



*Africa Media Review*, Volume 15, Numbers 1&2, 2007, pp. 1–21

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(ISSN 0258-4913)

## **The Rise of Open Access Journals: Their Viability and Prospects for the African Scholarly Community**

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### **Abstract**

Electronic publishing has enabled the publisher of scholarly journals to offer an enhanced high quality product, but one that comes bundled with unsatisfactory conditions: high prices, inflexible terms and copyright obstacles that severely restrict the optimal flow and use of information. Dissatisfied with the terms and limitations of traditional journals, individuals, groups and organisations have opted to advance a different model of journal. The open access movement may be seen as part of a critical trend that seeks to break the stranglehold of commercial expropriation of information. Open access journals are freely available for reading, copying, and disseminating. With growing support from many different quarters, the challenger to the \$3.5 billion publishing industry packs a potentially destabilising punch. This paper will cover the rise of open access journals and examine the economics of the ‘author pays’ business model. Notwithstanding the appreciable benefits to readers, the impetus to overturn deeply entrenched traditions must also overcome significant barriers. These include the practice of the academic reward system, funding issues, perceptions about quality and integrity, as well as the fundamental problem of the digital divide. While the open access model also presents a serious threat to scholarly society publications, all initiatives to promote visibility of African journals should be explored.

### **Résumé**

L'édition électronique a permis à l'éditeur de revues savantes d'offrir un produit de haute qualité, mais dans des conditions peu satisfaisantes: les prix élevés, les conditions rigides et les obstacles liés au droit d'auteur qui restreignent fortement le flux et l'utilisation optimaux de l'information. Insatisfaits des termes et des limites des revues traditionnelles, les individus, les groupes et les organisations

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ont choisi d'adopter un autre modèle de revue. Le mouvement du libre accès peut être considéré comme faisant partie d'une tendance qui vise à briser l'état de l'expropriation commerciale de l'information. Les revues de libre accès sont disponibles gratuitement pour la lecture, la copie et de la diffusion. Avec l'appui croissant de plusieurs milieux différents, le défi lancé à l'industrie d'édition qui est de 3,5 milliards de dollars a eu un effet potentiellement déstabilisateur. Cette étude portera sur l'essor des revues de libre accès et examinera les aspects économiques d'un modèle fonctionnel « auteur-payeur ». Nonobstant les avantages appréciables pour les lecteurs, le projet de renversement des traditions profondément ancrées doit également surmonter d'importants obstacles. Il s'agit notamment de la pratique du système de récompense académique, les questions de financement, les perceptions de la qualité et de l'intégrité, ainsi que le problème fondamental de la fracture numérique. Bien que le modèle du libre accès présente également une sérieuse menace pour les publications des chercheurs, toutes les initiatives visant à promouvoir la visibilité des revues africaines doivent être explorées.

### **Introduction**

Right from the arrival of the first graphical browser in 1993,<sup>1</sup> we have been aware of the Internet's great potential to optimise the flow of scholarly ideas. This potential has become more valued and urgent as knowledge is now widely acknowledged to be the premium resource that drives economic and social development. To what extent have the efficiencies and distributive power of the Internet been realised within the realm of scholarly journal publishing?

### **ICT for increasing efficiency and advancing cooperative learning**

A mark of the Electronic Age is that ICTs tend to be viewed as a solution, if not the cure-all, for almost any problem. There is a sense that performing any task electronically inherently advances that activity or process, or at very least boosts productivity. We are encouraged or obliged to automate our work processes, communicate electronically, store digital resources, create an online presence for our organisations, mostly in a drive for greater efficiency to save time, money and space.

In addition to the efficiency factor, another rationale for employing electronic media is that we would like to share or distribute information between colleagues, partners, clients and stakeholders. This desire or need to share information or work collaboratively in partnerships with others reflects another trend in the information age where networks are the unit of production. Working collaboratively helps us to keep up with the rapid pace of change and new knowledge. With the help of networking tech-

nologies, we have formed consortia, regional and international associations and other cooperative networks in order to pool resources and to learn from one another. One of the benefits of enhanced communication technology is that there is a more pervasive communitarian sense of a global fellowship -- that we can derive progress from collective effort. ICT has thus paved the way for greater efficiency and collaborative learning

In academic publishing, we have only evolved halfway towards achieving the benefits of the electronic age. The publication processes have been automated and the products are digital, certainly in a drive towards greater efficiency. Publishers have exploited Internet technology to link articles and citations in databases that span wide areas of knowledge. These facilities offer great convenience and those that have desktop access to them certainly save time. But we are not yet saving money. The widely anticipated financial savings that was forecast for the electronic medium has not come about; instead, we are finding scholarly journals to be more expensive. Publishers who have invested millions in developing electronic platforms have undoubtedly passed on the cost to subscribers. Academic libraries across the world have been forced to cut journals even as they spend more on them. So, electronic publishing has achieved some time efficiency but at a greater financial cost.

Open access publishing aims to achieve not only the efficiency factors of time and money, but also to advance the progressive dimension of sharing and collaboration towards a collective public good. While no one would contest this worthy aim, there is a flurry of debate and growing tension around the notion of open access publishing at the moment. The reason for this free for all is that open access presents a real possibility of destabilising a publishing tradition that has been with academe for over two hundred years. On one side, a group of advocates steadfastly claims that open access can overcome the ills of the serials crisis and liberate scholarly information; on the other side, we find the representatives of a \$3.5 billion industry whose interest is in maintaining the profitable status quo, flanked by non-profit publishers who play the quality and integrity card, but whose survival is threatened. In between are the policy makers and government agencies that have the power to regulate the industry by weighing in their considerable support where they see the greater efficiency and public good.

### **The Development of open access publishing**

There is no doubt that the Internet has been the catalyst for open access. Alongside the transition to electronic subscription journals, we have seen a growing diversification of electronic publications, each of them parallel

developments to the traditional journal, and all of them made possible by the Internet. Scholarly authors now frequently make use of a wider range of channels to disseminate their work. These include pre- and post-print servers, open access journals, discipline-based and institutional repositories, portals and subject gateways, newsletters and bulletins, and personal web pages. In some cases, these web-based products may have arisen as part of a fashionable trend, or as the 'latest thing' to implement. But, increasingly, within the last five to eight years, many initiatives have been ideologically driven, and have collectively become representations of, and aligned themselves with, the open access movement. With the failure of electronic journals to deliver relief from spiralling costs, individuals and organisations have sought an entirely new vision for scientific publication. Briefly, the aim of open access is the free and unrestricted access to all peer-reviewed scholarly literature for the benefit of improved scientific communication across the world. In particular, it stresses that economic disadvantage should not prevent access to information

The history of this movement is charted in the *Timeline of the Open Access Movement* (Suber 2004).<sup>2</sup> The pattern of chronological entries reveals how early open access ventures were initially only occasional footprints in the mainstream of academic publishing. By the mid 1990s, the entries on the timeline become denser as use of the World Wide Web gained wide currency. Since 2000, the open access timeline has become a busy road with multiple entries. Some of these entries document critical actions. For example, over ten entries document the protest resignations of entire editorial boards over publishers' exorbitant subscription hikes. These panels of editors subsequently launched their own cheaper or open access journals. From the universities' perspective, the chronology also documents a wave of protest actions, beginning in September 2003, that have been taken by universities against inflexible publishers. These include large-scale cancellations, new institutional policies, Senate resolutions, public statements and recommendations to faculty, librarians and administrators. These actions are indicative of the ongoing serials crisis that has been exacerbated by the monopolisation of the publishing industry by a few corporate giants.

### **The critical dimension of open access movements**

In highlighting the critical dimension of the open access movement, it may be possible to discern some similarities to several other separate, yet related, open access trends that are currently emerging and gaining strength. The free open source software movement has arisen in opposition to the

worldwide dependence upon expensive proprietary software systems that lock organisations into inflexible computer programmes that cannot be customised for optimal use. Open source programmers distribute their software's source code freely, and in this way contribute to the greater societal good of creating responsive programmes that others can learn from, or adapt, to make them more effective for different operating environments.

The Creative Commons movement, launched by Lawrence Lessig from Stanford University in 2002, is an initiative that seeks to break the copyright stranglehold of commercial publishers. The Creative Commons philosophy promotes the free dissemination of creative or artistic works over the Internet and provides a variety of legal licences that enables authors or artists to allow others to use their creative works without paying royalties, particularly where the use is non-profit. Cited examples include footage of the New York skyline for use by other film-makers, or making the scores of orchestral works available for free use by small-town orchestras.

Open courseware is another growing trend which sees distinguished universities such as Cornell, MIT and Berklee providing free access to all teaching and learning materials over the web. The term Open Content may also be used to refer to repositories of learning objects that enable compilers of online courseware to collaborate and share resources for teaching and learning.

A common thread drives these movements and connects them to open access. They each embody the more enlightened vision of sharing for greater public good. The fact that they are all emerging at the same time suggests a common rejection of the commodification and commercialisation of information, and the over-strenuous application of ever-restrictive copyright and intellectual property provisions which favour corporate interests while stifling the kind of sharing that leads to innovation and creativity. These open access initiatives represent a counterbalance to the competitive force of globalisation, which is antithetical to the collaborative ideal. In each of these phenomena, there is a use of the World Wide Web to democratise the use of information. In each case, one has a sense of the subversion of traditional publication.

### **Organisational support for the open access movement**

The open access movement has received a massive publicity boost courtesy of a spate of well-publicised public statements that endorse and promote open access<sup>3</sup>. These declarations are based upon principled stands by a wide range of stakeholders, including funding agencies, public interest

groups, library organisations, academies and not-for-profit publishers – and more recently, government agencies.<sup>4</sup> Each statement commits the signatories to promoting the unrestricted free distribution of scientific information on an equitable basis to all countries. They also call upon the academic community to take up the two available avenues of open access publication. These are open access journals and author self-archiving within electronic repositories, which may be discipline or institution based. These two options are seen as complementary, rather than exclusive channels.

The importance of repositories at this point in the evolution of open access scientific communication is the result of intensive efforts of the Open Archives Initiative,<sup>5</sup> an organisation funded by the US National Science Foundation, the Digital Library Federation and the Coalition for Networked Information. It is coordinating in-depth collaborative projects to develop internationally recognised standards and powerful archiving tools that enable interoperability and cross-searching of online archives or repositories, as well as software that enables the discovery of resources and sharing of metadata. The increasing adoption of open access repositories over the last year alone is testimony to the proven stability and success of these tools and standards.

Over the period from February to July 2004, the Science and Technology committee of the UK House of Commons conducted an official inquiry into scientific publication. One of the focus points of the enquiry was the question of open access journals. The committee requested written submissions from commercial publishers, not-for-profit and open access publishers, research councils, leading academics and librarians. Thereafter, representatives from these sectors faced critical questioning in public hearings as the committee attempted to gather evidence to determine what measures should be taken by the British government to ensure that researchers, teachers and students have access to the publications they need. The verbatim transcripts of these proceedings provide useful insight into the social and professional dynamics of the scholarly publication industry and its intersection with academe and government bodies in Britain (Science and Technology committee 2004a). What emerged from the hearings was a solid vote of confidence for open access archives or repositories.

The final House of Commons report, delivered on 20 July, recommends that ‘Research councils and other Government funders mandate their funded researchers to deposit a copy of all their articles in their institution’s repository within one month of publication.’<sup>6</sup> The repercussions of this recommendation are bound to unsettle commercial publishers. Their

chief concern is likely to be that the free availability of articles starts to break down the copyright monopoly they have enjoyed.

Notwithstanding the centrality of open archives to the open access movement, the focus of this paper is on open access journals, their economics, and some of the barriers that hinder their uptake. It will also look at their potential for the academic community in Africa.

### **Directory of open access journals (DOAJ)**

Open access journals may be found clustered at the site of the Directory of Open Access journals.<sup>7</sup> The Directory is a service that provides free access to 1149 full text quality-controlled scientific and scholarly open access journals across a wide range of disciplines. The goal of the DOAJ is to increase the visibility of open access journals, thereby promoting their increased usage and impact. From the homepage, one may browse journals alphabetically or topically. Contributing journals emanate from all continents and appear in several different languages. With assistance from the Open Society Initiative and SPARC (Scholarly Publications and Academic Resources Coalition), the DOAJ is gradually implementing functionality for article-level searching across the full range of journals. Using the protocol for metadata harvesting introduced by the Open Archives Initiative, it is also possible to download records for library catalogues.

Criteria for journal selection are that journals are peer reviewed, that the content presents primary research results and is aimed at researchers, and that no subscription fees are charged. The majority of the contributing journals are non-profit, low-key departmentally based initiatives that rely upon the volunteer efforts of a small dedicated group of academics or graduate students.

Although the majority of open access journals are currently non-profit concerns, these are by no means the most visible open access journals. Commercially based, profit-bearing open access journals are also freely available from DOAJ. It is these journals, produced by BioMed Central and the Public Library of Science, that have been attracting the most media attention. Although these are commercial publishers, they are nonetheless committed to making research freely available to all readers. They rely upon author charges to meet publication costs and produce sophisticated open access products in the science and biomedicine fields that have been shown to compete with the citation ratings of prestigious high-quality subscription journals (BioMed Central 2004).

### **Who pays?**

The radically different business model of these publishers turns that of the traditional journal upon its head: the publisher covers its costs and creates sufficient surplus by charging authors in order to make journals free for all readers. While any individual may submit a manuscript and pay a standard article processing fee, BioMed Central also offers universities and other organisations the possibility of paying an institutional annual membership fee. This upfront payment means that any affiliated member of that institution is relieved of author charges for publishing in any of over 100 biology and medicine journals produced by BioMed Central. Authors in countries with a GNP of less than \$1,000 per capita are exempt from publishing charges. Other developing countries are charged a highly discounted fee.

The vision of the open access movement is that in time all journals will transfer to the author pays model. For this reason, it is important to examine the system of payment in detail. Information available from the BioMed Central website<sup>8</sup> advises that, in a few years, the flat institutional membership fee will be phased out. In its place, an institution-specific annual fee will be calculated based on the number of BioMed Central articles the institution published in the previous 12 months. For example, if an institution's scholars published a total of 50 papers in BioMed Central's journals within a given year, the following year's membership fee would be calculated at 50 times the standard article fee (\$550 per article), resulting in an annual membership fee of \$27,500 per annum. It is generally accepted that this article fee is actually well below the actual per article production cost. BioMed Central's article fee is subsidised by sponsorships from research councils and philanthropic foundations that seek to boost uptake of open access. Studies (King & Tenopir 2004; Wellcome Trust 2004) show that the costs of publishing online range widely from several hundred to several thousand dollars per article, depending on variable costs arising out of differing value added services. As a further example, The Public Library of Science has costed its article charges at \$1500.

It would appear that, in its pursuit of eliminating subscription fees, the open access movement is not about to abandon hard-headed realism and is seeking realistic mechanisms to recover costs and generate revenue. Because it is anticipating a future in which all journals are toll-free, open access needs to find a sustainable business model that can support the complex variety of journal offerings.



### The economic viability of open access

Independent financial analysts have pronounced the Author Pays business model to be viable.<sup>9</sup> In determining the economics and sustainability of the open access vision, it is important to keep one's eyes fixed on the overall system benefits rather than focus narrowly on article costs. The chief benefit is naturally the free availability of published research for advancing knowledge, but there are other vital gains for a variety of stakeholders. A consultant for JISC, the centrally funded IT support group for UK universities, has identified these as follows (Friend 2004):

- Authors gain from higher numbers of citations (arising out of greater exposure), receiving greater acknowledgement of their work, in turn promoting their professional advancement;
- Funding agencies achieve greater effectiveness for the research they fund, in terms of greater opportunities for technology transfer and innovation, which in turn benefits the business community and society more generally;
- Publishers benefit by enjoying a more secure income stream, as the costs of producing each issue would be covered through upfront author charges.

However, for the first time, publishers will have lost their pricing power. Under open access, they will need to compete with one another to attract author manuscripts in order to bring in revenue. This is completely contrary to the current situation where authors compete for journal space. The BNP Paribas study (2003) anticipates that authors will "shop around" for open access journals that offer the most impact, faster publication speed and competitive article charges. In this way, authors regain control over the cycle of production.

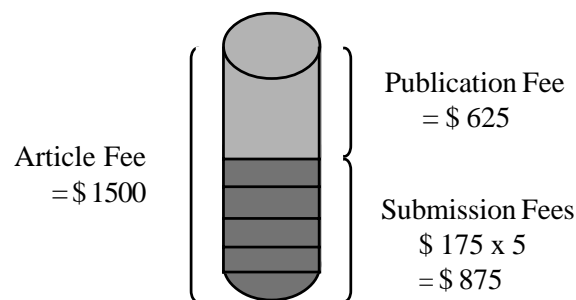
Author charges will also serve to expose authors to the costs of publishing from which they are currently shielded by virtue of library subscriptions. The Wellcome Trust study points to the market failure within the current structure of the publishing market, which actually operates as two mismatched or non-aligned sub-markets. The *academic sub-market* comprises the scholars that read and write articles. Researchers give away their copyright in order that their work can be disseminated. The most important criteria for the academic market is the impact of research and the value accorded to it in terms of citation rates. The *commercial sub-market* comprises the publishers and libraries and operates on price structures and profit margins. The normal market forces of supply and demand that serve to control price structure in other commercial industries do not come into play. This is because publishers hold absolute monopoly over

the copyright that authors assign them and there is no other route to access the published article except to pay licence fees or subscriptions. The pursuits of these two sub-markets are incompatible. Essentially, the dictum for academics is “publish or perish” while for publishers it is ‘profit or perish’.

### How do authors charge work?

Under the open access system of author charges, it is likely that all prospective authors will pay an initial nominal *submission fee* that will cover the costs of peer review. Submission fees would also serve to raise the general quality of submissions. Successful authors will then pay a larger *publication fee* to cover production costs. Traditionally, a higher rejection rate (e.g., the 80 per cent rejection rate of *Nature*) signifies a high quality or prestigious title, which comes with an expensive price tag as subscribers bear the cost for the editorial exclusivity of the journal. Under the open access system, this cost is spread amongst the submitting authors. Ironically, publication fees would be lower where there is a high level of rejection – as they would be cross-subsidised by the increased number of submission fees. This is demonstrated in Figure 1.

**Figure 1:** Increased number of submission fees lowers the overall publication fee per article



While authors may have previously been exposed to page fees charged by traditional journals, figures of this order start to appear as a disincentive to publish. How will author charges be funded? A recent JISC survey targeted two groups of authors – those that had either published, or not published, in an open access journal. The aim was to explore and compare the publication experiences of the two respective groups. One of the questions

asked the respondents was who should be liable for the article charges under the open access system. The chart at Figure 2 is reproduced from the survey. Regardless of whether they support or do not support open access journals, the authors concurred in their ranking of agencies that should subsidise publishing charges. It might be that well-funded disciplines use research grants, while the less-supported disciplines rely on institutions to pay the fees. This table shows there are a number of potential sources for article fees. By spreading the cost of the publication fees, no single entity has to bear the full load. This refutes the sceptics' charge that article fees merely shift costs from reader to author and that institutions will accordingly not realise any savings.

**Figure 2:** Where authors think open access publication fees should come from (JISC/OSI 2004:47)

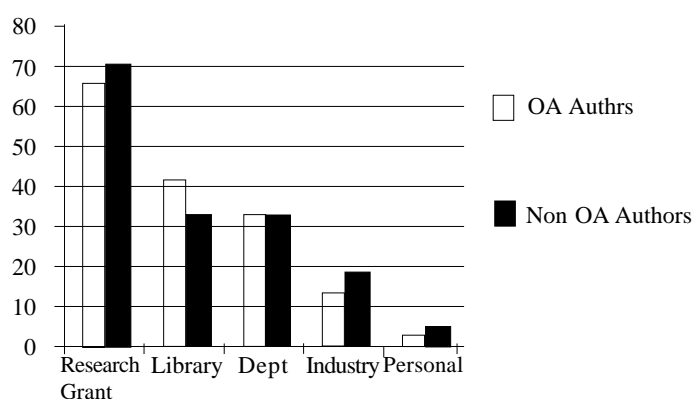
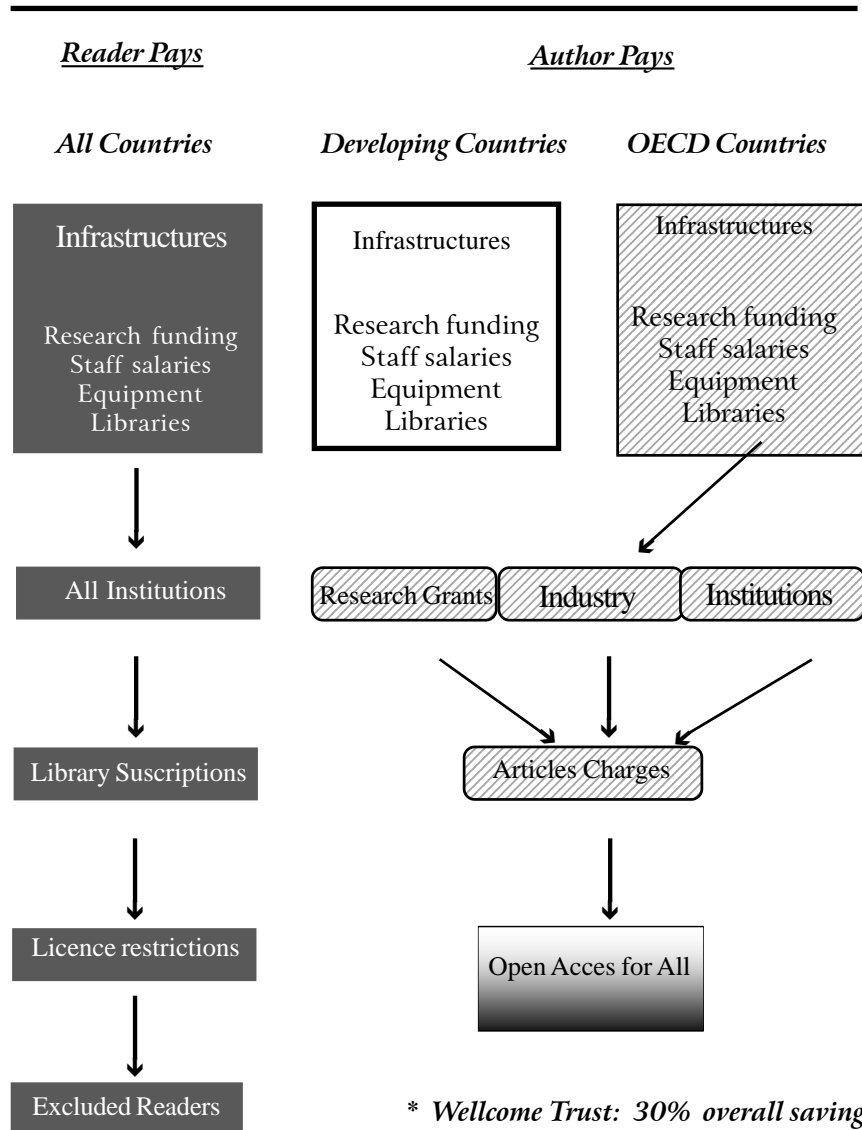


Figure 3 provides a rough overview of the overall costs of scholarly communication under the 'reader pays' and 'author pays' models and the associated liabilities or savings that these afford.

Under the reader pays system, there is no differentiation between richer and poorer countries. All institutions in all countries must pay subscription charges or licence fees with highly restrictive terms for usage. The net result is many excluded readers. Under the author pays model, there is recognition for the varying resource levels available within the research systems of different countries. Authors in developed countries are liable for article charges that are sponsored by a range of sectors. The result is open access for all readers.

**Figure 3:** Comparison of costs under Reader Pays and Author Pays models



In an article in the *Times Higher Education Supplement*, the Director of the Wellcome Trust, a major patron of biomedical research, has announced that the open access system could bring overall savings of as much as 30 per cent (Walport 2004). This is also borne out by the BNP Paribas study which compared the current annual cost of scientific journal subscriptions of three Ivy League universities against the calculations of author charges for the annual number of published articles produced by each of these institutions. While the overall savings depends on the number of articles published by an institution (and the system would appear to weigh against institutions that produce more articles), the BNP Paribas study concludes that 'the global scientific research community could save more than 40 per cent in cost by switching entirely to an open access model.' (Suber 2003). The same study concludes that, while open access journals currently account for less than 3 per cent of published scholarly output, there is a 50 per cent probability of a shift to open access within 10 years.

### **Moving towards open access**

We are facing a transitional period that presents a hybrid environment in which both reader pays and author pays options are available. Within this kind of environment, institutions will be liable for both traditional subscriptions and author charges. The longer this condition persists, the longer it takes to realise the predicted overall savings. Prolonging this situation might lead to a paralysis of the drive towards universal open access. At the same time, it should be recognised that the strong presence of a competitive agency has already won some concessions from major publishing corporates like Reed Elsevier and Oxford University Press. The former has just announced that its published authors may deposit copies of their articles in their institutional repositories, while the latter has converted one of its prestigious journals to open access. Publishers of traditional journals are beginning to examine routes to converting subscription journals to open access. One transition model is for existing branded journals to offer authors the option of paying article charges to make their articles open access within the regular issue. Readers that receive table of contents alerts would be able to access those articles immediately, even if they were not licensed to read other articles within the same issue.

It appears that authors and librarians are prime change agents, hence the importance of advocacy and educating these groups. A promotional brochure of the open access movement (*Create Change*)<sup>10</sup> urges scholars and librarians to actively pursue and promote open access channels within their institutions and lists concrete measures they may take to pro-

mote the rapid and efficient transition to open access publishing. The website provides tools and an advocacy kit similar to those encountered on social movements' websites. For example, sample letters that may be used to resign from editorial boards or as a referee of journal articles, press releases, advertisements for campus newsletters, as well as a PowerPoint presentation. Because the Association of Research Libraries sponsors the *Create Change* site, there is a heavy emphasis on educating librarians on how to run an advocacy campaign. The objectives of such a campaign are to make faculty and administrators fully aware of the developing crisis in the scholarly communication system, to provide information on journal costs, journal use and cost-effectiveness, and foster understanding of library decision processes and to engage their support in those processes (e.g., large-scale journal cancellations), and to stimulate informed discussion on issues such as copyright. The library sector should be teaching users about the benefits of open access publishing and listing and highlighting open access journals in catalogues and databases.

### **Barriers to the uptake of open access**

Several fundamental obstacles need to be addressed before any significant transition towards the author pays model will be seen.

#### **Academic reward system**

The behaviour of authors is conditioned to a very high degree by the academic reward system. Publication is a central feature of academe and plays a vital role in the reward structure of academic rating of individuals as well as institutional ranking. An important condition for the widespread acceptance of open access journals would be their recognition and accreditation by institutional, national and international councils and bodies that have the power to influence decisions about faculty tenure and promotion (Bjork 2004).

Without explicit recognition and validation of open access journals, academics have little incentive to publish their work in relatively unknown journals. What is required, therefore, is a systematic evaluation of the quality and impact factors of open access journals.

#### **Quality**

An enduring perception about open access journals is that they are less rigorous, lack stringent peer review, and that the whole notion of author payments presents a conflict of interests that undermines the integrity of selection (JISC 2004). Any journal's success depends upon authors choosing to submit their research to it for publication. If a journal has a

reputation for publishing poor work, it will not receive submissions. For this reason, open access journals have every incentive for accepting only high quality research.

Quality is largely measured by impact factors such as citation analysis. Although most open access journals are relatively new, some have begun registering impact in the citation analysis provided by the Institute for Scientific Information (ISI), which is currently the main metric for assessing impact. Dissatisfied with the limited selection of just 2 per cent of open access journals in ISI's latest release, Harnad and Brody (2004) have undertaken a large statistical study that compares citation counts over a decade for journal articles that are concurrently freely available over the Internet with the citation counts for articles appearing in the same journals, but that are not open access. This kind of empirical study will be vital for establishing the reputation of open access journals.

### **Author charges**

Scholars now have to make ideological and economic choices about where to place their articles. Authors may wish to support the principles of open access and be attracted by such benefits as faster publication speed and wider visibility, but, without financial support, would be inclined to submit articles without charge to subscription journals. On the other hand, a decision by funding institutions to support author fees would speed the transition to open access. Furthermore, if these bodies were to mandate open access publishing channels (journals or repositories) as a precondition of research funding, this would begin to institutionalise open access and author charges as a practice. It appears that this level of commitment is still some way off. The House of Commons Scientific Publications final report pronounced that, based on the evidence provided to them, the author pays model appeared to be viable, but the committee would not endorse the model without a comprehensive independent study into the costs associated with author pays publishing.

### **Digital divide**

A critical barrier to the uptake of open access could be the prospect of the limited impact that it would have on the very region that might potentially benefit the most. The promise of unrestricted access to all scholarly research is muted by the fundamental connectivity problems that face most campuses in Africa. These are the lack of reliable electricity supply, limited access to networked computers, slow response caused by inadequate bandwidth, and the lack of sufficient IT professionals to respond to system level problems.

Part of the strategy of the open access proponents must include campaigning for ICT development in developing countries. Growing worldwide consensus over the importance of ICTs in addressing development issues suggests that considerable resources will be directed towards supporting access to the Internet in Africa, especially to research and teaching organisations (Jensen 2003). Self-directed efforts, including the development of national ICT policies, deregulation of the telecommunications sector, decreasing costs of hardware and bandwidth, growth of regional networks and institutional-level prioritisation have already begun to make a difference.

In his article on the evolution of the Internet in Africa, Jensen draws attention to major infrastructural projects that should help reduce international bandwidth costs. These include fibre optic and submarine cable links and satellite capacity to deliver faster two-way electronic transmission. He also points to the use of VSAT as a cheaper and efficient means of providing telecom based services that are independent of terrestrial infrastructure.

### **Impact of open access journals in developing countries**

#### **Strengthening national science systems**

Can open access journals plug the gaps in the local research culture? Desirable as it is, mere physical access to global scientific information is not sufficient on its own to advance local knowledge production. Besides IT connectivity, consolidation of human networks and partnerships is also necessary for the development of a strong research culture. The internal dynamics of a national science system needs active nurturing for this culture to take hold. This nurturing requires government policies that favour the creation of research communities. Briefly, such policies might include the linking of doctoral programmes with the productive sectors, networking of local scientific groups with their international peers, encouraging «brain gain» practices that attract foreign scholars and reverse the migration of nationals, or enhancing the incentives for industry and agriculture to work collaboratively with scientists in the universities (Forero-Pinedo & Jaramillo-Salazar 2002: 138).

#### **South-North information flows**

That said, the realities of the present structural imbalance between the South and the North means that local scholars experience considerable difficulty when they attempt to intersect with international scholarly networks. The open access movement explicitly pronounces that its goal



is to promote wider sharing of scientific knowledge. Whether open access would be able to shift the inequalities of the relations between South and North in terms of bi-directional scholarly communication flows is moot. Access by local scholars to the newest ideas would start to eliminate the previous pattern where manuscripts from Africa were routinely rejected because they presented outdated concepts and arguments. While concessions for author charges for developing countries have been built in to the business model as a fundamental principle, sceptics might view this concession as a new artificial barrier that inclines publishers against selecting manuscripts emanating from the south because they do not generate revenue.

### **Scholarly society journals**

From the perspective of the African publisher, author charges are immediately not feasible as they are not in a position to waive these for local authors or to offset these losses through charges to international authors, as these account for a very minimal input.

The mission of the scholarly or professional society is to advance knowledge within the academic field it represents and to promote the work of society members by disseminating their articles to a wide readership. Teferra (2003) has recently reported on the difficulties associated with scientific communication in Africa. His study of the research environment reveals a shrinking community of researchers bled by brain drain, shrinking state funding and inadequate research facilities and salaries that lead many to abandon research. Those that remain are over-burdened with teaching and administrative loads that do not allow for reading and writing. The net result is that local journals experience a scarcity of high quality input. Teferra's survey of African scholars affirmed that 70 per cent value the contextual relevance and applied knowledge of local journals. But the survey respondents also acknowledged the weaknesses of these same journals: limited breadth and coverage, lack of visibility, and irregularity.

Such summations are repeated in other reports on African journals (Zezeza; Zell; Altbach in Altbach & Teferra 1998). The platform of open access cannot roll back fundamental deficiencies in regional infrastructure and research systems or of itself generate quality. The benefits it offers are greater visibility, readership and consequently greater impact. Lor (2004) has pointed out that the World Wide Web browsers are bias-free and will find relevant articles regardless of their origin or source, especially when articles are gathered in archives that use the Open Archives Initiative tools and metadata systems.

### **Visibility of local knowledge**

Publishers of local journals could obtain greater international exposure of their good quality work by participating in the DOAJ. Virtually all the African bioscience journals currently contributing to the Directory are produced via BioLine International. This non-profit agency is committed to providing open access to quality research journals published in developing countries. The website aggregates journals from Brazil, India, Indonesia, Kenya, South Africa, Uganda and Zimbabwe. An explicit objective is to fill part of the gap of South to North knowledge flows.<sup>11</sup>

The website of one of the contributing African publishers declares that it 'provides free access to research information to the international community without financial, legal or technical barriers. All the journals from this organisation will be freely distributed and available from multiple websites.'<sup>12</sup> Another participating society journal advises that '(t)he journal is published on a page sponsorship basis',<sup>13</sup> suggesting they have incorporated author charges as a mechanism for sustainability.

Contributing a journal to DOAJ presumes that each journal already has a website. Local journals that are still working towards that platform could avail themselves of the free open source software designed for this purpose by a project called Open Journal Systems.<sup>14</sup>

### **Open journal systems**

This initiative is based in Canada and aims to assist journals to become online (and open access) by providing a journal management system that requires little or no technical expertise but produces a professional online product. Some of the features of Open Journal Systems are designed to ease the burden of the publication process. There are facilities for online submission of articles or reviews, online management for each stage of publishing that allows editors to track the editorial and review process, and automatic e-mails for notification and acknowledgement. The system also has an automated system for creating metadata records that conform to the Open Archives Initiative protocol. In this way, all published articles are retrievable via Google or other meta-searchers. Open Journal Systems also supports the kind of value-added features of electronic journals, such as the facility for readers to sign up to receive e-mail notification of the table of contents for each issue. Readers may also post comments to articles and join in discussions.

If a society were to convert to an open access policy, would this mean the end of subscription fees? What kind of cost recovery mechanism could societies hope for? Since many individuals and organisations prefer to

keep a hard copy of a journal, societies might continue to provide print copies to paying members. The low cost of membership generally charged by most societies is not prohibitive, and while individuals enjoy the economic benefits of membership, they are also motivated to join societies to further the other aims of the body, which often include mentorship, professional development, workshops and conferences.

### Conclusion

Whatever the final outcome of the present debate, open access is succeeding in disturbing the power relations that have shaped the traditional practices of the cycle of scholarly communication. It seems that several eventual scenarios are possible, though the continued availability of both subscription and author-pays models does not provide the savings so desperately needed. An interesting philosophy that supports the hybrid model has been outlined by a mathematician (Burdzy 2002), but could be generalised for all disciplines.

Burdzy declares that publicly funded research articles should be available to the public as freely as 'tap water'. This works on the assumption that public money is used to provide safe and cheap drinking water to most people. In the same way, publicly funded foundations, universities and the government should create 'reservoirs' or repositories that provide journal articles in their unrefined form. The appearance of these articles would only be as good as the participating authors choose it to be.

Burdzy also reminds us that people have a choice whether to drink the free tap water or to buy bottled water. He proposes that the role of commercial and non-commercial publishers should be to produce and distribute an upgraded version of the product found in repositories, analogous to 'bottled water'. This would be an enhanced version of research articles, with elegant typesetting and linking to other articles. He points out that the price of bottled water cannot be too high as long as everyone has access to tap water.

The comparison of information to water is attractive and apt. We all need water and information in order to survive and flourish, and we are aware that the terrain of Africa and its research culture is generally dry and subject to harsh environmental conditions. It is vital that our 'water' (information) is conserved and promoted, both to sustain the local environment and so that it may refresh international thought. However, the assumption Burdzy makes about the free availability of drinking water points to the chasm that separates the developed world from our immediate experience. Access to clean running water is a basic human right that is

denied to many in Africa. The open access movement is attempting to open the floodgates to allow the free flow of information, but without the taps or reservoirs here, Africa may remain very thirsty.

### Endnotes

1. Mosaic, the first graphical Internet browser, was released in April 1993, followed by Netscape one year later (Okerson, A. 2003).
2. Suber, P., 2004, 'Timeline of the Open Access Movement.' <http://www.earlham.edu/~peters/fos/timeline.htm>
3. The texts of each of the public declarations are usefully gathered at <http://www.scidev.net/quickguides/index.cfm?fuseaction=keydocs&qguideid=4>
4. Open Access to US Government work urged. [Online] <http://www.biomedcentral.com/news/20040721/01>
5. <http://www.openarchives.org>
6. This is Recommendation 44 in the Conclusion and Recommendations of 'Scientific Publications, Free for All?' written by the Science and Technology Committee (2004b).
7. <http://www.doaj.org>
8. <http://www.biomedcentral.com>
9. BNP Paribas and Citigroup Smith Barney are two companies cited in P Suber (2003). See also Wellcome Trust (2004).
10. Available from <http://www.createchange.org/home.html>
11. <http://www.bioline.org.br>
12. <http://www.academicjournals.org/>
13. <http://www.bioline.org.br/info/md.about>
14. [http://pkp.ubc.ca/OJS\\_Sheet.html](http://pkp.ubc.ca/OJS_Sheet.html)

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nologies, we have formed consortia, regional and international associations and other cooperative networks in order to pool resources and to learn from one another. One of the benefits of enhanced communication technology is that there is a more pervasive communitarian sense of a global fellowship -- that we can derive progress from collective effort. ICT has thus paved the way for greater efficiency and collaborative learning

In academic publishing, we have only evolved halfway towards achieving the benefits of the electronic age. The publication processes have been automated and the products are digital, certainly in a drive towards greater efficiency. Publishers have exploited Internet technology to link articles and citations in databases that span wide areas of knowledge. These facilities offer great convenience and those that have desktop access to them certainly save time. But we are not yet saving money. The widely anticipated financial savings that was forecast for the electronic medium has not come about; instead, we are finding scholarly journals to be more expensive. Publishers who have invested millions in developing electronic platforms have undoubtedly passed on the cost to subscribers. Academic libraries across the world have been forced to cut journals even as they spend more on them. So, electronic publishing has achieved some time efficiency but at a greater financial cost.

Open access publishing aims to achieve not only the efficiency factors of time and money, but also to advance the progressive dimension of sharing and collaboration towards a collective public good. While no one would contest this worthy aim, there is a flurry of debate and growing tension around the notion of open access publishing at the moment. The reason for this free for all is that open access presents a real possibility of destabilising a publishing tradition that has been with academe for over two hundred years. On one side, a group of advocates steadfastly claims that open access can overcome the ills of the serials crisis and liberate scholarly information; on the other side, we find the representatives of a \$3.5 billion industry whose interest is in maintaining the profitable status quo, flanked by non-profit publishers who play the quality and integrity card, but whose survival is threatened. In between are the policy makers and government agencies that have the power to regulate the industry by weighing in their considerable support where they see the greater efficiency and public good.

### **The development of open access publishing**

There is no doubt that the Internet has been the catalyst for open access. Alongside the transition to electronic subscription journals, we have seen a growing diversification of electronic publications, each of them parallel