more equitable distribution of scientific knowledge and the ideal of a global knowledge commons is no longer seen as an unattainable goal (Global Knowledge Partnership 1997[2]). Important global initiatives such as the World Summit on the Information Society (WSIS) are looking to advances in ICT to bridge the knowledge divide and to achieve the Millennium Development Goals[3]. At the same time, the Declaration of the WSIS[4] calls for government, private business and non-government agencies to work together towards a more inclusive information society. This has been followed through in current proposals to the draft WIPO development programme, which has been proposed by two member states and now accepted by other states, and which says, 'In order to tap into the development potential offered by the digital environment, it is important to bear in mind the relevance of open access models for the promotion of innovation and creativity'[5]

Within this wider context, no other development is being so hotly debated as that of the Budapest Open Access Initiative (BOAI), which is based on the principle that scientific and technical information, largely publicly funded, is a global public good that should be freely available for the benefit of all (Alberts 2002). The scientific publishing environment has evolved into a system whereby journals are now a high-priced commodity that few can any longer afford, and so is contrary to the ethos of the BOAI. The user community is therefore much engaged with the development of mechanisms that will allow fair and free access to the global library of scientific knowledge.

One of the developments already in progress, and of immense potential benefit to developing countries, is the establishment of open access archives, the first of the BOAI options.

3.1 What are Open Access Archives?

Open access archives (OAAs) are electronic repositories of submitted material that may include already-published articles (post-prints), pre-published articles (pre-prints), theses, manuals, teaching material or any other material that the authors or their institutes wish to make publicly available without financial or technical barrier. Such archives may be based on an institute's output, or may be discipline-based or regionally-based. We focus on the already refereed and published scientific output, since it is this that forms the primary basis for future scientific development.

All OAAs may be configured to be globally interoperable through the use of a protocol that has been internationally defined by the Open Archive Initiative (http://www.oai.org) and is known as the OAI Protocol for Metadata Harvesting (tutorial on OAMPH (http://www.oaforum.org/tutorial). All such archives are searchable seamlessly through searching programs such as OAIster (www.**oaister**.org), Google etc. The consequence of this is that the precise geographical location of a paper submitted to an OAI-compliant archive has no affect on the ability of search engines to find it. As of April 1, 2005, OAIster harvests some 5 million records from 458 institutes. Although this shows the power of the searching programme, these figures include much besides scientific published papers. These are tagged and can readily be recovered using appropriate keywords. This is clearly of great benefit to authors in developing countries, since institutions in these regions with compliant open archive servers become part of the international community and their published research part of the global library of science.

The technical infrastructure for setting up institutional archives is now in place and the costs are minor. This is because there are a number of free open source software applications for setting up the archives. The best-known and most widely used software are Eprints (www.eprints.org) made available by the University of Southampton and DSpace by MIT (www.dspace.org). Other applications with varying functionality are also freely available (see the Guide to Institutional Repository Software produced by the Open Society Institute (http://www.soros.org/openaccess/software/).

Typical costs for setting up an institutional archive will need to cover those for a server (if one is not already available), computer staff time in a) setting up the archive and b) administering it, c) library or other staff time in formatting and submitting documents. Precise costs will depend on what staff time is already available and can be diverted to the process and how papers will routinely be prepared and submitted. Time required for document conversion and submission will depend on the numbers of documents to be processed and whether authors will do this themselves or whether libraries or computer departments will provide a centralised service. Overall costs are likely to be low and will be more than repaid by increased visibility of the research output of the institute and substantial savings in subscriptions.

The establishment of OAAs holding copies of already-published papers requires the agreement of the original publishers. Currently, 90% of some 9000 surveyed publishers (including the major S&T publishers) have agreed that their authors may archive copies of their published papers in their institutional archives. A directory of the policies of publishers towards this process is available from http://romeo.eprints.org. The remaining 10% may not yet have been approached. An argument that has sometimes been made is that OAAs may damage the publishing industry, but the experience in physics over some 11 years shows that the parallel existence of conventionally published journals and open access archives does not damage the subscription level to the journals (see study by Alma Swan on http://www.eprints.org/jan2005/ppts/swan.ppt).

3.2 The benefits of OAAs

The benefits of OAA to researchers and scientific organisations in developing countries is incalculable. Among the advantages are the following:

(i) Institutional access to international research output. Research that is currently inaccessible because of financial barriers becomes globally accessible. As more and more international institutes establish archives, a growing corpus of published research becomes available.
(ii) International access to research generated in developing countries.

Scientists in developing countries are under pressure to publish in foreign or "international" journals with a notable "impact factor" (as measured by ISI's Science Citation Index) if they wish to be recognized within and outside their own countries (Adomi and Mordi 2003). However, as few "local" journals are indexed by Science Citation Index scientists in developing countries often do not publish in journals from their own countries. As articles published in overseas journals are often inaccessible to other scientists in developing countries due to high access costs, many publications by developing country scientists remain invisible to their home institutions or fellow scientists. The result is that it is difficult for institutions and granting agencies in developing countries to take stock of their research output (Arunachalam 2004). Open access archives would be especially valuable to transitional economies such as Brazil, China and India, which have been investing substantially in scientific research in the last decade. These countries have seen a significant rise in the number of publications in recent years. For example, scientific publications from China (as indexed by ISI) has arisen from 69,000 to 115,000 articles between the two four-year periods 1993-1997 and 1997-2001 (King 2004). Likewise, Brazil has increased its share of the world's scientific publications from 0.84 to 1.21 percent in the same period (King 2004). If universities and science academies in these countries set up archives, they could be immediately populated with a great number of papers.

(iii) Promotion of institutional research ouput. By showcasing their faculty's research output, institutional open archives will bring prestige to both the staff and the institution. Above all, such archives will reconnect local and international research as well as provide a better picture of a country's research output and areas of specialization. This will have implications for future international collaboration, joint partnerships, funding proposals, and even recruitment of new faculty.

(iv) Improved citation and research impact. The most persuasive reason for institutions to set up interoperable open access archives, both in the developed and in the developing world, is the growing evidence that citation and the impact of papers that are openly accessible are far greater than non OA publications. In a highly cited study, Steve Lawrence (Lawrene 2001) found an "average of 336% more citations of online articles compared to offline articles published in the same venue" relating to computer science publications. To extend this evidence of impact, a large-scale study is now under way to examine the "Lawrence effect" across all disciplines, using a 10-year ISI sample of 14 million articles. The goal is to measure the citation effect of the articles from non-OA journals that have been made OA by their authors through self-archiving, and to compare this with articles that have not been made OA by their authors. Preliminary results suggest that there is a discernible difference in terms of the frequency with which the articles are cited, and that the difference is between 250% and 550% in favour of the articles that authors have made OA (Brody, et al. 2004).

A further study has been carried out on the willingness of the research community to make their publications available in institutional archives and it is of no surprise that some 90% were happy for this to take place (Swan and Brown 2004). The increased impact of their published research is likely to prove to be the greatest incentive for institutions to begin implementing policies for setting up and filling their archives in order to maximize the impact of their collective research output[6].

(v) OAA allows improved access to subsidiary data. While the primary role of institutional archives is to make available published material, many institutions also use their archive to provide access to other materials, including theses and dissertation, datasets, technical reports, instructional materials, doctoral theses and other forms of electronic publications that may include multimedia objects. Many of these digital objects do not have regular publishing outlets

but are nonetheless important for teaching and research purposes. Making these intellectual products openly available through institutional archives is vastly increasing the depth and diversity of raw material for research and development (Chan 2004).

Such resources are not only available from institutions from the North, but many institutions in the South have accumulated a treasure house of primary sources in areas of health, demography, cultural heritage as well as environmental and biodiversity data. For example, the Tuberculosis Research Institutes in Bangalore houses over 100 years' worth of epidemiological and TB surveillance reports from various rural regions in South India and research staff at the Institutes also publish widely. Much of this data are scattered, however, and available only to small numbers of researchers. If made available through an open access archive, these data could be of tremendous value for TB research, not only in India but also worldwide (Arunachalam and Gunasekaran 2002). Examples of this could easily be extended to all areas of science and medicine and show how the storehouse of knowledge in developing countries can also contribute significantly to the global knowledge commons.

It is abundantly clear from the above that as more OAAs are set up and more research output is available free of charge, the world's research activity can accelerate significantly. Since the setting up of OAAs is cheap, quick and universally beneficial, it is essential that awareness is extended and international participation encouraged.

4.0 Progress in establishing international Open Access archives

4.1 OAA progress in the developed nations

The debate on the value of open access to publicly funded research information is now migrating from 'whether' to 'how'. A growing number of declarations and commitments have been made by governments, international scientific organisations (research institutes and scholarly societies) and conferences. Web links to many of these are listed as an appendix to this paper. All of these declarations recognise the technical means now in existence through the WWW and support the concept of open access in principle. They call on their constituencies to join together to enable the wider and equitable access to the global knowledge pool.

Recently, further commitments have been made specifically to the open access archiving of publicly funded research. Recognising that changes to the existing publishing model will take time to achieve, and recognising the immediate benefits to all from an open access publishing environment, governments and organisations are advocating that research output that is publicly funded by their countries or institutes should be archived in institutional archives.

The UK House of Commons Select Committee on Science and Technology recently held an enquiry into science publishing and issued its report on July 20th 2004 (http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/39909.htm). The report contains a large number of recommendations for the government to improve science communications. Of special significance are the recommendations that:

> 1. The government should provide funds for all UK universities to launch open-access institutional repositories.
> 2. Authors of articles based on government-funded research should deposit copies in their institutional repositories.

A similar declaration from the US House of Representatives Appropriations Committee recommends that beginning in 2005, the National Institute of Health (the second largest funding body in the US) develop a policy requiring NIH-funded scientists to deposit their articles, as accepted for journal publication, into PubMedCentral (www.pmc.org). PMC is a publicly accessible central archive managed by NIH's National Library of Medicine, with the mandate of managing publicly funded research in health and medicine.

Since the publication of these recommendations, the UK government – lead by the Department of Trade and Industry – misread the recommendations and has not followed through on them (Oppenheim 2005) , and the NIH proposal has been 'diluted'[7]. Nevertheless, the intent remains and in the UK the recommendations are being vigorously adopted by individual institutes and universities (see report on the recent Berlin Declaration follow-up meeting on http://www.eprints.org/berlin3/program.html).
The two recommendations share the same objective of providing maximum access to publicly funded research through OAA, but differ slightly in approach. While the UK recommendation calls for a national network of distributed archives, the US recommendation calls for a centralized approach to providing open access to NIH funded research. However, since all OAI compliant archives are interoperable, it doesn't make a significant difference to authors or their readers where their publications reside. The distributed model does, however, encourage the archiving of a national network of academic achievement and the benefits of this both for the networked institutes and the global readership can lead to further networking.

 It is of interest that the UK House of Commons Committee also made recommendations regarding developing country support programs by publishers. The Committee notes that subsidized models, such as the HINARI program and similar AGORA and PERI initiatives, whereby publishers make their journals available to the poorest countries at reduced cost (but not to those where there is some existing uptake of their journals), need to be adapted to compliment the OA movement. A likely route would be to divert some of the money that is currently going to publishers into OA publishing or OA archiving models. Subsidized initiatives, while providing immediate relief, are seldom sustainable and it is widely accepted that investment in local infrastructure and training bring permanent benefits, whereas hand-outs eventually cease and leave countries still struggling to catch up.

4.2 OAA progress in developing countries

The recommendations now being made in the developed world will provide confidence and encouragement to science administrators in the developing world where the benefits from open access policies are greatest. Steps are now being taken to inform policy-makers in a number of the larger countries such as Brazil, China and India, and a number of OAA workshops have already begun the process of instruction in the technical aspects of OAA development.

The Indian National Science Academy (INSA) is a signatory to the Berlin Declaration and INSA held a one-day seminar on open access at its annual meeting at the National Chemical Laboratory, Pune, in late December 2003. In May 2004, INSA held another one-day workshop at its head-quarters in New Delhi on institutional repositories to raise awareness about the institutional and policy issues surrounding provision to open access. INSA has set up an experimental archive (http://drtc.isibang.ac.in:9080/insa/) to begin archiving publications from scientific members.

The Indian Academy of Science, Bangalore, held two workshops on open access issues in March 2002, while in May 2004 the MS Swaminathan Foundation, Chennai, hosted two

workshops to provide training on the technical setting up of institutional archives as well as the policy and administrative needs at diverse institutions across India[8]. The National Centre for Science Information (NCSI) of the Indian Institute of Science (IISc) is also active with training workshops and in the planning of a national level harvesting service, which will further demonstrate the benefits of open access to research papers by Indian scientists. Indeed, MHRD (Ministry of Human Resources Development, Government of India) has advised all the consortium members of INDEST (Indian National Ddigital Library in Engineering Sciences and Technology) to set up eprint archives using appropriate OAI-compliant software.

In Brazil, the Ibero-American Science & Technology Education Consortium (ISTEC) and its Digital Library Linkages initiative (DLL) released a public statement in May 2004 on Open Access to scholarship and research in Latin America. The statement urges "all Brazilian research funding agencies, IBICT, and university administrations to study open access and implement policies that would encourage systems based on the principles of the Berlin Declaration on Open Access."

IBICT, the Instituto Brasileiro de Informação em Ciência e Tecnologia, celebrated its 50th anniversary in 2004 and has been experimenting with both OAA and OA Publishing.
In the area of OAA, it has created a repository system known as Scientific Dialogue (Diálogo Científico, http://dici.ibict.br/index2.html), using the Eprints software. The project aims to create a central repository for technical reports, theses, pre-prints and post-prints. This project follows the establishment of the Brazilian Database of Theses and Dissertations – BDTD (http://www.teses.usp.br/). According to H. Kuramoto: "IBICT has both established a new metadata standard, namely the Brazilian Standard for the Publication of Theses and Dissertations – MTD-Br, and developed a software package (TEDE) to publish theses and dissertations in electronic format. This package has been distributed to a number of Brazilian universities that can now make their literature available worldwide."

It is of interest that Minho University, in Portugal, has translated and customized the open source institutional archiving software DSpace to Portuguese. IBICT has acquired this Portuguese version and has been promoting it's usage to other Brazilian institutions. It is encouraging to see that while there were only 4 open access archives registered with the Registry of Institutional Archives (http://archives.eprints.org/eprints.php) in August 2004, there are 18 archives registered as of April 2005. Clearly implementation and experimentation with OAA are becoming active in Brazil.

In South Africa, the South African Site Licensing Initiative (SASLI) of the Coalition of South African Libraries Consortia, with support from eIFL.net, held a workshop in August 2004[9] in order to engage the library, higher education communities, research offices, as well as government funding bodies with implementing the dual strategy of open access as recommended by the Budapest Open Access Initiative. This workshop is followed by an intensive three-day workshop on implementation of institutional repositories in May 2005. SASLI's effort in support of institutional repositories is noteworthy, as it is an indication that library consortia are recognizing that a national site licensing approach to information access is not sustainable in the long term and complementary approaches to information provision need to be supported and developed. As of April, 2005, three institutional repositories have been registered by South Africa in the eprints archive and other experimentations are ongoing.

Although awareness of institutional archives providing open access is still slight, and restricted to the larger countries with more advanced science infrastructure, a growing number of OAI-compliant archives are listed in the Registry of Institutional Archives

http://archives.eprints.org/eprints.php. Of the 413 registered archives, over 30 are from developing or emerging countries, and it is perhaps of interest that in a recent UNDP Open Access online discussion forum (http://groups.undp.org/read/?forum=gpgnet-oa), the contributions from developing countries were restricted to those with registered archives (Brazil, China, Colombia, Croatia, Hungary, India, Mexico, Peru, Slovenia, South Africa).

Some worries remain that online developments increase the 'digital divide', since remote regions continue to have financial and technical restrictions. However, it is in everyone's interest to push for extended connectivity and open access to information may be a powerful driving force. For regions still disenfranchised for technical reasons, there need to be developments in local/regional networks where institutes with connectivity can serve as distribution centres for others. Investment in wireless and satellite connections must also be made. It is essential that the development agencies recognize the importance of global participation in the network of archives and help inform and resource the poorer regions appropriately. The cost is trivial and the rewards are vast compared with most technical developments.

5.0 What must be done to achieve global open access?

As the discussion above suggests, the OAA 'feasibility study' has been thoroughly tested. What remains to be carried out to achieve a global, interoperable, free-of-charge network of published refereed literature is an awareness-raising exercise followed by regional technical workshops to train key individuals in the establishment of archives and their maintenance. The Open Society Institute continues to organise OA workshops, such as the recent ones held in the Ukraine, Lithuania, and China, but more are required. This has been made clear from contributions to the recent UNDP discussion forum which engendered requests for information and support from many developing countries (see http://groups.undp.org/read/?forum=gpgnet-oa). We call on the international organisations (IFLA, WSIS, UNESCO, UNDP, UNEP, WHO) and international academies to work together to inform and support the movement. A coordinated effort over the following years can achieve much and once a critical mass of information is archived, much else will follow.

6.0 Conclusion

The wide and increasingly energetic debates about Open Access have now lead to a real understanding of the adverse effects that ever-increasing serials prices can have on the advance of science. The debate has changed from that of a few visionary individuals to a groundswell of interest, concern and understanding. The importance of access by 80% of the world's population to the international library of knowledge is now recognised as an essential means of increasing the stability and economic development of the poorer nations. Likewise, access to research generated by 80% of the world's population can no longer be ignored. Now, the means to close the North to South, South to North and South to South knowledge gaps are available and we can see that all perceived problems can be solved without recourse to major academic upheaval or large financial commitments.

As it becomes clear that it is practicable to achieve the goal of Open Access, more governments are asking that all publicly funded research is made available to all for free. As a body of institutional archives is established, not only will the research community in the developing world at last be a part of the international research community, but researchers in the developed world will begin to understand the value of local research and knowledge (the 'missing information') to the resolution of the world's major problems in health, agriculture, the environment and more closely defined disciplines such as taxonomy or biodiversity. Open Access archiving, this low-

cost, easily achievable and sustainable development, has been shown to work and soon will be the key to a rapid advance in scientific growth throughout the world.

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[1] Budapest Open Access initiative, http://www.soros.org/openaccess/read.shtml

[2] See http://www.globalknowledge.org

[3] Millennium Development Goals (2003) Available from:
http://www.developmentgoals.org/About_the_goals.htm

[4] WSIS Declaration (2003). Available from:
http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0004!!MSW-E.doc
(English version of the declaration).

[5] http://www.wipo.int/documents/en/document/govbody/wo_gb_ga/pdf/wo_ga_31_11.pdf

[6] See the growing list of studies documenting the relationship between open access publications and citation impact, maintained by Steve Hitchcock of the Open Citation Project, http://opcit.eprints.org/oacitation-biblio.html

[7] See Peter Suber's FAQ on the NIH Public-Access Policy and how it has become diluted, http://www.earlham.edu/~peters/fos/nihfaq.htm

[8] For details, see http://www.utsc.utoronto.ca/~chan/oaindia/

[9] For a description and summary of the workshop, please see http://www.sasli.za/

List of declarations:

- **Budapest Open Access Initiative**: http://www.soros.org/openaccess/read.shtml

- **Bethesda Statement on Open Access Publishing:**
  http://www.earlham.edu/~peters/fos/bethesda.htm

- **A position statement by the Welcome Trust in support of open access publishing:**
  http://www.wellcome.ac.uk/en/1/awtvispolpub.html

- **Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities**:
  http://www.zim.mpg.de/openaccess-berlin/berlindeclaration.html

- **Science, Technology and Innovation for the 21st Century. Meeting of the OECD Committee for Scientific and Technological Policy at Ministerial Level, 29-30 January 2004 - Final Communique**:
  http://www.oecd.org/document/0,2340,en_2649_34487_25998799_1_1_1_1,00.html

- **IFLA Statement on Open Access to Scholarly Literature and Research Documentation**: http://www.ifla.org/V/cdoc/open-access04.html

- **Declaration of Principles WSIS**: http://www.itu.int/wsis/documents/doc_single-en-1161.asp