

IST-2001-33127

SciX

Open, self organising repository for scientific
information exchange

D4: Recommendation, model comparison

Responsible author: Turid Hedlund

Co-authors: Bo-Christer Björk, Jonas Holmström

Access: public

Version: 1.0

Date: March 26, 20044

EXECUTIVE SUMMARY

The aim of this task is to focus on the developments made in open access publishing during the SciX project. A comparison is made of the baseline established in the SciX report *Scientific Publishing: As-is Business and information model* to the *Scientific Publishing: to-be business and information model*. A model of the value-chain of the scientific publishing process demonstrates especially the activities in the publishing models that can be bypassed in open access publishing. The report also concludes on recommendation for the future on the basis of the research questions highlighted in the two reports concerning new business models, cost analysis comparing current publishing to open access publishing and an analysis of the barriers to change.

Firstly the report includes an analysis of the implications of the open access publishing business model compared to the traditional print journal business model. The implications concern among others speed of publishing, indexing of articles, subscriptions, access handling and library handling costs. The copyright negotiations, which are carried out between the publisher and the author of a research paper were added as an activity to the to-be business and information model. The effects of copyright negotiations and the form of copyright transfer are discussed on open access publishing as a secondary outlet. This form of publishing requires that the author retains the right to publish on a web page or in an institutional repository.

Secondly the report analyses the new initiatives promoting open access taken during the year 2003. Among others the emergence of institutional repositories as an important Open Access channel, the interest of society publishers for moving established journals into Open Access as well as the new form of publishing using author charges will be discussed. New initiatives are the political commitment of research policy makers to Open Access shown by organisations like the OECD, the UK parliament and the European Commission.

Thirdly we analyse the current state of the different open access publishing channels, the open access journal, the subject specific repository, the institutional repository and self-publishing.

We can clearly identify hybrid models for open access journals where limited or delayed access to the content is practised. Journals practicing author charges is an emerging business model, a similar model is the one based on institutional memberships. A common feature for these latter models is that costs earlier covered by subscriptions are moved to the producers of the article. In the first case with author charges to the author and in the latter case to the authors institution. Also consortia memberships for a whole country have been practiced.

The subject-specific repository has been discussed earlier in the To-be report of the project on a more general level. In this task we will provide a more detailed case study of a subject-specific service provider in economics (RePec).

Open source software for setting up subject-based or institutional repositories is one of the main deliverable in the SciX project. In this part of the study we will discuss the implementation of institutional repositories in organisations.

Fourthly, a discussion and a sum up of the conclusions in the earlier studies is presented followed by recommendations for the future.

RELEASE HISTORY

Date	Changes
March 26, 2004	Final version, SciX template applied

TABLE OF CONTENTS:

EXECUTIVE SUMMARY	2
RELEASE HISTORY	3
TABLE OF CONTENTS:.....	4
1. INTRODUCTION.....	5
2. MODEL COMPARISON.....	7
2.1 IMPLICATIONS OF THE CHANGING MODELS FOR JOURNAL PUBLISHING	7
2.2 CHANGES IN COPYRIGHT HANDLING	9
3. THE CURRENT STATE FOR DIFFERENT OPEN ACCESS PUBLISHING FORMS	12
.....	
3.1 OPEN ACCESS JOURNALS.....	12
3.2 SUBJECT-BASED REPOSITORIES	14
3.3 INSTITUTIONAL REPOSITORIES	16
4. DEVELOPMENTS AND NEW INITIATIVES TAKEN DURING THE YEAR 2003. .	18
5. RECOMMENDATIONS FOR THE FUTURE	21
5.1 CONCLUSIONS FROM THE SCIX WORK	21

1. INTRODUCTION

This report constitutes deliverable four of work package one (process and social-economic analysis) in the SciX project, funded by the European Commission under the contract IST-2001-33127. The first and second reports titled "*Scientific publishing: as-is business and information model*", "*and Scientific publishing to-be business and information model*" included a cost analysis of different publishing models and an analysis of the barriers to open access publishing. It also introduced the process model of the scientific publishing life cycle (SPLC-model).

In this study the aim is to compare the two models presented earlier. Thus section two presents an analysis of the implications that open access journal publishing has, compared to the traditional print or print/electronic or subscription-based scientific journals. In the models the unit of observation is the single publication, how it is written, edited, printed, distributed, archived, retrieved and read, and how eventually it may affect practice. Pure electronic or pure paper-based publishing could be described by subsets of the model. The same goes for free publishing on the web ("open access"), which resembles traditional publishing, but where certain activities such as negotiating, keeping track of and invoicing subscriptions can be almost entirely left out.

In the case of traditional journals, typically published by commercial publishers or learned societies, the author usually grants the publisher a rather exclusive copyright, in return for the services that the publisher renders the author. The surrender of copyright is normally total and thus legal barriers appear for secondary publishing for example in institutional repositories. The critical mass of institutional repositories depends on the inclusion of the best work of each university's faculty that is the journal papers published elsewhere. From a legal viewpoint this constitutes a challenge, since university administrations will be very careful not to break any copyright contracts, in contrast to individual researchers posting copies of their work on their home pages quite carelessly in spite of possible legal obstacles. The legal implications of the copyright transfer and new initiatives like the creative commons licensing policy will be discussed in this report.

The third section analyses the current state for different open access publishing forms, such as the open access journal, hybrid journals, institutional and subject-based repositories. We can clearly identify hybrid models for open access journals where limited or delayed access to the content is practiced. Journals practicing the principle of author charges are an emerging business model, a similar model is the one based on institutional memberships. A common feature for these latter models is that costs earlier covered by subscriptions are moved to the producers of the article. In the first case with author charges costs are moved to the author and in the latter case to the authors' institution. Also consortia memberships for a whole country have been practiced.

The subject-specific repository has been discussed earlier in the To-be report of the project on a more general level. The best-known subject-specific repository was founded already in 1991 for high-energy physics. Such repositories typically target at parallel publishing of material, which is being written for other outlets (such as conferences or traditional journals), allowing earlier and more efficient dissemination. The guiding principle of electronic archives is, that

researchers themselves upload article manuscripts, conference papers etc. into the repositories. Thus very low maintenance costs can be achieved. Papers in a repository are available globally much earlier, than for instance the finally published versions of the manuscripts in paper-based journals. In some areas like computer science this can be a significant benefit. In this study we will give a more thorough picture of a subject-specific service provider in economics (RePec).

An open source software for setting up institutional repositories is the main deliverable in the SciX project. The implementation of institutional repositories into organisations however is an emerging form of open access publishing and a newcomer compared to journals and subject-specific repositories. The increasing interest of the universities to start institutional repositories brings a more systematic and long-term commitment to the activity of self-publishing on a website. University libraries are in a better position than individual academics to guarantee that the material is available even after decades and that the collection is systematically maintained, for instance to take account of changing file formats and media. Institutional repositories represent an integral part of the long-term strategies of the universities in question, especially since the implementation requires a redesign of the publishing and library policy. The main content of a repository is the university's own production of thesis and working papers, but in the long run the posting of the central production of the university's researchers, i.e. their conference papers and journal papers, is crucial. Although institutional repositories can be seen as useful marketing channels for individual universities their most significant impact on the global scale can only be achieved via co-operation via the OAI-protocol and open access harvesting services.

In section four we will sum up on the recent developments and new initiatives in open access publishing. In the fifth section a short summary of the main conclusions from the earlier studies will be presented and we will discuss recommendations for the future.

2. MODEL COMPARISON

2.1 IMPLICATIONS OF THE CHANGING MODELS FOR JOURNAL PUBLISHING

During the last half of the 20th century scientific publishing evolved to its present stage. The anonymous peer review system developed, and journal publishing became dominated by a number of commercial publishers which were able to answer to the quickly risen author demand for outlets.

In recent years the domain of scientific journal publishing has, like so many other areas of business, which in a relatively short time span have gone over to an electronic business model, undergone radical changes. It is indeed an area eminently suited for e-commerce, since the product itself is divisible into small packages of 10-20 pages of text, which can be consumed on the computer screen or printed out on the nearest laser printer. The central issue is that the Internet offers a new type of technological platform, which offers opportunities for innovations in the business or revenue models of selling different types of commodities. It also offers opportunities for non-commercial grassroots movements in the form of peer-to-peer networks where commercial intermediaries can be bypassed altogether. The term disintermediation has been used to describe this phenomenon.

In the early days of open access most journals and repositories were organised on a voluntary basis by small groups of scientists, in a manner closely resembling Open Source programming projects such as the one resulting in the Linux operating system. Since scientist have been used to working without a monetary compensation as editors and reviewers of journals also in the service of commercial publishers it wasn't difficult to adapt to this production mode. And since these journals only appeared in electronic form a lot of the expensive activities of paper based journal production could be avoided.

Figure 1. is an illustration of the value chain for delivering a scientific article to its potential readers. The illustration contains both the steps of the traditional print/electronic model as well as of the open access model, and is based on the more elaborated model presented in the deliverable 2. The essential differences between current mainstream publishing and the Open Access models as practised by most independent OA journal publishers are:

- OA publishing is usually much faster and unnecessary delaying of publication in order to stick to a regular issue schedule is usually avoided. This has been established in the survey to editors of open access journals. The median time from submission to publishing was 5 months.
- Traditional publishing relies to a large extent on commercial indexing services for spreading information about an article to potential readers. In some cases open access journals are also indexed in the main subject-based indexing services.
- OA publishing has until now mainly relied on general search engines as a means of "marketing" their content to readers who do not regularly follow the journal. The DOAJ directory of open access journals will in the near future add a new article level indexing service to their directory. This feature will naturally make open access journal content

visible and searchable and thus add to the functionality of open access journal publishing.

- In traditional publishing there is a need for an intermediary between the publisher and the readers for setting up the subscription arrangements and this has even been accentuated in the electronic environment leading to the setting up of library consortia.
- In traditional publishing there is a cost to society in the form of many potential readers who don't get access to research results they would have needed due to high subscription cost or the amount of extra effort needed to get access to a publication.
- Although the Open Access mode solves this problem, potential readers may fail to find out about interesting OA articles because these are marketed efficiently only to a select community of researchers and because general web search engines are rather inefficient tools for finding relevant and quality assured material.

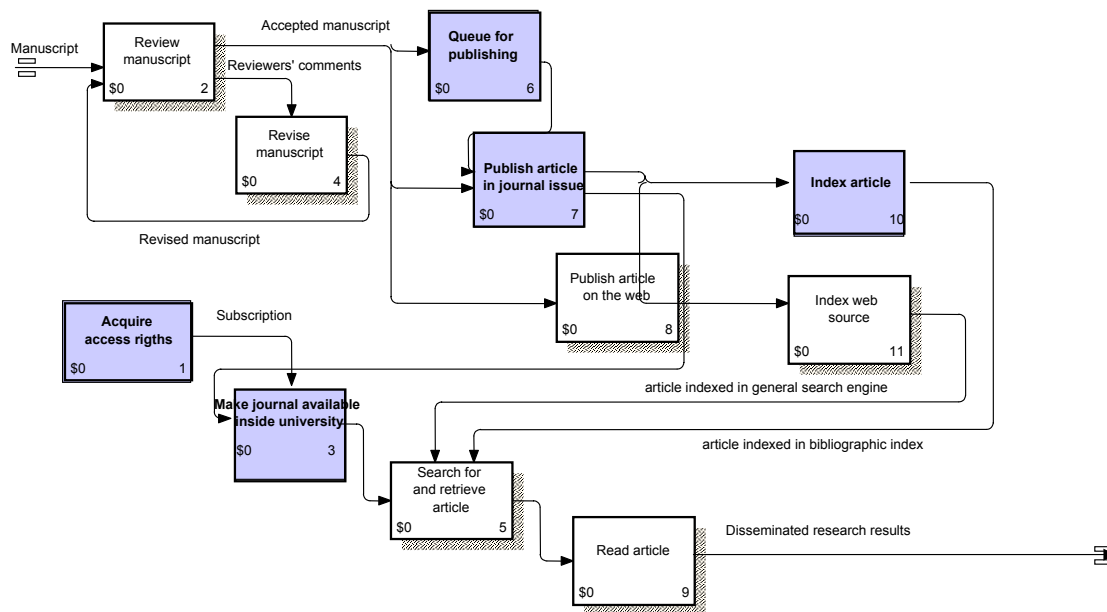


Figure 1. A diagram of the value chain of scientific publication based on the SPLC model. The diagram contains both the activities of traditional mainstream publishing as well as Open Access publishing. Those elements, which can be bypassed in the Open Access model have been indicated by a darker background.

2.2 CHANGES IN COPYRIGHT HANDLING

After a decade of experimenting there is now quite a lot of evidence about the possibilities and difficulties in making Open Access a real alternative. Particularly the legal framework has been regarded as an important hindering factor. The three channels discussed here are open access journals, which function as primary outlets, and subject-specific and institutional repositories, which mainly function as secondary outlets complementing the mainstream channels of journals and conference proceedings. Self-posting on the web is left outside the discussion, even though it is a rather important channel at present.

In the case of traditional journals, typically published by commercial publishers or learned societies, the author usually grants the publisher a rather exclusive copyright, in return for the services that the publisher renders the author. It must be stressed that contrary to what proponents of OA often state, authors do not give away the product for free. Rather they trade their papers without specific payment for the services that the publisher renders them (peer review, quality labelling, marketing, dissemination). The fact that some publishers have charged page charges to authors in addition to charging subscribers is one indication of this. Many copyright forms grant the author the right to limited distribution of copies to colleagues.

Open Access journals, on the other hand, have from the start adopted a rather liberal approach reminiscent of the licensing schemes used by the Open Source programming community (often referred to as copyleft). As a rule the author retains the copyright to the work. What the open access journals typically are interested in is that the paper, if made available elsewhere in the exact format of the journal, is attributed to primary publication in the journal, and also that nobody else (except the author) can resell the content. In conclusion the copyright issue does not constitute an obstacle for the proliferation of open access journals. Currently used copyright agreements for OA journals are quite satisfactory from both the author's and the journal's viewpoint.

A strong impulse for **subject-specific repositories** was the long lead-time between submission of a draft manuscript and the publication of the full paper. In some areas of science, such as high-energy physics, a tradition of scientists exchanging preprints on paper already existed and the new repositories just developed this mechanism further.

One of the problems with low cost subject-specific repositories is that due to the high number of papers in the successful ones, the managers of the service have no resources to check the legality of the papers posted. It is up to the authors and their discretion to take out papers once they have been accepted for publication, if they have signed copyright agreements, which prohibit keeping the copies on the server. The legal problems resemble the situation with institutional repositories and will thus be discussed below.

Institutional repositories will in early stages get their initial content from works of the faculty for which the university itself or the authors retain the copyright, such as Ph.D. thesis and working paper series of departments. These entail no legal problems. In the longer run, however, the critical mass of institutional repositories depends on the inclusion of the best work of each university's faculty that is the journal papers published elsewhere. From a legal viewpoint this constitutes a challenge, since university administrations will be very careful not to break any copyright contracts.

Many of the major publishers have recently, if the author asks for it, granted the authors permission to the parallel non-commercial electronic publishing on the web pages of the university of the author. In **The ROMEO** project (Rights Metadata for Open archiving) <http://www.lboro.ac.uk/departments/ls/disresearch/romeo/> conducted by the Loughborough University and funded by the Joint Information Systems Committee several leading publishers were asked about their official view concerning the publishing of the manuscript or the finalized paper in open access servers. Of these 33 publishers agree in some form, whereas 49 gave a negative answer. Together the publishers who participated in the survey represented 7169 journals. When the results were weighted according to the number of titles, 49 % of the journals permitted the publishing of either or both versions.

The **Creative Commons** <http://creativecommons.org> licenses are offering a way between the poles of giving up your copyright totally or the opposite in keeping all rights. Creative commons means offering *some* of your rights to any taker, but only on certain conditions. In March 2004 BioMed Central has adopted the Creative Commons attribution license on their submissions.

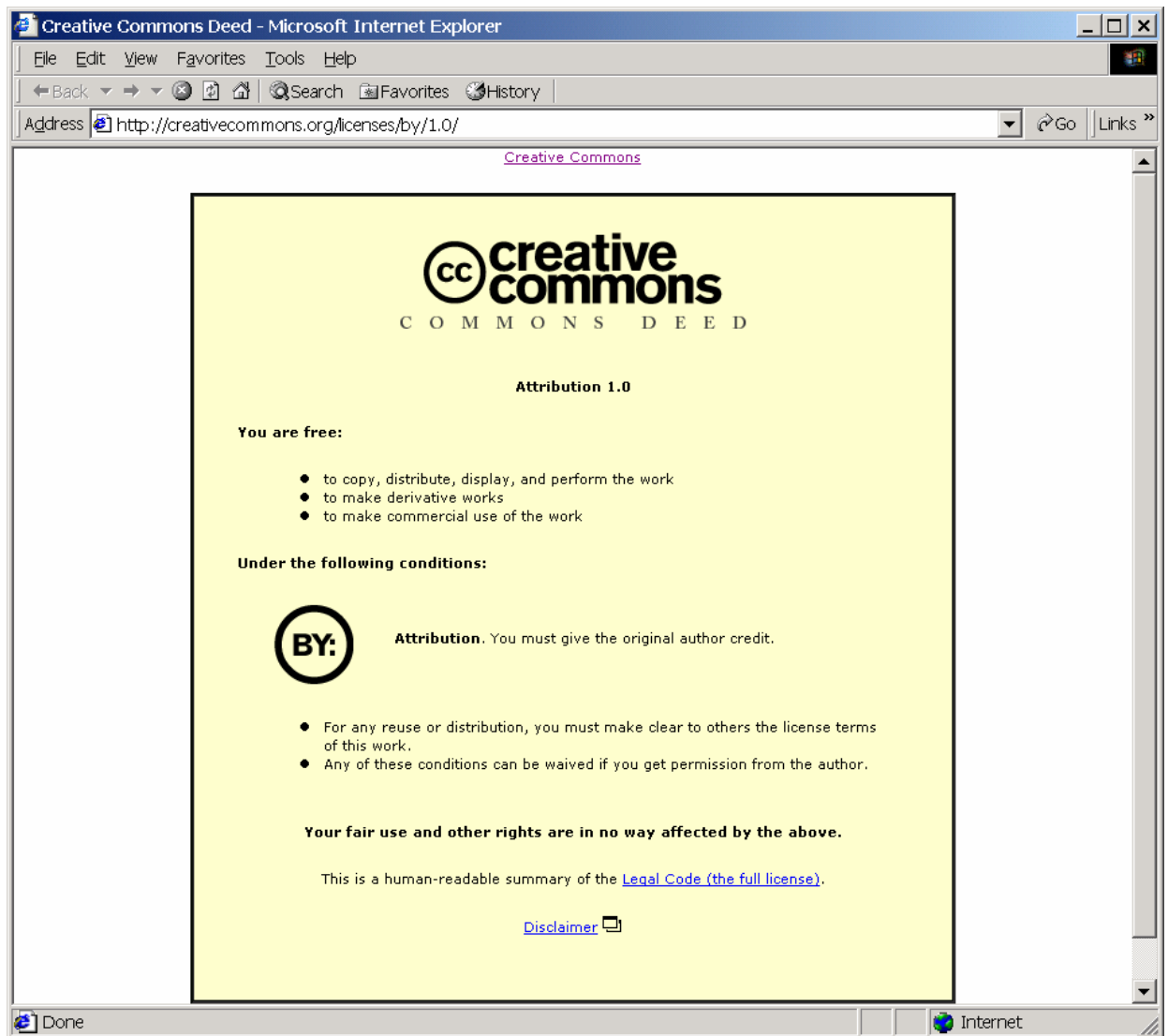


Figure 2. The Creative Commons Attribution licence as a human-readable summary.

3. THE CURRENT STATE FOR DIFFERENT OPEN ACCESS PUBLISHING FORMS

In this section we will give an overview of the current state of open access publishing. The forms presented are open access journals, subject-based repositories or service providers and institutional repositories. For open access journals a new hybrid model allowing either delayed or limited access is discussed. As an example of subject-based service providers we present a repository in economics that has grown to a considerable source for both pre-print and post-print articles. OAI-compliant institutional repositories were of particular interest since one of the deliverables in the SciX project is an open source software for this type of applications. In the following the state of art for each publication form will be discussed.

3.1 OPEN ACCESS JOURNALS

After about a decade of experiments it has become evident that the mode of open access publishing can produce some successful journals and repositories, but also that it is very difficult to change the habits of academics, in particular as submitting authors. The obstacles for a major shift towards open access are formidable and the traditional subscription based model still dominates the picture. The success of the open access model is dependent on finding the right incentives for the actors in the publishing process for going over to it.

Recently a different type of Open Access journals has started to emerge. Thus publishers such as BioMed Central¹ and the Public Library of Science² provide a re-engineered value chain, which appears to be more cost effective than the traditional one. This new type is based on the fundamental realisation that the paying client of a scientific publisher should not be the reader (and his representative the library), but the author striving for recognition, dissemination and long-term preservation of his scientific results. Journals, which provide these services can finance the operations through author charges or finance from the organisation that finances the authors. Even in the traditional subscription model one can argue that authors in fact do not give away their manuscripts for free to the publisher, but rather trade them in exchange for these kinds of services. Some publishers have in fact also earlier levied page charges from authors for publishing their work

The new models offer free electronic access to primary scientific knowledge, not only to the research community within the university but to the whole society. The open access model can be compared to the open source principle in that the use of the published scientific journals is free. The user is able to read, print and distribute the publication without payment for non-commercial purposes.

Table 1 contains a classification of the business (or revenue) models, which can be used for sustaining the publishing of a scientific refereed journal. In some cases the business model of a particular journal can be a combination of the different options in this classification. For some of these options practical examples have been given.

¹ <http://www.biomedcentral.com>

² <http://www.publiclibraryofscience.org/>

As can be seen in the table there are several different options for running and financing open access journals. Biomed Central already has a couple of years experience of running almost one hundred OA journals. Their experience seems to indicate that it is difficult to get individual authors to pay article processing charges in the order of 500 USD. Thus there has recently been a clear shift in their revenue model from pure author charges to institutional membership, where universities or consortia of universities agree to essentially cover the author fees of their own academics³. The Public Library of Science Biology is now starting to offer this option to its comparatively high article processing charge of 1500 USD.

Grants have often helped in starting new OA journals (in the case of PloS a grant of 6 million USD) but it is difficult to get grants for sustainable operations. Advertising can in certain areas of science, such as medicine, be an important means of financing the operations, but is an option only for a small minority of scientific domains.

As for the hybrid models, delayed open access means that paying customers get access to the articles immediately whereas others only after a delay of say one year. One of the central points of the Public Library of Science manifesto from 2000 was preservation of archival scientific research literature and to encourage scientific publishers to make their archives available for free distribution. Limited open access might mean that it is possible to view an article on the screen for free, but that for instance the quality of the illustrations and the printed version is poor compared to the paid version. Open access to individual articles is currently practised by Oxford University press for one of its flagship journals *Nucleic Acids Research (NAR)*. The author decides him/herself if the article is openly accessible by paying an author fee.

	PAPER	ELECTRONIC
PAID ACCESS		
• per article	Document delivery	Pay-per-view
• per journal	Traditional journal subscription	Electronic journal subscription
• bundled		"The Big Deal" or Science Direct
HYBRID ACCESS		
• delayed		The Association of Learned and Professional Society Publishers for the journal <i>Learned Publishing</i>
• limited functionality		For example, read-only possibility.
• Individual article basis		Oxford University Press for the journal <i>Nucleic Acids Research (NAR)</i> .
OPEN ACCESS		
• Community service		Majority of small OA journals
• Advertising		British Medical Journal

³ <http://www.biomedcentral.com/info/libraries/instmembership>

• Grants		Public Library of Science
• Author charges		Public Library of Science Biology
• Institutional membership		BioMedCentral

Table 1. A classification of journal business models including examples.

3.2 SUBJECT-BASED REPOSITORIES

The probably most well-known subject-based repository is the physics pre-print archive⁴ started in 1991 by Paul Ginsparg. In Economics RePEc⁵ (Research Papers in Economics) is a collaborative effort to enhance the dissemination of research. After arXiv.org, RePEc is the second-largest library of freely downloadable scientific papers in the world. RePEc contains metadata on working papers, journal articles, individuals, institutions, and software. Additionally a number of other services, such as current awareness, are offered on top of or parallel to RePEc.

RePEc archives contain bibliographical information about working papers and journal articles. An archive must contain descriptions of the archive, the series, and the papers, which may include a link to the full text. Archives also have to store their files in a certain structure and express the description in a certain format called ReDIF. Currently over 300 archives contribute to RePEc.

Institutions, individuals, and publishers provide the bibliographical data to RePEc. Institutions such as university departments, professional associations, national banks, and research centres/institutes run their own archives. Individuals whose institution does not have an archive can submit papers to the archive EconWPA, which in turn provides its bibliographical data to RePEc. RePEc currently contains 1,161 series.

⁴ <http://www.arxiv.org>

⁵ <http://repec.org/>

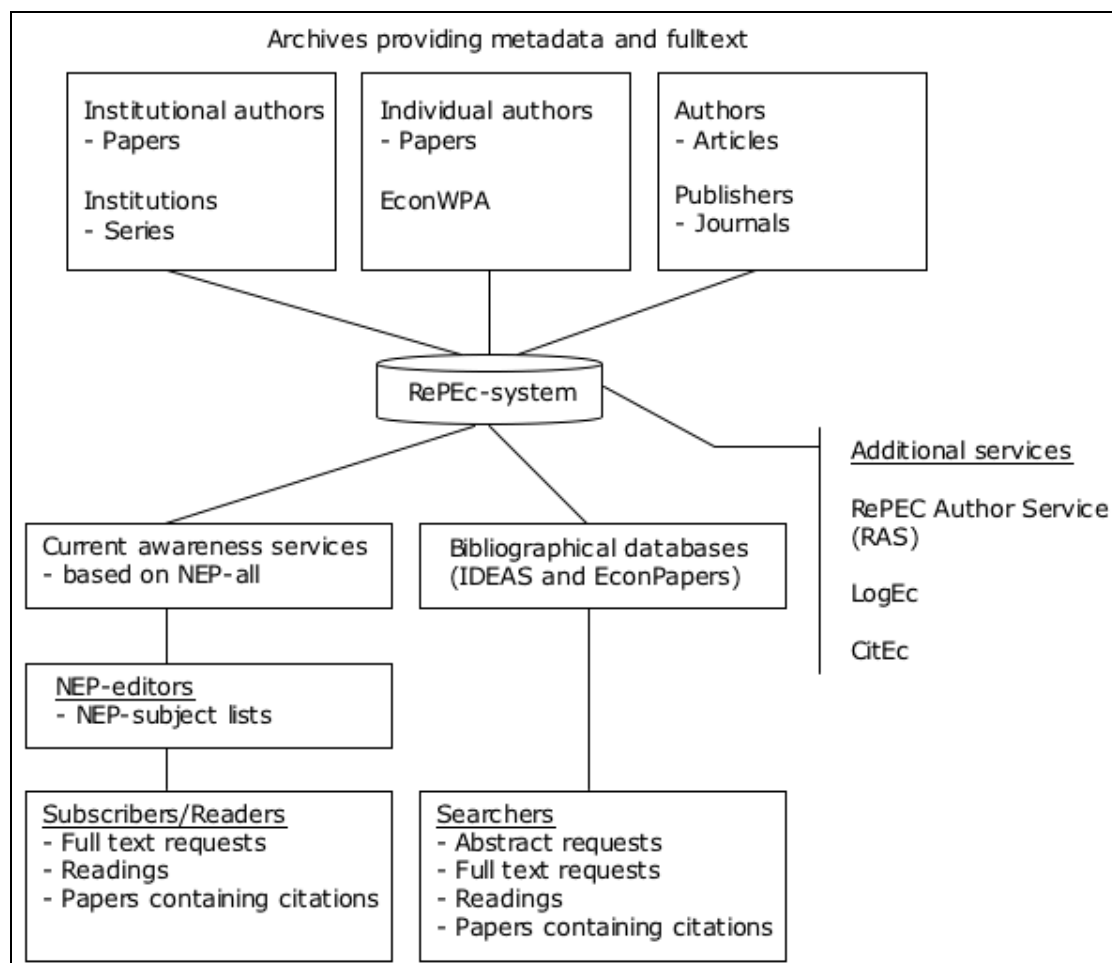


Figure 3. Overview of RePEc functionality

The bibliographical data in the archives is regularly harvested and used to provide services to end-users. IDEAS and EconPapers are two different bibliographical databases containing essentially the same information searchable through different interfaces. Searchers may use these bibliographical databases to identify relevant papers. Searchers can then view abstracts and download the full text if it is available. Paper downloads result in readings by researchers, which in turn write new papers citing the papers downloaded from RePEc.

RePEc has no formal management structure. The RePEc project is volunteer-driven, inspired by the Open Source software movement. The project is managed by a multinational team of academic economists, librarians, and computer specialists. The RePEc group offers technical and organisational expertise in running web-based scholarly communication services. RePEc has received modest support for infrastructure projects. It co-operates closely with a number of publishers, but the project is entirely independent of commercial interests. RePEc data is freely available, in the sense that the provider pays for the provision of the data, not the user. In order to make such a system viable without public subsidy, the cost of providing the data must be spread among many agents. Contributing to RePEc assures the widest possible circulation: a scope that no proprietary system, or single publisher's site, can provide.

3.3 INSTITUTIONAL REPOSITORIES

The idea of institutional repositories is to allow dissemination of research work done at for example a university or a research institution but can also be extended to companies. Institutional repositories present a rather different picture from current OA journals and subject-specific repositories. For the administration and implementation of institutional repositories the university or organisational libraries have a central role. They also take a very long-term perspective in the setting up of institutional repositories. They need for instance to take into account already in the planning stages the periodic necessity to upgrade the storage media and the storage formats. The workflow in the organisation for the different types of material (thesis, reports, conference papers, articles) put up in the repository, need to be carefully designed and implemented in different levels and departments of the organisation. In addition to scientific publications universities also have a need to systematically organise the educational web material produced by the faculty.

When universities start planning for such systems they tend to use one of the following solutions or perhaps combinations of these:

- Plan for joint national collaboration platforms
- Use well-proven open source applications
- Buy the software from outside IT-consultants
- Outsource the whole service to commercial publishers

An example of the first option is the Dutch DARE project. The currently best-known open source solution is the D-space system, originally developed by MIT for its own internal use but currently offered for use to other universities. But there are several other software applications available. A guide to institutional repository software is provided by the Open Society Institute (2004). It includes descriptions of the following applications (SciX not yet included):

- ARNO project (Academic Research in the Netherlands Online).
<http://www.uba.uva.nl/arno>
- CERN Server Software, <http://cdsware.cern.ch>
- D-space, open source application from the MIT. <http://www.Dspace.org/>
- Eprints, available from the University of Southampton. <http://software.eprints.org/>
- Fedora, developed in the University of Virginia. Fedora is a digital library system for very large repositories. <http://www.fedora.info/>
- I-TOR, developed by the Netherlands Institute for Scientific Information Services, offers a toolkit for constructing and environment in which several databases can be accessed and displayed in an integrated manner. <http://sourceforge.net/projects/I-tor/>
- MyCoRe developed in the Essen University library. A flexible system stressing the need to configure the software to disparate digital libraries and repository databases.
<http://www.mycore.de/engl/index.html>

An example that institutional repositories also can be used in international corporations to promote the visibility of the research results is the Nokia company. Its institutional repository, Figure 3, contains research articles.

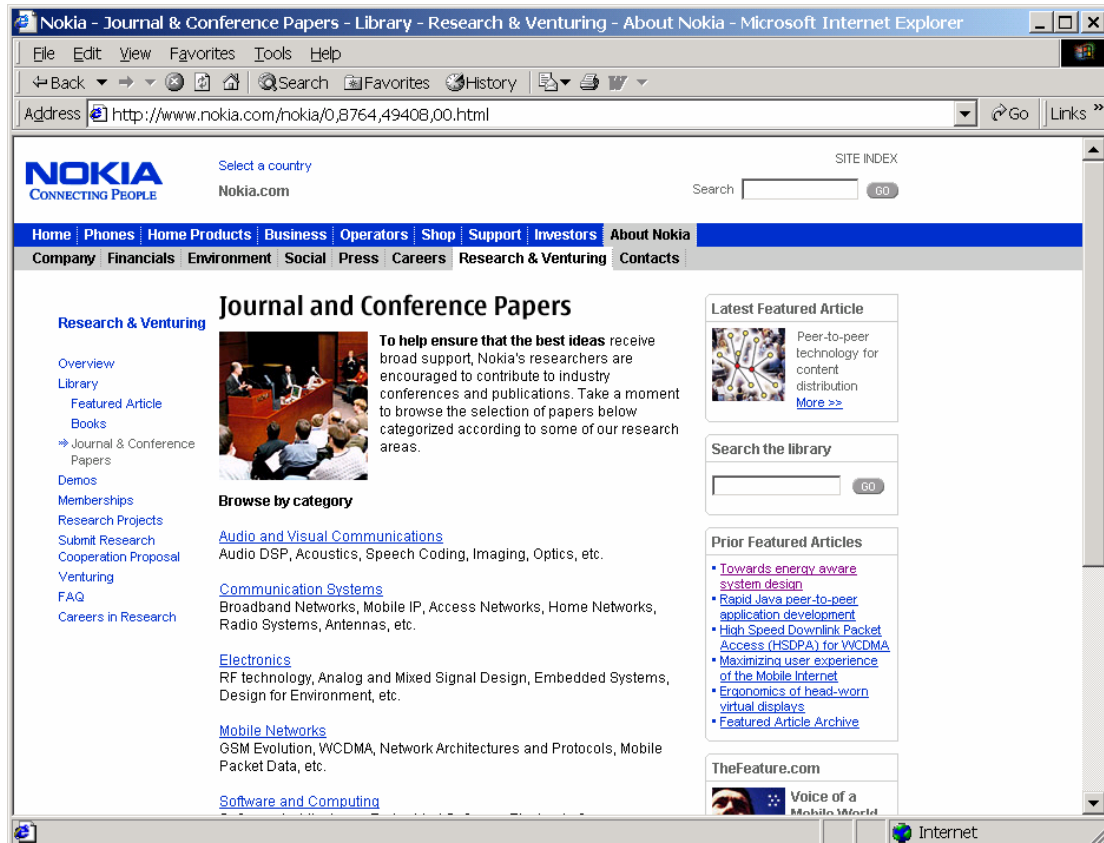


Figure 3 The Nokia institutional archive of research articles and conference papers.
<http://www.nokia.com>

4. DEVELOPMENTS AND NEW INITIATIVES TAKEN DURING THE YEAR 2003.

Since the planning of the SciX project, almost three years ago, some very important developments have taken place. In the above section we gave an overview of the current state of open access publishing forms. In the following recent developments and initiatives for the most important publishing forms are discussed.

- The emergence of institutional repositories as an important OA channel
- The emergence of new professionally operating publishers using OA with author charges as their business models
- The interest that some society publishers have shown for moving established journals into the OA realm
- The political commitment of high level research policymakers to OA and the interest shown by organisations such as the OECD, the UK parliament, the European Commission to understand the problems at hand and to define their policies in regards of OA.

Three years ago the two main OA channels where OA journals and subject specific repositories, both categories almost exclusively run as community effort type activities in an Open Source like manner. One of the primary aims of the SciX project was explicitly to establish guidelines and collect experiences of how a subject specific repository can be organised in a more professional and sustainable manner. But during the past two three years a new category of repository, the institutional one, has emerged as a serious alternative to the subject specific one. Universities and research institutes have also in the past published certain types of research publications in house, such as Ph.D. thesis and research reports, but are now as they are going over to open access electronic publishing of these, also showing an interest in putting copies of journal article and conference papers of their faculty in these repositories as well. The perhaps best known example of such a repository is the one created by MIT. The software used for this, D-Space, is also made available to other organisations using an open source license.

Biomed Central has been the publisher that has pioneered Open Access funded by author charges as a viable business model, and they now publish around 100 journals on their very professional level platform (See Figure 4). After some initial experiences that indicated that it is difficult to get scientists to pay the 500 dollar author charge, Biomed Central has changed strategy and has entered into institutional membership deals with individual universities and university consortia (notably JISC in the UK). The members pay yearly fees which cover all submission from their member scientists, in the case of JISC all English authors. This seems a very promising route and also Public Library of Science is starting to explore this revenue model.

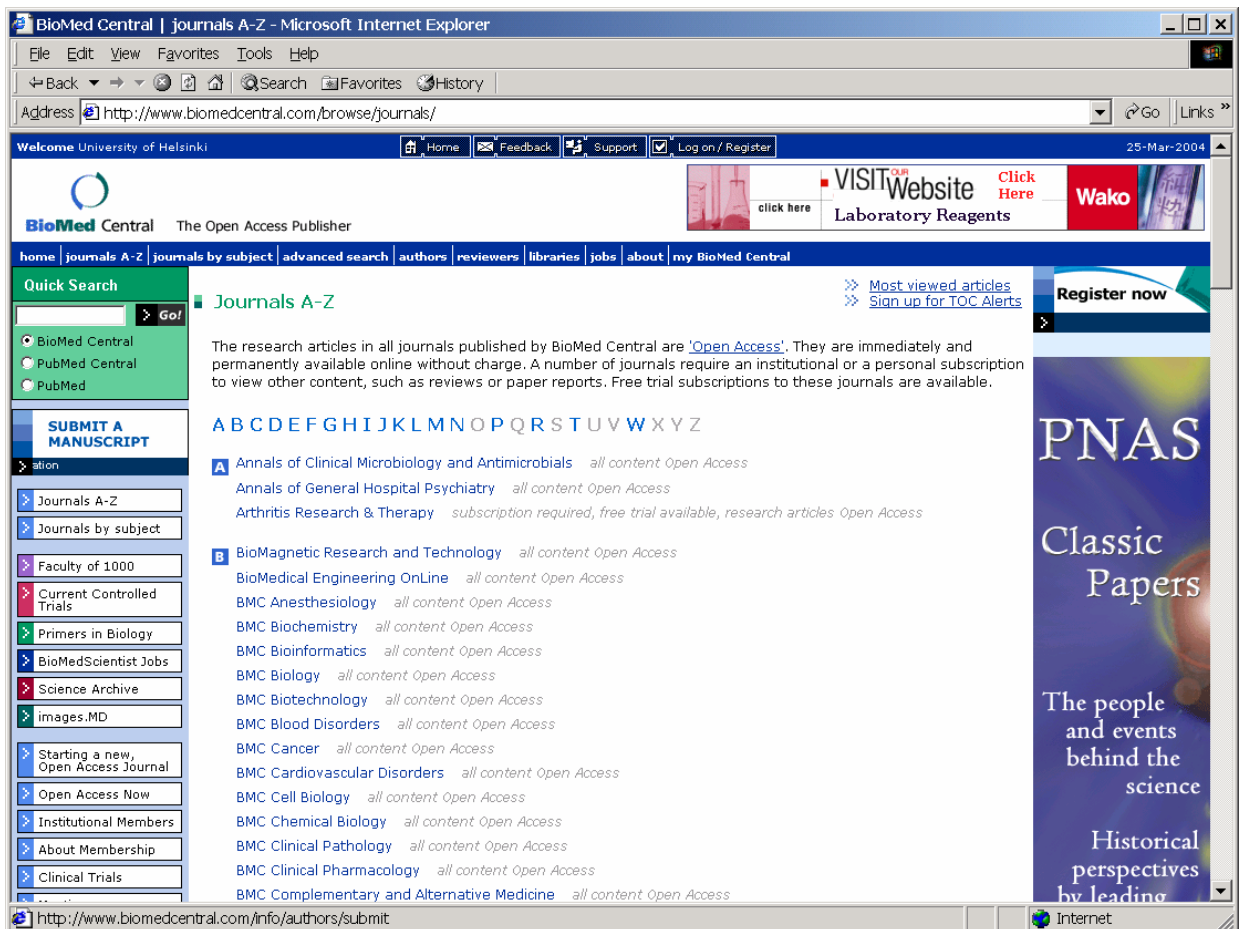


Figure 4. BioMed Central offering access to around 100 scientific journals.

Both Biomed Central and PLoS are upstart companies. In addition a number of established publishers are starting to experiment with a hybrid model, where each author gets to decide whether his article is open access or not, by paying an author fee. Table 6 contains information about some known examples (Source: mails from Thomas Walker and Peter Suber).

JOURNAL	SINCE	PRICE LEVEL
Limnology and Oceanography	Jan. 1999	> 500 USD
Entomological Society of America (4 journals)	Jan. 2000	120 USD
Physiological Genomics	July 2003	1500 USD
Company of Biologists (3 journals)	Jan 2004	800 USD
The Scientific World		150 – 600 USD
Nucleic Acids Research	2003	500 USD

Table 6. Examples of journals practicing the hybrid approach to OA publishing

The Journal of Limnology and Oceanography (see figure 5), claims on its web pages that articles published as open access in 2003 have been downloaded 2.8 times as often as those that require a subscription (the figure for 2002 articles was 3.4).

One way to tackle the barriers to more widespread OA publishing is action on a political level, involving decision makers from organizations that fund the research, employ the researchers etc. A concrete manifestation of such actions is the Berlin declaration which was signed by a number of very high-ranking university representatives from Germany and France. The following extract from the text, signed in October 2003, speaks for itself:

Our organizations are interested in the further promotion of the new open access paradigm to gain the most benefit for science and society. Therefore, we intend to make progress by

- *encouraging our researchers/grant recipients to publish their work according to the principles of the open access paradigm.*
- *encouraging the holders of cultural heritage to support open access by providing their resources on the Internet.*
- *developing means and ways to evaluate open access contributions and online-journals in order to maintain the standards of quality assurance and good scientific practice.*
- *advocating that open access publication be recognized in promotion and tenure evaluation.*
- *advocating the intrinsic merit of contributions to an open access infrastructure by software tool development, content provision, metadata creation, or the publication of individual articles.*

We realize that the process of moving to open access changes the dissemination of knowledge with respect to legal and financial aspects. Our organizations aim to find solutions that support further development of the existing legal and financial frameworks in order to facilitate optimal use and access.

(source: <http://www.zim.mpg.de/openaccess-berlin/berlindeclaration.html>)

Another current action is the UK parliamentary inquiry, in which both commercial publishers and OA proponents such as Biomed Central and PLoS have been giving testimony regarding their views on the efficiency of the current system. This action indicates the concerns of legislative bodies for the state of affairs. The European commission has also shown an interest in further investigating the issue by issuing a tender request in September 2003 for a report on “study of the economic and technical evolution of the publications markets in Europe”.

Very closely related to the open access to research publications is the access to research data produced with public funding, a very important issue for instance in biomedicine. Here the OECD has recently been active and has in March 2004 published a report entitled “Promoting Access to Public Research Data for Scientific, Economic and Social Development.”

5. RECOMMENDATIONS FOR THE FUTURE

The impact of Open Access channels on the whole flow of scientific publications is still very small. General awareness of the advantages of OA publishing is naturally a prerequisite for scientists choosing to use OA channels both for primary and secondary publishing and much remains to be done to achieve this. On the other hand the emergence of OA channels has put mainstream publishers on their toes actively looking at new business models.

The enthusiasm and iconoclastic spirit of the early days is now changing into a more realistic search for sustainable business models, and a better understanding of the formidable barriers to change. The most common form of OA is in fact still self-publishing by authors who put copies of their publications on their own home pages. This is, however, not an efficient long-term solution.

- The dominating business model for OA journals and subject repositories is still the community service model. In the long run this model does not look sustainable outside the parts of science where some solutions have already developed. The author charge model for OA journals could be a solution, but there are still many open questions.
- The costs per article for OA journals are clearly lower than for mainstream print+electronic journals, but not as radically lower as some proponents of OA have suggested.
- Institutional repositories in principle offer many advantages for parallel publishing (archival security, sustainable financing) but the copyright challenges need to be resolved. The central lever for change is the point at which the author of a publication decides where to submit it (and also whether to upload a copy to a repository).
- In Europe there are numerous regional or national journals published in English or other European languages, often published on minimal budgets with public subsidies. These would definitely benefit from going OA and would need support with IT-infrastructure, advice etc.
- OA journals have not been very good at marketing. Solutions such as the Directory of Open Access Journals (DOAJ), which has been set up by the Lund university library with the help of SciX data, can be helpful. Branding is also extremely important from a marketing viewpoint. A key issue for marketing and awareness is the efficient indexing of Open Access material is the success of the OAI-Protocol for Metadata Harvesting.

5.1 CONCLUSIONS FROM THE SCIX WORK

- It is very important to get a critical mass of initial content. The easiest way to achieve this is via partnership arrangements with organisations that have a legacy repository of existing publications. In the case of SciX this has been achieved through organisers of a number of recurring conference series.
- These associations have membership fees, which include getting the proceedings to such conferences for free or a reduced price. It is difficult to persuade them that totally free access is a much better solution, because they fear a loss of revenue if access is not restricted to membership. There is a one-time cost of digitising and handling of existing

material with cannot be funded as a “community service” type activity. The longer term running costs will be much lower though. In the case of OA journals, such as ITcon, there is no such legacy material. Here the challenge is getting authors to submit their best material for publication.

- Making the products developed available as Open Source solutions is a fruitful extension of the community service ideal, and will help accelerate the developments. Thus SciX solutions have been successfully applied for other domains.
- Raising awareness is very important, and this has to be done partly on the national level. Librarians, authors, publishers etc. are to a large extent inspired by concrete examples of how OA works. The timely dissemination of SciX results has for instance resulted in the founding of the FinnOA committee by the National Library of Finland. The initial experiences of using a formal process modelling language for modelling scientific publishing have also been very positive.

Trying to get researchers to support the move towards Open Access, which most agree in principle would be good for the advancement of science, is like trying to get people to behave in a more ecological way. While most people recognise the need to save energy and recycle waste it takes much more than just awareness to get them to change their habits on a large scale. It takes a combination of measures of many different kinds, such as technical waste disposal infrastructure, legislation and taxation to get massive behavioural changes underway. The same is true for making the results of science openly available on the web.