

Two Worlds: About Bars and Stars in Scientific Information Publishing, An Analysis of Open Source Ideology As a Means of Self-controlled Publishing.

by Cees de Blaaij

Zeeuwse Bibliotheek, Academic Department, Middelburg, Netherlands

Abstract:

Scientific publishing has become very profitable for several publishing companies. Information in our age has become a first rate economic asset. Another consequence is that smaller publishing companies have gradually been taken over by bigger ones. Ergo there is less competition and more concentration of economic power in the publishing sector. At the same time it has become more important for the mammoths of the publishing industry to protect these interests and give it a sturdy legal basis. This approach has triggered significant changes in intellectual property laws on a global scale. Global diversity of intellectual property became a global standard because economic powers wanted to control distribution channels to reach customers.

This development did not benefit large groups of authors in general. Especially those authors who had and still have contractually obligations to the bigger publishing companies cannot make their scientific information accessible to the larger public. The simple reason for this is that the price for consumers - like libraries - has become too high. Furthermore that authors have transferred their rights to the publisher. This has resulted in a Catch 22 situation: "you-can-check-out-any-time-you-like but-you never can leave".

In less poetic words: this "for profit" approach has caused an access crisis in scientific information because the ideological and legal basis of the scientific information chain has been disturbed. This article reviews this situation and analyses the viability of present efforts for publishing scientific information (including grey literature) via other kinds of publishing modes based on "open source ideology".

This approach benefits authors of scientific information in general, but especially the authors of grey literature because of the public nature of this type of information. An open source approach counterweights the present economic policies of big publishing houses. The sharing of knowledge is the primary goal based on public interest. Secondly the problem of public access is guaranteed and thirdly the author(s) have more self-determination. They have more control of their situation.

Introduction

The UK House of Commons Select Committee on Science and Technology published a report on science and technology on the 7th July this year¹. In this report the committee stated "there is a mounting concern that the financial benefits from the Governments substantial investment in research is being diverted to an excessive degree into the pockets of publishers

¹ UK Science and Technology Committee, Tenth Report, Scientific Publications: Free for all?, dd. July 7th 2004; HC 399-I, HC 399-II, source: <http://www.parliament.the-stationery-office.co.uk/pa/cm/cmsctech.htm>

shareholders". Ian Gibson, the committee's chairman, even accused commercial publishers even of "ripping off the academic community".²

This statement characterizes for a large part the feelings that exist today about publishers in the intellectual public domain established by the activities of the scientific community. This domain can be considered as a global information pool with two sides fighting for a larger share of the knowledge pool.

The development of new digital technologies opened new ways of distributing and exploiting information. Scientific information became a mining area for commercial publishers: an "intellectual land-grab" was the result. A battleground for the involved scientists and publishers, especially the commercial publishers in the scientific, technical and medical fields.³

The actual setting resembles a Prisoners Dilemma game⁴: "Two men look out the same prison bars; one sees mud and the other stars".⁵ The first player represents the research community for the greater part dissatisfied with the practices of the scientific publishing industry due to control of intellectual property rights and consequential restrictions on the free circulation of scientific knowledge.

The other player represents the publishing industry, trying to exploit the same resource at a maximum profit for his own benefit.

Game theory

Each player is without concern for the well being of the other player. This doesn't lead to an optimum solution. According to the principles of game theory the best strategy for a given

² The Times (London), August 6, 2004.

³ The humanities and social sciences are not considered here.

⁴ A good introduction to Prisoners' Dilemma, including studies of strategies and discussion of the game's significance is Robert Axelrod's **The Evolution of Cooperation** (Basic Books, NY, 1984).

⁵ The Oxford Dictionary of Quotations is the source of this quotation by Frederick Landbridge (1843-1923) from his book, A Cluster of Quiet Thoughts, Religious Tract Society, 1896.

player is often one that increases the payoff to one's partner as well. It has also been shown that there is no single "best" strategy; how to maximize one's own payoff depends on the strategy adopted by one's partner. Only by cooperation the situation would improve, according to the pay-off matrix⁶. At this moment both players are not working together but a new kind of public-private publishing model is desirable if not vital to serve the needs of the scientific community.

To show this I will first evaluate the present subscriber-pays model of scientific publishing on its impact in respect to the academic community. Secondly I want to deal with the problem: Can a model of common property rights mean – based on what is called Open Access or more specific Open Source – as a model for scientific publishing.

In regard to Open Source we need to take two considerations into account. Besides free access to research, we also need a balanced control of intellectual property rights in the framework of open source ideology. The way grey literature has been handled so far on institutional and subject-specific levels can offer an experience for new ways in Open Access publishing.

Market monopoly

The free market has to a certain degree monopolized the scientific information market.⁷ Reed-Elsevier is the leader in digging the gold mine. Estimates are that they control 20%-25% of sales of the STM market and publish about 1800 titles. This means that they set the tone in the

⁶ A **payoff matrix** or **payoff function** is a concept in game theory, which shows what payoff each player, will receive at the outcome of the game. The payoff for each player will of course depend on the combined actions of all players. For the situation regarding Open Access it resembles a scenario of two states engaged in an arms race. The Open Access Movement and the commercial publishers will reason that they have two options either to use or don't use or come to an agreement. Neither side can be certain that the other one will keep to such an agreement. They both incline towards their own model.

	Cooperate Com. publishers	Defect Com. Publishers
Cooperate OA movement	win-win	lose much-win much
Defect OA movement	win much-lose much	lose-lose

serials marketplace. Behind Elsevier there is group of commercial publishers who resemble the leader in marketing strategy like Springer/Kluwer. This merger was engineered by Candover and Cinven, a venture capital firm specialized in exploiting acquisitions for profit.⁸

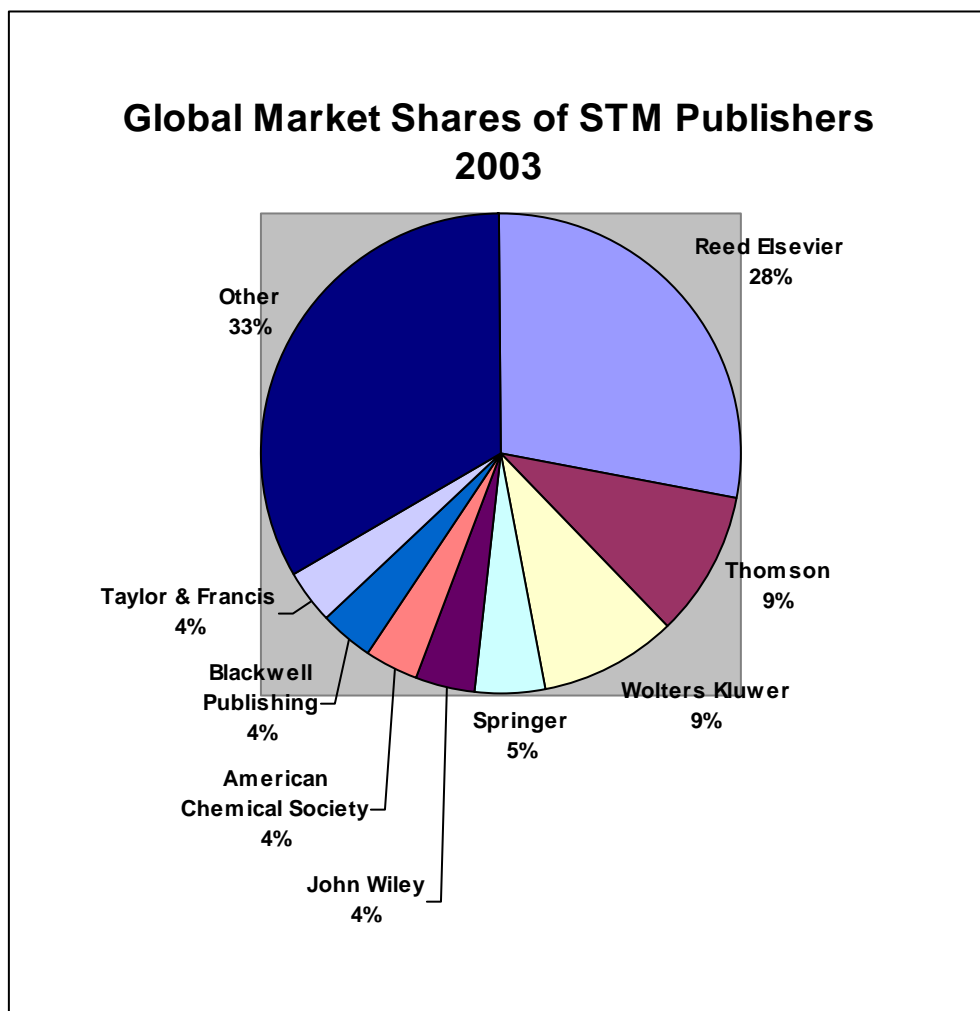


Figure 1.⁹

⁷ The situation for the humanities is quite different. Also Open Access works differently Humanities than for STM market, see: Peter Suber, Promoting Open Access in the Humanities, source: <http://www.earlham.edu/~peters/writing/apa.htm>

⁸ CANDOVER/CINVEN / BERTELSMANNSPRINGER (Case No COMP/M.3197 - Mergers) [2003] EComm 54 (29 July 2003)

⁹ Source: UK Science and Technology Committee, Tenth Report, Scientific Publications: Free for all?, dd. July 7th 2004; HC 399-I, HC 399-II, source: <http://www.parliament.the-stationery-office.co.uk/pa/cm/cmsctech.htm>, p. 5. The percentages are rounded up or down to whole numbers.

Figure 2 Key figures Elsevier¹⁰

Key figures Elsevier					
Year	1999	2000	2001	2002	2003
Net Revenues*	2,577	3,091	3,671	3,991	3,571
Net Profit*	-48	27	101	144	242
* in million(s) of Euro					

Dividends						
Fiscal Exercise	2003	2002	2001	2000	1999	1998
Dividend Net (Euro)	0.22	0.21	0.21	0.19	0.15	0.26319

Earnings per share					
Year	1999	2000	2001	2002	2003
Earnings per share (in Pence)	-0.07	0.04	0.13	0.18	0.31

Sales per activity	
Scientific and medial publications	28.00%
Legal, fiscal and regulatory publications	27.00%
Economic information	27.00%
Education	18.00%

As we can see scientific publishing is a very rewarding business. The margin of profits has gone up considerably the last four years as a result of ever increasing subscription prices and are as much as 34% for Reed-Elsevier. Elsevier is defending this by saying that such a margin is necessary to ensure the sustainability of STM journals and publishing more papers each

¹⁰ Source: Yahoo Finance <http://uk.biz.yahoo.com/p/e/elsn.as.html#2> (consulted 18th Oct. 2004)

year.¹¹ This is not very satisfying if we compare these high profit margins to the general situation of faltering library budgets. In general academic library budgets simply cannot keep up with increased costs and new subscriptions.

Secondly the costs of print publications restrict the amount of information being published. Not many individuals would subscribe to costly journals. So only libraries will buy them as far as this is still possible.

In 2003 Cornell University¹² paid \$ 1.7 million for 930 Elsevier subscriptions. This consumed 20% of the university's total periodical budget. That is only 2% of the total number of serial titles to which Cornell subscribes. There was too much financial restraint. The result was massive cancellation of Elsevier titles. Cancellations by other universities like Harvard¹³ and MIT, Duke University, University of North Carolina, North Carolina State University¹⁴ happened for the same reason.

One reason it came so far is that libraries kept on paying to serve the academic community and they relied on high-priced titles with a high esteem for the peer reviewed journals.

Publishers believed that libraries would complain, but they would pay up in the end.

Stockholders wanted to see rising profits so publishers will raise prices as much they can.

But with the cancellations a new step has been made towards a situation more favourable for Open Access. Cornell instigated after the cancellations they would support the development of Open Access journals as a viable alternative.

¹¹ The Economist, August 5th 2004

¹² Cornell Faculty Senate Resolution. Resolution regarding the Universities Library Policies on Serial Acquisition, with Special Reference to Negotiations with Elsevier. Source: <http://www.library.cornell.edu/scholarlycomm/resolution.html>

¹³ Source: <http://www.news.harvard.edu/gazette/2004/02.05/10-libraries.html>

¹⁴ Source: <http://libraries.mit.edu/about/journals/cancellations.html#access2>

Intellectual property rights

The second problem is the control of intellectual property. There are several implications which are a part of the subscriber-pays model but can be avoided in an open source model.

- Authors provide their article for free to scientific publishers. At the same time they have to transfer their copyright to publishers. They do not get paid, instead they must find acclaim within the academic community. In normal circumstances suppliers of economic goods get paid for commodities.
- Scientific information is becoming more and more centralized due to economic concentration of publishing companies by mergers. This means there is less competition and more restrictions to access related to high prices.
- Publishers limit the use of journals by using access control by IP address recognition, number of simultaneous users etc. Licensing conditions, that do not reflect usage patterns and service requirements in many cases.
- Cancellation of printed journals by libraries can lead to access restrictions of digital back issues due to licensing regime
- The “fair use” principle might be at stake (case Felten vs. RIAA)

Influence of copyright law

A general objective of copyright law is to stimulate the creating of scientific works and make it possible that after a limited time these works become available to the public domain. The introduction of new copyright laws in the late 90's did exactly the opposite. The extension of the duration of copyright protection in Europe¹⁵ in 1993 and the USA in 1998¹⁶ caused the

¹⁵ EU Directive on harmonising the term of Copyright Protection, 1993

¹⁶ Sonny Bono Copyright Term Extension Act, October 7th, 1998. The change in the law allows corporations to have exclusive rights for a total of 95 years, instead of 75 years. For individuals, such as authors and songwriters, it extends copyrights to a total of 70 years after death, up from 50 years.

effect that writings belonging to the cultural heritage will stay invisible like unpublished manuscripts needed for research. In the situation of the USA it means that no new works will enter the public domain until January 1, 2019¹⁷. Another example that hampers research is the introduction of new copyright law related to the use of digital technologies.

In the American situation creating excerpts from journal articles for academic purposes is considered to be fair use but the Digital Millennium Copyright Act (DMCA)¹⁸ makes it illegal to create such excerpts by circumventing copy protection on electronic media.

Maintaining the “fair use” exception does not provide for enough protection.

The introduction of DCMA brought liability to the scientific world. I refer to the case *Felten et. al vs. RIAA (Recording Industry Association of America) et. al.*¹⁹.

This was a case in which Princeton academics were suing the recording industry over abuse of the DMCA to silence research that could impinge upon the entertainment industry's desires to protect its intellectual property at all costs.²⁰

The recording industry threatened the researchers under the DMCA for their planned release of a research paper describing the defects in the proposed Secure Digital Music Initiative (SDMI) lock-down schemes for audio CDs. The original threats led the researchers to withdraw the paper from a planned conference. In response to the lawsuit, the recording industry promised not to sue the research team for presenting the research at a security conference in August 2001. Only after getting assurances from the government, the recording industry, and a federal court stated that the threats against his research team were ill conceived and would not be repeated. Felten and his team decided not to appeal. The question

¹⁷ No copyrighted works will enter into public domain due to term expiration in the United States until January 1, 2019,

¹⁸ For an overview see: Digital Millennium Copyright Act: Status and Analysis, source: <http://www.arl.org/info/frn/copy/dmca.html>.

¹⁹ Plaintiffs' Brief in Opposition to RIAA, SMDI And Verance's Motion To Dismissing *Felten v. RIAA* (Aug. 13, 2001), see: http://cyber.law.harvard.edu/openlaw/DVD/cases/Felten/20010813_eff_felten_brief.html.

²⁰ Electronic Frontier Foundation Complaint, *Felten vs. RIAA* (June 6, 2001), see: http://cyber.law.harvard.edu/openlaw/DVD/cases/Felten/20010606_eff_complaint.html. Also other documents at: http://www.eff.org/IP/DMCA/Felten_v_RIAA/ and <http://www.riaa.com/news/newsletter/press2001/042501.asp>

is if the current national or international copyright regimes are being efficient – whether it can reach an optimum between private incentives and social benefits. The case of Felten vs. RIAA shows that scientific research can be put in jeopardy. There are quite a number of law cases in which copyright law is supportive in protecting the interests of the entertainment industry and not enough attention is being paid to the issues of freedom of access and of the public domain. To advance to a more fruitful situation for science and the public domain several requirements have to met:

- Existing copyright law should not be seen as a dogma, but should be used as an instrument to encourage scientific research.
- Placing a low limit on the scope and duration of copyright protection to make sure that scientific information becomes widely available. Scientific information is a strong social asset so it needs to be legally treated as such.
- Revisions to copyright law should not take vested interests or particular interests in question. For a system of property rights to function the cost of establishing and enforcing the regime must not exceed the benefits.
- Too many restrictions on access can ultimately harm the foundations of a democratic society that needs to be well informed.

Subscriber-pays model under review?

What will be the result of all this? Clearly the present subscriber pays model is in crisis. The UK House of Commons' Science and Technology Committee stated that the current model for scientific publishing is unsatisfactory and called on the UK government to support Open Access journals: that is digital, online, free of charge, and free of most copyright and licensing restrictions.²¹ The committee concluded however that the attitude of the government was

²¹ For an introduction to Open Access use the Open Access Overview, source: <http://www.earlham.edu/~peters/fos/overview.htm>

disappointing and noticed that the British government had “given little thought to the issues so far”. The committee hopes that the Report will prove to be a catalyst not only on a national scale but also internationally because of general interest.²²

This hope was not too far fetched as other governmental institutions and universities in the world tackled the same problems.

Just before the UK report was published, the U.S. House of Representatives Committee of Appropriations approved a provision in a bill that backs Open Access to material published by the National Institutes of Health.²³ The committee expressed its concern about the lack of Public access to research findings and the rising price of journals.

Leading research associations in Germany, France and Switzerland signed the so-called Berlin Declaration – a call for free access to research findings.²⁴

The European Commission has also started an investigation into the publication of academic journals across Europe. The commission is seeking measures to improve access to research. It will look at the trend towards Open Access publishing where researchers pay to publish articles.²⁵ Also the OECD Committee for Scientific and Technological Policy on a ministerial level decided to “work towards the establishment of access regimes for digital research data from public funding”²⁶

Towards an Electronic Open Access Paradigm

A different approach that could fulfil the needs for sharing scientific knowledge and at the same time has a balanced approach towards intellectual property rights is needed. The field of computer science offers comparative solutions. Already in the beginning of the 1980’s some

²³ NIH Open Access Plan – Frequently Asked Questions available at <http://www.earlham.edu/~peters/fos/nihfaq.htm>

²⁴ Source: <http://www.zim.mpg.de/openaccess-berlin/berlindeclaration.html>

²⁵ The Guardian, City Pages, June 18, 2004, p. 30

²⁶ 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 Communiqué

computer programmers²⁷ dissatisfied with restrictions to release their programming codes and to build on code of others, started new projects where they had the right to share their work. In 1984 the copyleft mechanism was introduced. Copyleft works under the GNU General Public License²⁸, is a free software license, and gives the right to all users the freedom to redistribute and change software or any program derivated but only if the distribution terms are unchanged. In this way the code and the freedoms become legally inseparable. Copyleft itself is a method of licensing to achieve its goals: to create the most favorable conditions for a wide range of people to feel invited to contribute improvements and/or elaborations to this work, in a continuing process.

In the world of computer science there is a discussion going on which regime of license provides a larger degree of freedom. Basically this is the same discussion as in the scientific community how to provide for Open Access and to promote a freer exchange of information. The system of scientific publishing requires the attributes of peer review and adequate access control. This working method resembles a model used by software developers known as Open Source.

The Open Source system depends on a developer who is willing to make software code available to the public and uses a system of peer review to test and refine the application. This leads to debugging and a more stable code.

The Open Source model provides a developmental model because it also operates on basis of collaboration and peer review. Feller and Fitzgerald stated that the Open Source Model

- Is parallel, rather than linear

²⁷ Richard Stallman launched the GNU project in 1983 with the objective of creating a complete free operating system. He is the founder of the Free Software Foundation. To promote GNU, Stallman published the GNU Manifesto in Dobb's Journal of Software Tools Vol. 10, Number 3, March, 1985 “, to bring back the cooperative spirit that prevailed in the computing community in earlier days...”

²⁸ GNU is a recursive acronym for “GNU's Not UNIX”; it is pronounced “guh-noo.” For more information: <http://www.gnu.org>

- involves mutual collaboration between communities of developers all over the world
- uses independent peer review
- provides feedback to user and developer contributions
- includes participation of motivated developers
- includes increased levels of user involvement
- make use of extremely rapid release schedules²⁹

The Open Source community's use of copyright provides a strong model for the academic community but also from a processual perspective. Science as a social phenomena often used the practice of sharing and reviewing of information. In the Middle Ages literature in the format of theses were nailed to the wall for review. So the academic research model complies with this Open Source ideology.

Another interesting development is also the use of Creative Commons: a legal method which enables copyright holders to transfer some of their rights to the public while keeping others through a mixture of licensing and contract schemes. The target is public domain or open content licensing terms and gives copyright much more flexibility. Present international copyright law does not provide such flexibility for sharing information. The intention is to avoid problems such as I mentioned in the case Felten c.s. Creative Commons was launched in 2001. Movies, books, songs and images are being placed under this umbrella of flexible copyright. Recently in November 2004 Science Commons was launched project to apply the philosophies and activities of Creative Commons in the realm of science. Public Library of Science (PLOS) which has agreed to adopt CC attribution license as its standard license. Creative Commons underpins also the thought of the 1st US Copyright Act of recreating the balance of copyright and keep copyright duration limited by voluntarily releasing that right after a shorter period.

²⁹ Joseph Feller, Brian Fitzgerald, Understanding Open Source Software Development, London : Addison-Wesley.

Another important development is the fact that World Intellectual Property Organization has adopted a development agenda³⁰ that acknowledges the need for balance in the worldwide policy on trademark, copyright and patents. This means attention for open source and the Creative Commons project. The interests of the public had never been represented before at WIPO meetings. With the pressure of non-governmental organisations and adoption of the development agenda the interests of the non-profit are taken more seriously. This is hopeful for the future.³¹

Involvement of Grey Literature

Building collections of grey literature offers good examples of the way it has been made available to the public. Digitalisation and using the Internet for free distributing of information like government information helped the public domain. As the main characteristic of grey literature is its non-commercial nature and supports the idea of Open Access.

It would be interesting to make some cost-benefit analyses in comparing the use of four channels for availability: electronic journals, institutional repositories, subject-specific repositories and self-posting on authors' home pages. These analyses would give us more insight in respect to the viability of the Open Access system.

Subject specific repositories are the oldest. It should be noted that before the coming of the Internet there already existed some tradition in exchanging preprints in research areas where speedy publication was required. Subject repositories allow early and efficient dissemination if contributors involved upload their manuscripts and conference papers in timely manner.

Relatively low maintenance costs are involved. Institutional repositories started when universities began to realize that there was a digital information overload syndrome and there

³⁰ WIPO General Assembly, Thirty-First (15th Extraordinary) Session Geneva, September 27 to October 5, 2004. Proposal by Argentina and Brazil for the Establishment of a Developmental Agenda. See: http://www.wipo.int/documents/en/document/govbody/wo_gb_ga/pdf/wo_ga_31_11.pdf

³¹ Future of the World Intellectual Property Organization, see: <http://www.cptech.org/ip/wipo/futureofwipo.html>

was a need to guarantee that research material like theses and working papers would be available for the years to come and systematically maintained.

These repositories also offer an opportunity to avoid the temptation of self-posting. It's important for institutional repositories to make use of common Web standards like the Open Archives protocol.

Self-posting is perhaps the most used method to disseminate information but it is not effective because of a lack of adequate indexing. Using general search engines could be helpful but they hardly can make enough distinction between what is relevant and what is not.

Costs will do it

If Open Access will be a big success depends for a large part on costs and recognition inside the scientific community of the peer reviewed quality of Open Access journals.

On June 17, Credit Suisse First Boston released a report "analysing the effect of the new European inquiry on Reed-Elsevier. From Elsevier's point of view, the good news is that the inquiry is part of a larger plan to double EU spending on scientific research (from 5 to 10 billion Euros/year), which will result in many more research articles. Increasing the number of articles published is a venerable justification for journal price increases. The bad news is that the EU already seems to accept that libraries face a pricing crisis, that academics face an access crisis, and that OA is part of the solution. If so, this could endanger Elsevier's 35% profit margins on STM journals. While the EU may not have the power to change the structure of journal publishing in the member countries, the reports from the UK and EU inquiries may stimulate policy changes in the way research is funded in the US, which comprises more than 50% of the STM journal market."³²

³² SPARC Open Access Newsletter, issue #75, source: <http://www.earlham.edu/~peters/fos/newsletter/07-02-04.htm>

The UK-based Wellcome Trust has released a report stating that Open Access could reduce publishing costs by as much as 30 percent. The trust, an independent research-funded charity, estimated publishing costs based on "discussions with individuals in senior positions" at various publishing operations, as well as existing literature on STM publishing.

For a "good- to high-quality journal," the report found, "first copy" costs--the cost of getting an article finalized for publication--would likely be about \$1500 per article under an Open Access model. Overall, the report concluded, the total cost of access to research would add just an additional one percent to the costs of research.

Reed-Elsevier believes the Open Access system is flawed for two reasons: first, it is not covering its costs, and second, it transfers the cost from consumer to producer. Authors and research institutions must pay to be published on Open Access, between \$ 500 to \$ 1,500 a time, but Elsevier believes that the cost of maintaining the scientific system - which requires pieces to be reviewed by the authors' peers in journals - is actually \$ 3,000 to \$ 5,000 a paper.³³ Other publishers have put the costs of article production at £1250, closer to \$2000 per article. Despite the hassle about costs Elsevier has permitted that as of June 3rd authors of papers can post the final text of their articles on the authors' personal or their institutions websites or repositories³⁴ Also Springer will start from January 2005 to put all back issues of it's 1.250 scientific journals online.

So things are moving in the right direction concerning Open Access. Unfortunately a new study³⁵ by the Association of Learned and Professional Society Publishers (ALPSP) shows that 82% of senior researchers (4,000 thousand in 97 countries) knew "nothing" or just "a little" about OA. It makes it clear it will take some time to get scholars acquainted with Open Access.

³³ The Independent, February 20, 2004

³⁴ See: http://www.elsevier.com/wps/find/authored_newsitem.cws_home/companynews05_00145 and http://authors.elsevier.com/getting_published.html?dc=PRP

³⁵ ALPSP response to the report of UK Parliamentary Inquiry (1/10/04), source: <http://www.alpsp.org>