

# Scientific Publishing: the Dilemma of Research Funding Organisations

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# Scientific Publishing: the Dilemma of Research Funding Organisations

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Present changes in scientific publishing, especially those summarised by the term ‘Open Access’ (OA), may ultimately lead to the complete replacement of a reader-paid to an author, or funding-paid, publication system. This transformation would shift the financial burden for scientific publishing from the Research Performing Organisations (RPOs), particularly from scientific libraries, universities, etc, to the Research Funding Organisations (RFOs). The transition phase is difficult; it leads to double funding of OA publications (by subscriptions and author-sponsored OA) and may thus increase the overall costs of scientific publishing. This may explain why – with a few exceptions – RFOs have not been at the forefront of the OA paradigm in the past. In 2008, the General Assembly of EUROHORCs, the European organisation of the heads of research councils, agreed to recommend to its member organisations at least a minimal standard of Open Access based on the Berlin Declaration of 2003 (green way of OA). In the long run, the publishing system needs some fundamental changes to reduce the present costs and to keep up its potential. In order to design a new system, all players have to cooperate and be ready to throw overboard some old traditions, lovable as they may be.

## **The strategic role of scientific publications**

Research Funding Organisations and bodies that evaluate academic appointments or nominations of prizes base their decisions on the scientific quality of persons and their projects. In turn, because of our society’s fascination for numbers, scientific quality is predominantly measured by quantitative indicators, such as publication records, citations, and impact factors. It seems to be an inevitable consequence of a growing community of scientists – and perhaps also a product of the ‘political correctness culture’ – that personal knowledge and assessment of

colleagues is increasingly replaced by ‘objective figures’, although numerous warnings exist with respect to the limitations of bibliographic data.<sup>1</sup> We all play the game which, for the time being, makes publishing strategy one of the most important career factors for a scientist. Thus, it seems only fair to grant every scientist complete freedom when and where to publish the outcome of his or her research.

This, however, is just one side of the medal. The other is engraved by the growing difficulties of academic libraries to cope with the budgetary consequences of the fast growing market of scientific journals.

### **A new paradigm: Open Access**

Making the complete output of printed scientific information available to every scientist has become increasingly difficult during the last decade, not only in the so-called Third World, but also in many industrialised countries with a long tradition in research. This development, and the fast expanding world wide web, led to a new philosophy for the dissemination of scientific information named ‘Open Access’ (OA). In short, OA means the availability of information through the internet to everybody free of charge. In practice, OA stands for very different procedures, such as publishing in purely electronic OA journals (the ‘golden way’ of OA), in hybrid journals published on paper as well as electronically, and the deposition of conventionally published articles on a personal or institutional electronic depository (‘green way’).

While some Research Funding Organisations (RFOs) have quickly responded to this development by linking their grants to the obligation that all papers resulting from research supported by them should be published according to the golden or green way of OA, many others have ignored this development until now. A survey conducted in 2007 among the members of EUROHORCs, the Association of Heads of National Research Organisations in Europe, showed that only a few organisations have adopted a mandatory rule for OA publication, and merely one half of the member organisations have signed the Berlin Declaration of October 2003,<sup>2</sup> although the declaration, supporting the transition to the electronic Open Access paradigm, represents just a cautious first step in the direction of a new publishing strategy without binding character.

### **The dilemma of Research Funding Organisations**

Generally, RFOs are not found at the forefront of the OA paradigm. Still, a few exceptions stand out. One is the British Wellcome Trust, which since 2005

...requires electronic copies of any research papers that have been accepted for publication in a peer-reviewed journal, and are supported in whole or in part by

Wellcome Trust funding, to be made available through PubMed Central and UK PubMed Central as soon as possible and in any event within six months of the journal publisher's official date of final publication.<sup>3</sup>

On the one hand, the Wellcome Trust provides grantholders with additional funding to pay for OA publications or for so-called sponsored OA in hybrid journals, which allow unrestricted access to printed articles provided that the author pays for it. On the other hand, submission of articles to journals which do not allow for OA after a delay time of not more than 6 month, is not permitted to scientists supported by the Trust.

The US National Institute of Health (NIH) serves as a second example of a RFO at the forefront of OA. In May 2005, NIH has adopted a recommendation for OA publications (primarily in the form of submissions to PubMed Central), but only 10 to 20% of all the eligible papers were actually submitted. This meagre compliance caused the US Congress in December 2007 to pass a bill that makes mandatory the deposition of any article originating from NIH support on PubMed Central not later than 12 month after journal publication. Like the Wellcome Trust, the NIH restricts submission of articles to journals with rules for publication compatible with NIH requirements.

It is not accidental that both cited examples refer to RFOs active in supporting biomedical research, i.e. a field in which appropriate repositories exist and the turnover time ('half-life') of articles is very fast. Agencies funding projects in the whole spectrum of research disciplines – most national agencies funded by public money belong to this group – are confronted with a much broader variety of publication cultures than found in biomedical research. Given the high career-relevance of publications, RFOs that see themselves as supporters of individual researchers and their careers are reluctant to impose publication rules that may ultimately be harmful for the scientists. For instance, in the humanities, the writing of books and chapters of books is more common and more rewarding than writing journal articles, which are often published in small, regional journals, frequently in a language other than English. Since the 'half-life' of articles in humanities and social sciences is often several years – that is, much longer than in biomedicine – publishers of such journals often insist on embargo times of more than one year or forbid OA at all.

There is yet another aspect that makes OA a difficult issue for a public RFO. In most countries there exists a traditional division of responsibilities between research institutions (such as universities) and RFOs: the former provide all the basic infrastructure needed to do research (and a scientific library is part of this), the latter cover the costs for specific research projects. Therefore, many RFOs, even if they have adopted OA rules, are reluctant to pay for OA publications or for sponsored OA articles in hybrid journals, since covering such expenses, if it becomes a general rule, would ultimately mean shifting costs from the budget

of the universities to that of the RFOs. In fact, hybrid journals (with both reader-paid and author-sponsored OA articles) do not relieve the budget of libraries at present. Many libraries pay for online access already, and most potential readers of journal articles have OA access to journals through their libraries. Therefore, author-sponsoring of OA articles means paying twice for the same service, once by the library and once by the author, while the extra profit goes to the publishers. At present, only a few percent of published articles have author-sponsored OA, but the cash would become quite large if the percentage were to increase, particularly with regard to the fact that the charges to make articles electronically available to everybody (sponsored OA) are exorbitantly expensive and give unwarranted extra profit to the publishers without much benefit to the scientific community.

The essence of OA is often described as a transition from a reader-paid to an author-paid publishing system with two major benefits: the reduction of overall costs and a much better availability of scientific information. Present reality looks different: we are not replacing one system by another, but adding one to the other. While it is true that the availability of information has improved (at least for those with easy access to the internet), the costs are still higher, even higher than before. In other words, the optimal, cost-efficient and fair system for disseminating scientific information has yet to be found. This explains the dilemma of RFOs and their reluctance to automatically pay for OA, even if they ask their clients to make their results available by putting their publications into repositories.

### **Temporary steps**

Although the information technologies have revolutionised the potential to disseminate scientific results – and continue to do so – the essence of scientific publishing has remained virtually unchanged (reader-paid and on paper). There are several reasons for this, starting with the inherent conservatism of many scientists, especially with regard to subjects outside their particular field, the obvious and understandable economic interest of the publishers, and the many open questions regarding the long-term preservation of information if not printed on paper, to mention just a few. ‘Never change a winning horse’ is the phrase that I hear most frequently when talking about OA. However, there may be a more basic problem than mere ‘stubbornness’ and ‘greed.’ Certain changes cannot be made gradually but need a significant jump. Often-cited examples are those of a change of keyboards to make typing easier, or the change from left-hand to right-hand driving. In engineering, systems that defy gradual change are named ‘locked’. I am personally convinced that, although initiatives such as those of the Wellcome Trust or NIH are of vital importance to prepare the ground for change,

the real breakthrough yielding advantages to all players involved will only be possible if RFOs, libraries and publishers all sit together to create a truly new system. Such a system must be open to everybody, it must be cost-efficient, and it must guarantee long-term preservation of scientific information. It will not be free of charge (remember: there is no such thing as a free lunch), so the costs have to be covered by someone, whether it be the reader, the author, the institution, the funding agency, the government, or some combination of these.

As long as such a 'grand solution' is not found, individual or organisational steps, such as those taken by the NIH, the Wellcome Trust, and others, are helpful to gather relevant experience from different possible solutions. The PEER project presently under review within the seventh framework program of the EU is such an initiative in which publishers, research organisations, and libraries will conduct an experiment to assess the impact of OA on the dissemination of information and on the economic performance of journals.

Along the same lines, in April 2008 the General Assembly of EUROHORCs has agreed to recommend to its member organisations (MOs) a minimal standard regarding OA<sup>4</sup> which includes signing the Berlin Declaration. The central part of this declaration reads as follows:

On 18 April 2008, the General Assembly of EUROHORCs agreed to recommend a minimal standard regarding Open Access to its Member Organisations. At the same time, it acknowledges the fact that some MOs have adopted stricter rules already. It considers the proposed minimal standard as an intermediate step towards a system in which free access to all scientific information is guaranteed without jeopardizing the system of peer review, quality control, and long-term preservation. It encourages its members to continuously examine possibilities to move beyond the proposed minimal standard, to develop, jointly with the publishers, means to move toward full Open Access, and to reduce embargo time to not more than six months and later to zero.

Scientists and research organizations can support this recommendation in different ways:

#### *Recommendations for scientists*

1. High quality publication of scientific results in the appropriate journal – printed or electronic – or in books represents a major responsibility of every scientist.
2. When choosing the appropriate means of disseminating scientific information, authors should always consider the issue of Open Access. If a variety of options are found to be appropriate, higher priority should be given to journals with Open Access rules which are in minimal accordance with the recommendations defined by EURAB in December 2006.

*Recommendations for Member Organisations (MOs) of EUROHORCs*

3. All MOs of EUROHORCs should sign the Berlin Declaration on Open Access (2003). It is strongly recommended that whenever possible they adopt the EURAB recommendations or at least a weaker version of it by excluding a compulsory limitation of the embargo time to 6 months or less.
4. The overwhelming majority of scientific journals support self-archiving already, but only a very small minority of scientists make use of this possibility. Thus, all scientists, either funded by or doing research for MOs, should be informed about the already existing mechanisms for Open Access and strongly advised to make use of them.

**Scientific information: The search for a new cost-effective and fair model**

If one could, from the point of view of a scientist, reinvent the world of scientific publishing from scratch, that is, circumvent the deadlock of the present system, what would such a system look like? What would be its essential components in the age of the internet?

The ideal model of scientific publishing should take care of:

- (1) Peer review
- (2) Text editing
- (3) Final Layout, especially figures and tables
- (4) Creation and maintenance of repositories allowing for easy access by standard search tools
- (5) Possibility for libraries and individuals to produce or order paper copies
- (6) Guarantee for long-term preservation of electronic and/or paper version of information.

To design a new publishing system requires answering the following question: who should do what and who should cover the costs? The tentative answer sketched in Table 1 takes the perspective of a typical public RFO, which is responsible for the funding of all scientific disciplines.

The rationale behind the scheme is a distinct division of responsibilities between authors, publishers, research institutions and libraries. The scientific community should be in charge of the review process (as it is now) and, according to the principle of academic autonomy, cover the costs by rendering the reviews free of charge. The publishers, according to the proposed model, would act as administrative (review) and technical (editing, layout) service providers. Their costs would

**Table 1.** Scientific publishing: tasks, responsibilities, financing

Task	Responsibility	Financing
1. Peer Review	SC, organised by Eds, supported by Pub	RPO (RFO)
2. Text Editing	Author/Eds/Pub	RPO (RFO)
3. Layout	Pub	RPO (RFO)
4. Repository	RPO/Lib, (Pub)	RPO
5. Individual copies	Readers, Lib	Reader
6. Preservation	Lib	Lib, through budget of respective RPO

Eds = Editors; Lib = Libraries; Pub = Publishers; RFO = Research Funding Organisation; RPO = Research Performing Organisation (university, research institution etc.); SC = Scientific Community.

be covered by the research system (see below). The dissemination of journals would no longer be the task of the publishers, since all articles would immediately be made available through the internet (immediate OA). By separating the publishing process from information dissemination and by fully covering the costs of the former task, the present unfruitful discussion about delay periods (the time until an article can be made freely available after publication) becomes obsolete. I am aware that this scheme would mean a significant change of the role of the publishers; they would become competing service enterprises, at least in the journal segment, yet there would still be the book market (see below).

In the sometimes heated debate about OA, an argument that is often used is that paying for publications means paying for research twice. This argument may hold some truth in the case of some overpriced journals. However, it is certainly false if generalised. In the same way that researchers need an often costly infrastructure, the dissemination of their results has its price. In the model presented in Table 1, the administrative preparatory tasks (item 1 to 3) should be outsourced to the private sector. Its costs should be part of research funding. Here there are basically two solutions: either they are covered by the Research Performing Organisations (RPOs), as is mostly the case for the libraries until now; or the national authorities responsible for the distribution of research money decide to include the publication costs in the budget of the RFOs. Of course, a combination of the two schemes is also possible. Personally, following the tradition that the research infrastructure is the responsibility of the RPOs and that some of these costs are now increasingly compensated by adding a so-called overhead to the grants coming from the funders, I would prefer the institution-paid model, but another model would be suitable as well, as long as the responsibilities are clearly defined and become a general rule.



This brings us to the final question, the creation, maintenance and preservation of repositories. At present, several players are sharing this task: the scientists themselves with their personal web pages, the universities and/or their libraries, inter-institutional repositories such as PubMed, some RFOs, the ‘classical’ publishers with their electronic versions of paper journals, and pure OA journals. With the disappearance of paper journals it would be a natural consequence for the publishers to withdraw from the repository task. In turn, research organisations and national libraries have by far the longest tradition in the long-term preservation of scientific information; they seem to be the natural candidates for creating repositories, also because they are financed by public money and thus are less exposed to short-term policy changes due to economic reasons. Of course, this solution would include the possibility for universities to form national, international or disciplinary repositories and thus to gain experience and reduce costs. Finally, with the exception of some organisations such as the Deutsche Forschungsgemeinschaft (DFG) which traditionally supports scientific information systems in Germany, most RFOs are not responsible for libraries and other information systems. Therefore, they are not mentioned in tasks 4 and 6 in the last column of Table 1.

Most of what has been said applies to journal articles and thus is primarily to the exact and applied sciences, and to the bio-medical sciences. The story is very different for books – and therefore for the humanities. Books last longer, and are mostly sold and bought ‘on target’ (not as series). In spite of the many predictions regarding the disappearance of printed matter (remember the ‘paper-less office’), books will probably survive all electronic competition, and so will their market. In fact, for the publishers, the book market will be the future – much more so than the journals market.

To summarise, the publishing system needs some fundamental changes to reduce the present costs and to keep up its potential. While the different incremental changes proposed and introduced by the different players may help to explore new schemes, they will neither bring about the new solution nor reduce the costs – to the contrary, these changes are mostly cost-additive. In order to put in place a new system, all players have to cooperate and be ready to leave behind some old and cherished traditions.

## Notes and References

1. See, for example, Citation Statistics, a report commissioned by the International Mathematical Union (IMU) in cooperation with the International Council on Industrial and Applied Mathematics (ICIAM), and the Institute of Mathematical Statistics (IMS), June 2008, available at <http://www.iciam.org>
2. See <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html>

3. <http://wellcome.ac.uk/About-us/Policy/>

4. See <http://www.eurhorcs.org>

### **About the Author**

**Dieter Imboden** is Professor of Environmental Physics in the Department of Environmental Sciences at the Swiss Federal Institute of Technology (ETH) in Zurich. He studied theoretical physics in Berlin and Basel and received his doctorate at the ETH for his studies on theoretical solid-state physics. His interest for the environment, particularly water, led him to the Swiss Federal Institute of Aquatic Science and Technology (EAWAG) where he founded a research group for mathematical modelling, environmental physics and energy before taking the position at ETH. He is President of the Research Council of the Swiss National Science Foundation (SNSF), the major Swiss funding agency for basic research, and President of EUROHORCS, the European organisation of the heads of research councils.