

Published in: Między przeszłością a przyszłością: książka biblioteka, informacja naukowa – funkcje społeczne na przestrzeni wieków. [Between past and future: book, library, information science – social functions over the centuries (Festschrift for Professor Maria Kocojawa)]; edited by Marii Próchnickiej & Agnieszki Korycińskiej-Huras. 2007. Krakow, Poland: Wydawnictwo Uniwersytetu Jagiellońskiego [Jagiellonian University Press]. pp. 287-295. ISBN 978-83-233-2429-4

Serving the research community or making money? Current issues in scholarly research and its communication

Ian M. Johnson

*Professor and Associate Dean, Aberdeen Business School, The Robert Gordon University, Garthdee Road, Aberdeen AB10 7QE, Great Britain
(i.m.johnson@rgu.ac.uk)*

Abstract

This paper notes the growth of scientific publishing and the reasons underlying it. It examines the features of electronic journals and journal publishing that have led to the publishers' new business models. It comments on the challenges that face countries whose main language is not one of the major international languages. It notes the (sometimes inadequate or misplaced) response of librarians to these wide-ranging changes, and highlights some of the issues that remain outstanding.

"Money is information on the move"

Information is the lifeblood of the developed economies. An American banker once described money as "information on the move." A key part of that process is the scholarly peer-reviewed journal, the standard means by which ideas and information are communicated within the scientific community and between the scientific community and those who seek to apply the results of their research for commercial purposes. Its contribution to economic development thus gives it a wide public significance.

Today, the vast majority of the world's scientific research is published in the English language by 7 companies – Reed Elsevier, Thomson ISI, Springer Science, John Wiley, American Chemical Society, Blackwell Publishing, and Taylor and Francis Ingenta. It is not my intention to criticise those companies, but to explore some of the implications of the changes that are taking place in scientific communication that have led to such a concentration, and the roles of business and government in that process.

Growth in scientific publishing

The growth in scientific research and publication has been a well-noted phenomenon – usually referred to as the 'information explosion'. In mathematics, for example, there were about 800 papers published each year in the 1870s. Today there are about 50,000 papers published each year.

To cope with similar increases in volume in all disciplines, the established journals have increased the number of papers that they publish, but the growth has largely been accommodated by the creation of new journals devoted to narrowly focused specialist areas. At the beginning of the Nineteenth Century, there were about 90 scientific journals worldwide. Today, most of the world's scientific research is published in about 16,000 journals, and seemingly almost entirely in English.

Initially these scientific journals developed through the efforts of universities or the scientific societies. Some still maintain their publishing programme, as a professional service or because it makes a financial contribution towards the cost of the rest of their activities. However, most have found it convenient to assign the management of their publications to a commercial company, or have welcomed the opportunity to complete an outright sale of their journals.

Audience for scientific journals

The journal remains a sound vehicle for the transmission of new knowledge. It provides an indexed archive of information, with the quality of the research results assured by the editorial peer-review system, and the majority of researchers across all disciplines report that access to refereed journals, whether in printed or electronic media, is essential to their work. However, in North America and Western Europe, conventional print publishing is now recognised as inefficient. Because of the increasing number of journals, libraries were forced to be selective, and the sales of established journals declined. To maintain their income whilst selling fewer copies of a journal, the publishers imposed regular price increases. These increases took place during a period when libraries' budgets were declining as a share of their host institution's overall budget. The consequence was to reduce further the sales of each journal. Thus a vicious circle of increasing prices and declining sales was created. As a result, the contents of each journal suffered limited and declining visibility amongst potential readers. This has been referred to as the 'scholarly communication crisis.'

Investment in electronic publishing

From the user's perspective, the emergence of electronic journals has reversed that trend. The last ten years has seen a rapid increase in investment in electronic publishing. Electronic publishing, whilst having high, fixed infrastructure costs has low, marginal distribution costs, reduces handling and storage costs for the purchasers, and its geographic boundaries are limited only by the availability of the technology to access the Web. Electronic journals now play an increasingly significant role in widening access to information. The major publishers soon recognised that there is a substantial demand for the papers published in the older issues of their journals – for example, over 20% of the papers consulted in chemistry are more than 15 years old – and have been investing heavily in digitising the back files of their journals. Elsevier, for example, has spent millions of dollars to date in converting its files to electronic formats. In addition, they are also adding features to their databases to facilitate and encourage greater use. For example, they have had systems in place for some time that send out email messages to interested individuals to

alert them to new issues and their contents, a vital service in a rapidly changing scientific environment. Now, the publishers have developed systems that offer other significant forms of support for researchers, for example CrossRef¹ which enables links from references cited in one paper to the full-text of the paper referred to, if it is available electronically, regardless of who published it. This also facilitates rapid access to interesting papers, although it has to be acknowledged that the full text may then not be accessible because of subscription and licensing arrangements. They have also recognised that current indexing and abstracting services provide poor coverage of potentially significant journals, often concentrating on only the 'top quality' journals, and the publishers are making it possible to search for relevant information in all the journals published on their web site. As a result of digitising their older journals, the publishers recognised that a larger volume of material attracted more users to their web site, and that a larger range of material might enable them to sell their electronic product more easily and thus recover their investment more rapidly. Extending this understanding has brought about further consolidation in the industry. The major companies have been actively buying smaller companies and incorporating their journal titles into their database.

New business models

The significant expenditure that these developments and acquisitions have necessitated has confronted publishers with a further challenge. The publishing industry has been accustomed to collecting journal subscriptions before delivering the product. They are, perhaps understandably, anxious to recover the substantial investments that they are now having to make. One way that they have chosen to do this is through the so-called 'big deal', through which they offer access for subscribers not to a single journal or to the subscriber's own selection of titles, but to all the titles, or a group of titles within a broad subject area, that they make available electronically. Although the traditional method of packaging and publishing scientific information had become so expensive that the libraries and their users had increasingly been unable to access what was being published, the new packaging - the 'big deal' - is such that the libraries cannot pick and chose what they believe (correctly or incorrectly) is most in demand by their users. Whilst the additional features just mentioned, have without doubt increased the visibility of the journals' contents, the limited choices available within the 'big deals', coupled with the high cost of these subscriptions, have been controversial. The controversy was fuelled by the declining share of their budgets that universities have allocated to their libraries - the major purchasers of scientific journals. Librarians have tended to refer to this as the 'serials crisis.' In reality, it might have been more accurately described as the 'library management crisis.' There has been a significant failure by librarians to make university authorities aware of the consequences of their own policy of encouraging academic staff to undertake research and publish the results, and to ensure that libraries' purchasing funds are adequate to support the growth in research activity.

The costs that libraries incur have, to some extent, been offset by collaborative negotiations on behalf of groups of libraries (consortia) to agree a price at which they might purchase a package of titles, if they wish to do so. The 'big deal'

¹ CrossRef [online]: <http://www.crossref.org/> [Accessed 3 January 2006]

been a particular issue in the less wealthy countries, but schemes have emerged to make the journals more affordable. One model is that promoted by the Soros Foundation initiative, eIFL² – ‘electronic Information For Libraries’ – which has negotiated licences for a variety of databases at a reduced price on behalf of participating countries. This model, originally developed by a commercial publisher, is based on selling a subscription direct to a national government agency at a price related to the Gross National Product, and licensing use by all the publicly funded institutions in the country. A similar model has been used by consortia in some of the States in the U.S.A., which have purchased licenses for use by all the publicly funded institutions in the State, but with the costs then re-charged to the institutions concerned.

A recent study (Schonfield *et al.*, 2004) may have pointed the way to a new approach. This demonstrated not only the (substantial) extent to which use of journals has increased as a result of the introduction of electronic access, and that the overall cost to a library of providing an electronic journal is less than that of a printed journal (because of savings on administration, cataloguing and storage), but also – and most significantly – that the cost per use is minimal. However, librarians are not noted for radical thinking. It is therefore no surprise that there has been little debate about the implications of possibly moving completely to accessing the range of journals issued by all publishers on a ‘pay per view’ basis, instead of having subscriptions to a selection. Nonetheless, the publishers have shown themselves able to adapt rapidly to changing their product, and it would be surprising if they had not begun to evaluate the information that they can extract from their records of access to their databases. It would not be difficult for them to determine what charges they would need to make on a ‘pay per view’ basis to maintain their financial viability.

Government and business support for research

For the moment, the debate has focused on how the results of research should be published, and who should pay for publication. Most governments make that assumption that research contributes to economic development, and provide financial support for scientific research through their universities or specialist research institutes. There has been a longstanding debate about this assumption. The relationship is complicated by many variables that interact in different ways in different circumstances. For this short paper, I will assume that scientific research does make a contribution to economic development, and examine the implications of the involvement of one section of the media in this process.

Research funders are certainly not keen on seeing the fruits of their investment locked away behind closed doors - the premise of public funding for research is that the public benefit. There is generally an expectation that - unless scientific research is related to state security or defence, or is commercially confidential - the work will result in a paper that will be published. This has led to a concern that government is paying twice for the same thing. It pays the academic to do the research, and then it pays the publisher to buy the journal in which the results of the research appear.

² eIFL [online]: <http://www.eifl.net> [Accessed 30 September 2004]

But there is rarely a budget line for 'publishing' in a typical research grant, because the assumption is that the paper will be published at someone else's expense – the author and the publisher.

Academic rewards

The expectation that the research will be published as a journal paper is reinforced by the reward system in academia – a reward system that is also supported by governments. That reward system – tenure, promotion and other honours – is based largely on an individual's record of research and publication.

The highest recognition is generally accorded to papers that appear in the most highly regarded journals – that is those journals known to have the highest standards for selecting papers offered to them, based on a rigorous system of peer-reviewing. In most cases, that means the journals that are currently included in the Citation Analyses published by the Institute for Scientific Information in the U.S.A. It is the data produced by ISI that is used to assess the productivity of national research efforts and their international standing. ISI has hitherto only analysed peer-reviewed journals that are regularly published in English (but will include some Spanish-language journals from the start of 2006, partly as a concession to its major customers in Spain and Latin America).

This has presented a dilemma for researchers in countries whose language is not English. Naturally, they wanted their papers to be published in these prestigious and highly visible journals if it raised their status and potential rewards, but they also recognised that these journals improve international access to their work and increase its impact. If these researchers published in a national journal in their own language, the distribution level was likely to be low. It may not give them the international standing that they need to attract research grants. They may not be invited to international meetings where they can share ideas and build a network of collaborators – the 'invisible college' that plays an important part in the transmission and development of scientific ideas. Their invisibility in the main international journals thus held back the quality of research and development in their country. Researchers may therefore have been reluctant to publish in their own language but, if they published internationally, the result of their research may not have been available nationally because their colleagues and students could not read English well enough.

The situation is even more complex in some countries where the government also subsidises journals that publish - usually in the local language - the results of research carried out in that country. So, we can find governments paying for research, and subsidising journals in which the results of the research could be published, but giving the highest rewards to their academic community for publishing in English in one of the journals published by one of the major international companies.

Alternative models for scientific publishing

In the transition between paper and electronic publishing, new experimental models are bound to capture attention. Forms of open access publishing are now being widely advocated by librarians as alternative to the journals published by the major companies. However, this is a distortion of the original intention of

open access, perhaps best summarised in a paper by one of its best known proponents, Stevan Harnad, Professor in the Cognitive Neuroscience Center at Université du Québec à Montréal:

“The open access initiatives are not aimed at competing with or replacing publishers. They constitute a parallel movement concerned with access and not with publishing... Secondly, open access is not aimed at resolving the serial crisis forced by libraries, although this may prove a by-product of the initiatives. The primary goal is to assist researchers maximise access to and the impact of their own research, not to resolve the budgetary problems of libraries... Third, open access is not aimed at providing access for teachers, students and the general public... Fourth, open access initiatives are not aimed at providing access for the Third World. Again, this will be a side effect, but we cannot present the movement as motivated primarily by this.”
(Harnad, 2003)

These concepts have been around for more than 10 years, but some 5 years ago the Soros Foundation launched the ‘Budapest Open Access Initiative’, which seeks open access, i.e. free access to the scientific research texts that authors give to publishers without asking for any kind of royalty or payment.³ The Initiative recommends two complementary strategies: the practice of self-archiving, where an author deposits a copy of an article in an open website (while possibly continuing to publish in conventional journals), and the creation of a new generation of online open access journals.

A significant number of universities, particularly in the U.S.A., Britain, and the Netherlands, have established institutional repositories. Into these they are placing the outputs of their staff, the research papers and teaching materials of their academic staff, internal reports and other documents produced by the administrators, and in some cases audio-visual records of events. Provided that these repositories conform the guidelines issued by the Open Archives Initiative⁴, they should be indexed by search engines. However, the issues relating to quality control, and long-term archiving of the texts included in the repositories has not yet been adequately addressed.

Over 1,500 journals in a multitude of languages are now recorded by the Directory of Open Access Journals⁵ maintained by Lund University in Sweden. Only journals that operate a peer-reviewing system are listed, so they are of comparable quality to those published by the commercial publishers. But the Directory only provides links to the journals, and provides an index that is still experimental and incomplete. It does not house their databases, or accept any responsibility for archiving them.

If one looks at the origin of these open access journals, there are a variety of financial models underpinning their current existence, including one in which authors pay to have their work published. That appears to be little more than a variation on the old business model in which the publisher takes money before producing a journal, and does not guarantee long-term preservation of the

³ Budapest Open Access Initiative [online]: <http://www.soros.org/openaccess/index.shtml> [Accessed 12 April 2005]

⁴ Open Archives Initiative [online]: <http://www.openarchives.org/> [Accessed 3 January 2006]

⁵ DOAJ [online]: <http://www.doaj.org> [Accessed 30 September 2004]

output. However, most of these 'open access' journals appear to be being subsidised in some way by institutions or individuals. The future sustainability of these journals has not been proven. There is a lot of energy and funding for start-up projects, but regular support is less assured, particularly when the financial support comes from institutions or governments that have to reconcile conflicting demands on limited budgets. Let me give you a couple of examples.

In Brazil, in 1997, the research support agency of the State of Sao Paulo began to support the development of an open access electronic journals service to raise the standards and visibility of scientific journals published in Brazil.⁶ The model has been widely adopted in South America, particularly by the medical community, and the office in Sao Paulo provides a central service for them all – although they are funded separately in each country. But, in 2004, the State agency in Sao Paulo was seeking additional support, and is clearly questioning whether it should be expected to support something that has an international role? What, then, are the prospects for individual institution's repositories?

Anecdotally, I can also point to an acquaintance of mine who has established a successful and highly regarded open access journal, but he has recently retired, and the journal's database is stored on his former university's computer. What are the prospects of that journal continuing? Who will devote the time and energy required to undertake the editorial role without financial reward in some form, even if it is only an appropriate allowance of time within a personal employment contract? Which university will accept responsibility for a growing database, and for migrating it through technological changes in the future?

Providing a permanent archive is another issue. Archiving in the paper world is undertaken largely by the official deposit libraries, usually national libraries. Publishers provide copies for the deposit libraries, but they take no active part in the archiving process as such. They seem to wish to do the same in the digital world. Although the publishers have been anxious to protect their journals' content from unlicensed use, they have shown a marked reluctance to commit significant financial support to permanently archiving it electronically (Van Drimmelen, 2004). Elsevier have designated the Dutch National Library as its principal archival site; Springer have made a similar arrangement with the German National Library. But in the digital environment, you always eventually need to adapt to new computer hardware and software, and these change rapidly and significantly over time – and preserving the database thus brings with it unpredictable costs. How can individual institutions cope with the technical and financial challenges of providing electronic archives? What is the publisher's responsibility?

And there is still the problem of linguistic isolation. Linguistic isolation is not new. In the Nineteenth Century, a lot of the world's best science was published in German, and monoglot English speakers were isolated from it! Clearly, most countries will wish to continue to see the results of research undertaken in their country published in their country and in their own language. So how can their governments assure their researchers that their work will become visible in an

⁶ SciELO - Scientific Electronic Library Online [online]: <http://www.scielo.br/> [Accessed 7 August 2004]

international arena? Translating every paper into English before mounting it on the Web would be a costly process.

So, what is the alternative? It has been said that few scientific papers published today are read thoroughly. That is an inevitable consequence of increasing the volume of papers available but not increasing the time available to read them! The vast majority of papers probably receive no more than a cursory glance. The reader may look at the title - to see if it is potentially interesting; the author and his institution - as a further guide to the probable quality of the work; the abstract - to note whether the results indicate anything significant; and - if they are not clear in the abstract - the materials and methods used to assess the validity of the results (Franklin, 2003). 'Hungarian Library Abstracts' has provided a good model for this during the print era, albeit focused on a specialist area. It is encouraging to see *Elektroniczna Biblioteka*⁷ providing a good example of what is possible in the digital era.

©The author, January 2006

AUTHOR



Ian Johnson has held senior positions at the Robert Gordon University, Aberdeen, Scotland since 1989, when he was appointed Head of the then School of Librarianship and Information Studies, and where he led the establishment of a wide range of courses and research in library and information sciences, publishing studies, and corporate communication. Following the merger of 4 Schools to create the Aberdeen Business School, his responsibilities now focus on the development of teaching and learning policy and the School's human, financial and technical resources. Previously he was in charge of industry liaison and continuing education programmes at the College of Librarianship Wales (the University of Wales School of Librarianship and Information Studies); Assistant to the British Government's Advisers on library matters; and an operational manager in public libraries.

He was Chairman of the International Federation of Library Associations and Institutions (IFLA) Section on Education and Training from 1991 to 1993, and Chairman of the Professional Board of IFLA from 1993 to 1995. He was also Chairman of the (British) Library Association's Personnel, Training and Education Group from 1993 to 1995, and from 1996 to 2000 represented the Group on the Council of The Library Association. He was Chairman of the Heads of Schools and Departments Committee of BAILER: the British Association for Information and Library Education and Research from 1997 to 2000, and Chairman of the Executive Board of EUCLID: the European Association for Library and Information Education and Research from 1998 to 2002. He is currently joint editor of *Libri:*

⁷ EBIB - Elektroniczna Biblioteka [online]: <http://ebib.oss.wroc.pl/english/index.php> [Accessed 6 January 2006]

international journal of libraries and information services; and a member of the Editorial Board of *Education for Information*.

REFERENCES

FRANKLIN, J. (2003) Open Access to Scientific and Technical Information; the state of the art. *Information Service and Use*, 23 (2/3), 67-86

HARNAD, S. 2003. The research impact cycle. *Information Service and Use*, 23 (2/3), 139-142

SCHONFIELD, R.C., KING, D.W., OKERSON, A. and FENTON, E.G. 2004. *The non-subscription side of periodicals: changes in library operations and costs between print and electronic formats*. Washington, D.C., U.S.A.: Council on Library and Information Resources. [online]: <http://www.clir.org/pubs/reports/managing.html> [Accessed 6 January 2006]

VAN DRIMMELEN, W. 2004. Universal access through time: archiving strategies for digital publications. *Libri*, 54 (2), June, 98-103