

A brief overview of international trends in Open Access

Leo Waaijers, Open Access consultant

November 2009

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1. Definition and stakeholders

Open Access can be defined as access to research-based publications that are peer reviewed, permanently and promptly accessible without payment, and reusable on the sole condition of crediting the author(s). Achieving Open Access (OA) involves all the stakeholders of the research life cycle (figure 1), to begin with the authors who are the initial copyright holders of the publications and then the publishers who coordinate the peer review. Libraries build and maintain the national and institutional infrastructures that facilitate prompt and permanent access. Research funders define conditions for granting financing; mandating access to the resulting publications may be among these conditions. Service providers encourage the reuse of scientific and scholarly findings. Ultimately, legislators may set rules for access to knowledge in our knowledge-permeated democracies.

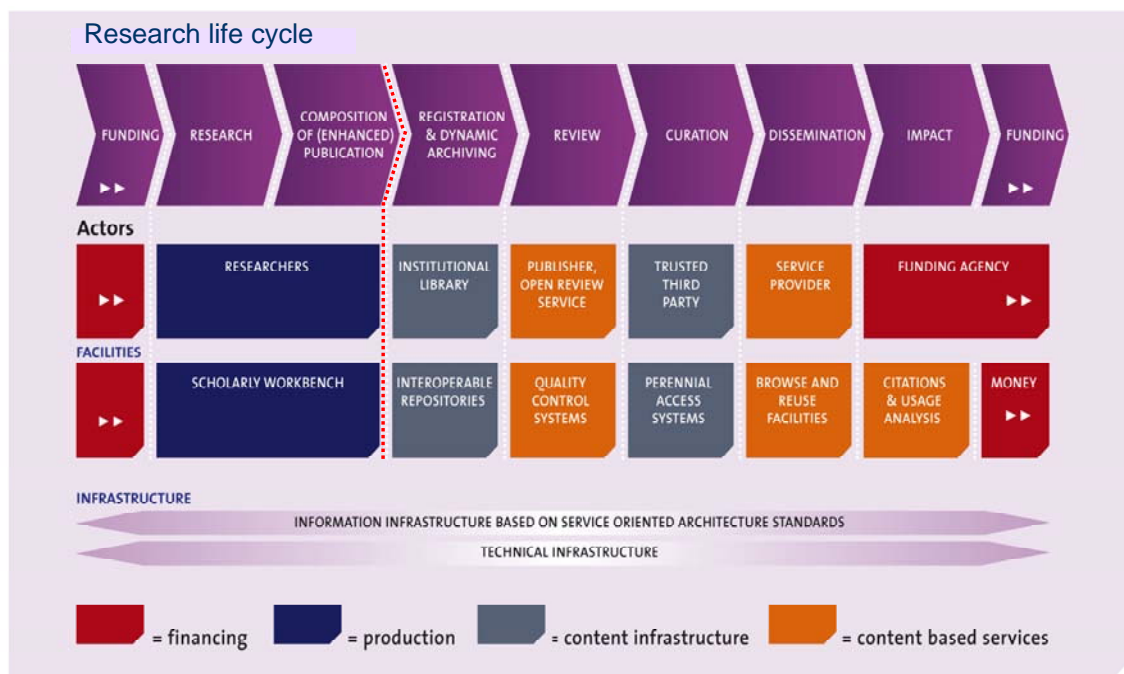


Figure 1. The research life cycle

2. OA motives

The arguments in favour of Open Access reflect the diversity of stakeholders. The list of reasons includes but is not limited to:

1. Corporate Social Responsibility

More and more Higher Education (HE) organisations see maximising the socio-economic and cultural impact of public R&D investments as part of their "Corporate Social Responsibility" (the view that socially responsible behaviour is rewarding for an enterprise or organisation). A clear expression of this is found in the [Berlin Declaration](#)²: "Our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society." The declaration has been signed by more than 250 HE institutions.

2. Citation advantage

Citations expose the talents of both author and institution. The debate on the [citation advantage of OA](#)³ has been extensive. It is now generally accepted that OA articles generate more citations than non-OA articles early in their lifespan. It is still too early to judge whether this will be the case for the whole of their lifespan; OA articles are still too new for that.

3. Advancement of science

"If I have seen further, it is by standing on the shoulders of giants" (Newton). The assumption that a wider circulation of academic publications is beneficial to the progress of science is commonplace. In the forthcoming era of enhanced publications – i.e. publications that include text, data sets, algorithms, graphs, etc. – having a variety of conditions for access to the components of such publications would make their use impractical. The [European University Association](#)⁴ has urged its 800 members to develop clear strategies to advance Open Access.

4. Protection against abuse

1. Plagiarism from openly accessible documents can be more easily detected than from texts with restricted access (see: [plagiarism detection tools](#)⁵).
2. In an OA world, "copyright piracy" (publisher-speak for unauthorised access) does not exist; one cannot steal oxygen from the atmosphere.

5. Research transparency

Open access to publications, including data sets, algorithms etc., increases the transparency of research. (1) It enables a broader audience to read the articles critically and try to reproduce the reported results in case of doubt. Ultimately this is the best quality control. (2) It informs a broader audience about research progress, thus reducing the risk of unnecessary and costly duplication.

6. Cheap distribution

The OA distribution process is simple. The conventional distribution process accounts for one third of the total costs. These costs can be saved globally.

A brief history of OA

The Second World War demonstrated the results of research-based warfare (missiles, radar, encryption, atomic bombs). If science could contribute so much to war, why not to peace as well? The idea of a knowledge-based society was born. Both in the West and in Eastern Bloc countries, there was a massive expansion in higher education, boosted by the race for supremacy. Research communities grew and became anonymous. Publishing developed into an industry including branding and ranking of journals based on the (controversial) use of citation counts. The accompanying business model was based on the exclusive assignment of copyright to the publishers, giving them a monopoly on control of access to the publications. They could thus define the price of access unilaterally, which resulted in price increases of 10% to 12% annually over a couple of decades. Publishing tycoons like Robert Maxwell (Pergamon Press) and Pierre Vinken (Elsevier) candidly acclaimed their journals as successful profit machines. Annual profit margins of 35% or more became the standard for the dominant publishers. As a consequence, libraries could no longer afford

their subscriptions and had to cancel more and more journals. This in turn gave rise to further price increases as publishers wanted to maintain their revenues.

This spiral became known as “the journals crisis”. Eventually the spiral was broken by the introduction of a new pricing model early in the present century. Publishers halved their price increases in exchange for non-cancellation clauses in multi-year contracts with the libraries, the “Big Deals”. This mitigated the problems but left libraries with annual price increases that still exceeded their budget growth (if there was in fact any growth) and no freedom to attune their collections to their clients’ needs. Publishers could maintain their profit margins by reducing their costs with the aid of the massive application of information technology and by scaling up. The publishing industry saw a process of business acquisitions resulting in a limited number of dominant players. That process is still ongoing. Springer acquired Kluwer Academic in 2004 and BioMed Central in 2008; in 2006 Wiley and Blackwell merged, in 2007 Hindawi and Sage entered into a strategic partnership; and there was also a continuous stream of smaller take-overs.

Since the early 1990s, libraries have been seeking a new publishing approach, one no longer based on copyright monopolies in the hands of publishers. Their hope was based on information technology; “Open Access” became their slogan, comparable to “Open Source” in the world of ICT. Understandably, publishers have paralleled libraries’ ambitions with a strong defence of the prevailing business model that served them so well. At times, the debate has been haranguous. Only recently, an appeal to [moderate the OA debate](#)⁶ was released by the International Federation of Library Associations (IFLA) and the International Publishers Association (IPA).

Libraries and OA

The Open Access Initiative Protocol for Metadata Harvesting – [OAI PMH 2.0](#)⁷ – of June 2002 meant a breakthrough for libraries in their efforts towards alternative approaches to providing access to research publications. Technically, OAI divides the world of scholarly and scientific information into two layers: a data layer and a services layer. The data layer consists of repositories – mainly institutionally based – that comply with the OAI standard. They contain the metadata of research publications in the simple “Dublin Core” format or extended or qualified versions of this format. These metadata link to openly accessible research publications, which may or may not be contained in the repository. Any service provider applying an OAI harvester can easily collect these metadata and provide access to them via a portal. The services may be generic – Google type – or be aimed at specific target groups, for example students, discipline-based communities, professions etc. Web 2.0 facilities such as feeds, social tagging, or annotating can be offered as add-ons.

The two-layer approach also refers to a business concept. A repository is typically part of the institutional and national infrastructure, linked, for example, to the institution’s research information system and the long-term preservation facility of the national library. It is designed for machine-to-machine interaction, requires the fastidious application of standards, is supply based, and is embedded in the realm of international cooperation. In short, a repository is typically a public domain device. By contrast, the services within

the second layer are end-user-oriented activities, demand driven, scalable, and bespoke. They operate in competition and are financed on a practice base. A service is a market oriented entity.

Infrastructure

Throughout the world, academic libraries have embraced the setting up of repositories. The [Registry of Open Access Repositories](#)⁸ lists almost 1400 of them, but there may be many more. Operationally, repositories are not very different to catalogues. Both are databases that are part of the institutional infrastructure and contain metadata or catalogue cards that refer to documents, and publishers may restrict access to those documents. Functionally, however, their role is more-or-less opposite; catalogues give local users access to publications produced elsewhere, repositories give external users access to locally produced publications. The migration from the traditional to the new function requires a mental paradigm shift. The traditional stacks-holding “import library” has always been a local monopolist defining its own collection, cataloguing rules, etc. A repository-holding “export library” is a small building block in a global knowledge infrastructure based on common standards and protocols. The associated metamorphosis has been described as “from collection to connection”. This is not always easy for libraries.

In a number of countries, libraries have worked together to set up national infrastructures that not only provide access to the research results of their country but also aim at long-term preservation, author and document identification, and other supra-institutional aspects. In some countries, these initiatives are coordinated by dedicated agents such as [JISC](#)⁹ in the UK, [SURF](#)¹⁰ in the Netherlands, [DEff](#)¹¹ in Denmark or [NORA](#)¹² in Norway. In other countries, existing organisations play this role, for example the [IUA](#)¹³ in Ireland, [UMIC](#)¹⁴ in Portugal, or national libraries such as the [KB](#)¹⁵ in Sweden, [NatLib](#)¹⁶ in New Zealand, and the [NL](#)¹⁷ in Australia. In these cases there is a certain risk that OA has to compete with other issues on the agenda, whereas a dedicated body can really focus. In all cases, however, it is critical that the relevant stakeholders (see figure 1) are brought together in a committed setting. Libraries alone are not enough. In general, the Research Council, the University Association and the Academy are included, and sometimes educational or knowledge-sharing bodies too. Often, the explicit support of the Ministry of Education is gained. Remarkably, Open Access publishers are absent. One can imagine that they are still perceived as too young and not well established.

Given that the task at hand is basically the inclusion of the national knowledge map into the global cognitive atlas, international cooperation is imperative. At a technical level, this is realised by developing and following common standards and protocols. Gradually, this cooperation is being extended to policy and strategic areas. [Knowledge Exchange](#)¹⁸ and [Nordbib](#)¹⁹ are examples of this.

Libraries are also active within the services layer. Based on the repository they often take care for the display of the research results of their university and they sometimes feed the personal websites of their professors. At more and more institutes, the repository combines with the institutional current research information system – CRIS - to form the basis for the institution’s annual report and research assessments. A few library services have won worldwide renown, for example [Cream of Science](#)²⁰ in the Netherlands, [DOAJ](#)²¹ in Sweden, [BASE](#)²² in Germany, [RoMEO](#)²³ in the UK, and [OAIster](#)²⁴ in the US.

Institutional costs

How far all these activities make access to knowledge cheaper – for libraries the initial OA driver – remains to be seen. But expectations are that Open Access will turn out to be cheaper for the academic community as a whole because the complicated distribution process with its significant costs for contracts and access restrictions can be eliminated. Moreover, the Open Access model is based on the operation of market forces, while the traditional model is based on copyright monopolies.

When it comes to costs at institutional level, it is relatively simple to carry out a cost comparison between the OA model and the conventional model. In the Open Access model, the institution pays a publication fee per article. Pricelists for publication fees can be found on the websites of [Sherpa/Romeo](#)²⁵ and [BioMedCentral](#)²⁶. Moreover, two-third of OA journals do [not charge a fee at all](#)²⁷. The calculation can take account of the fact that research funding bodies are increasingly viewing publication as the culmination of the research process and therefore accept the publication costs as part of the research budget. The [SHERPA-JULIET](#)²⁸ website gives an overview of the relevant policies of the major research funders.

In the traditional model, an institution not only pays subscription and/or licensing fees but also reproduction fees, charges for individual articles that are requested (via interlibrary loan or directly from the publisher), plus the contract costs already referred to. The latter are difficult to calculate, but they are nevertheless considerable. To begin with, the library must determine its purchasing policy; this often involves time-consuming consultations with faculty. The accessions then need to be registered in a complex system of subscription records or laid down in licences; these legal documents specifically regulate access rights and are usually only drawn up after lengthy negotiations. The institution must then implement the agreed access restrictions by means of shielding constructions such as IP addresses, passwords and proxy servers, or special software such as SFX. Finally, these restrictions mean that filling the institution's repository is a laborious matter and therefore needlessly expensive.

The calculations will show that the overall cost advantages of Open Access are not spread evenly between institutions. In an age of Open Access, genuine research universities may even find themselves having to pay more than in the traditional model period. But such institutions also spend more (than teaching institutions) on other research facilities such as laboratories, supercomputers and grids, and on attracting top researchers. Indeed, *noblesse oblige*. Cost estimates for Open Access publishing range from 1.5% to 2% of the research budget.

Recently two Higher Education institutes in the Netherlands have done such a calculation. As expected, Open Access is very beneficial to the Institute of Social Studies, with its focus on an educational programme. Surprisingly, the outcome for Utrecht University, a typical research university, is rather more complex. As soon as research funders are prepared to pay for the publication fees for articles that result from their projects, Open Access is also financially advantageous to this institute (see boxes 1 and 2).

Established in 1952, the **Institute of Social Studies** in the Hague is an international graduate school with typically 400 students per year. Its research programme results in books, reports and about 60 articles in peer reviewed journals annually. An intangible open access advantage is the free access that ISS alumni, who are often based in developing countries, will have to these articles.

Open Access		Subscriptions	
Publication fees ISS ¹	€ 120,000	Subscriptions & licences	€ 180,000
		Document supply ³ + copyright clearance fees	€ 65,000
Platform or aggregation costs ²	€ 25,000	Collection management ⁴	€ 60,000
	<u>€ 145,000</u>		<u>€ 305,000</u>

1. 60 peer reviewed articles @ 2000. The publication fee is an estimate based on the pricelist published by BioMedCentral. The list refers to STM journals mainly (<http://www.biomedcentral.com/info/authors/apccomparison/>). For social sciences the fees may be lower.

2. ISS assumes that even in a full open access world still some aggregation or platform fees will be needed.

3. Includes out of pocket costs to third parties (other libraries, publishers) and in house handling costs.

4. This is a rough estimate. Includes defining the collection, acquisitions and administration, shielding access and copyright issues.

September 2008.

Michel Wesseling,

Head of the Office of Library and Information Technology Services.

Box 1 Cost comparison Institute of Social Studies

Established in 1636, today **Utrecht University** is an internationally renowned top research university with almost 30.000 students and over 8.500 staff. Annually UU publishes 5000 articles in peer reviewed journals; of these 1500 result from externally funded research (figures 2005). Utrecht University is a signatory of the Berlin Declaration on Open Acces.

Open Access		Subscriptions	
Publication fees UU ¹	€ 6,500,000	Subscriptions & licences	€ 4,500,000
		Document supply ³ + copyright clearance fees + collection management ⁴	€ 1,000,000
	<u>€ 6,500,000</u>		<u>€ 5,500,000</u>
Publication fees research funders ²	€ 1,950,000		
Remaining costs UU	<u>€ 4,550,000</u>		

1. 5000 peer reviewed articles @ 1300

2. 1500 peer reviewed articles @ 1300

3. Includes out of pocket costs to third parties (other libraries, publishers) and in house handling costs.

4. Includes defining the collection, acquisitions and administration, shielding access and copyright issues.

September 2008.

Bas Savenije,

University Librarian of Utrecht University

Box 2. Cost comparison Utrecht University

From A to B

One pressing problem has become the transfer from phase A to B. An institution that decides to use Open Access does not immediately cease having to pay its subscription and/or licensing fees. In fact, it pays not only for publishing its own articles but also – through the subscription or licensing fees – for publications by institutions that have not yet made the switch. This effect can be prevented if large groups switch together, although that requires co-ordination. One example is CERN's [SCOAP3](#)²⁹ project. This involves CERN – acting on behalf of the high-energy physics community – defining the conditions for quality control and open distribution of articles and requesting publishers to submit quotations. As a consequence, this discipline is switching to Open Access all in one go. Other examples are the Dutch university library consortium UKB and the Max Planck Gesellschaft, which in [experiments with Springer](#)³⁰ could make the switch to Open Access publishing for all their authors in Springer

journals. Recently, the [University of California](#)³¹ concluded a similar deal. The economist Ted Bergstrom has already referred, as far back as 2001, in a now [famous parable](#)³², to the need for such co-ordination. The [Compact for Open Access Publishing Equity](#)³³ of Cornell University, Dartmouth University, Harvard University, Massachusetts Institute of Technology and University of California at Berkeley could well be a groundbreaking initiative in this respect.

The essential point of the Springer deal is that universities do not have to pay extra during the transition period for having the articles of their researchers published in Open Access in a Springer journal. Box 3 gives a good insight into the effects of the contract between the Dutch library consortium UKB and Springer for a university, in this case Wageningen University and Research Centre.

Springer Open Choice also Free in 2008 and 2009

For the time being, Wageningen UR authors do not yet have to pay for [Springer Open Choice](#)³⁴. In 2007, the library cooperative UKB and publisher Springer signed a declaration of intent on Open Access. The agreement stated that all publications by authors associated with a Dutch university and published in a Springer journal in 2007 would be made accessible through Open Access free of charge. In 2007, Dutch universities published 1162 articles in Springer journals. This pilot has since been expanded to a maximum of 1250 articles for 2008 and 2009. After reaching this quota, a charge of \$1500 per article will have to be paid. If an external subsidiser pays for the admission to Open Choice, this publication will not count towards the maximum number of articles. Articles are entered in Open Choice in the order in which they are received.

If an author has submitted an article to a Springer journal and the article is accepted, he/she receives a screen with the notice of acceptance that explains the complimentary admission to Open Choice. The screen also allows the author to register the publication for Open Choice. The university libraries will also be notified if an article has been accepted, so that they can register it in the Institutional Repository.

Box 3. The [UKB-Springer deal for Wageningen UR](#)³⁵

Publishers and OA

In order to understand how Open Access publishing works compared to traditional publication, it may be illuminating to take a brief look at the publication process for scientific articles.

Gold and Green

There are two schools of thought regarding OA: "Gold" and "Green" (see figure 2). Gold means publishing in an Open Access journal and Green means making the publication available via a repository in addition to publishing it in any kind of journal.

The quality control in both approaches is identical: a pre-print (submitted manuscript) goes through an editorial and peer review process that, often after revision of the manuscript, may result in a post-print (accepted manuscript). Then, before publishing the article, the publisher expects to be remunerated for its work, namely organising the quality control and subsequent distribution of the article via one of its journals (which may be highly branded). At this point, the two approaches diverge.

Before publishing the article, Open Access (Gold) publishers charge a “publication fee”, “author fee” or “article processing fee”. Upon receiving it, they publish the article promptly in an Open Access Internet journal via a “Creative Commons licence” that requires users to correctly attribute the content to the author(s). Open Access publishing originates in the digital world; paper copies are available at a printing-on-demand surcharge.

Alternatively, traditional publishers require exclusive, complete and irreversible assignment of copyright, which gives them control over access to the article. They then convert this control into revenue via subscriptions, licences, copyright clearance fees, and various conditions for reuse. In this model, the pricing is still paper based and discounted, usually by 10%, for e-only procurement.

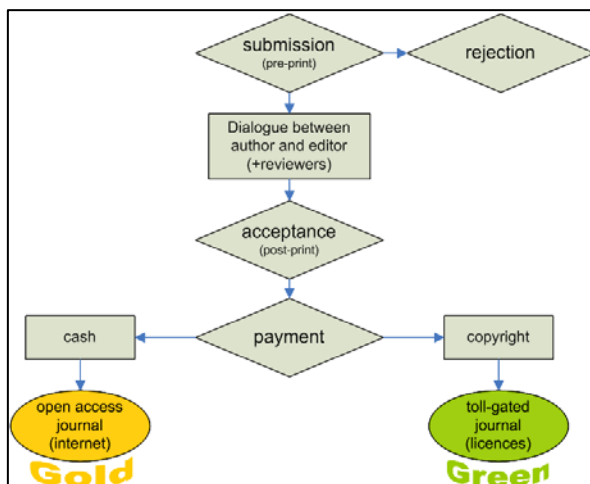


Figure 2. Gold and Green publication modes

The copyright monopoly that traditional publishers thus acquire is mainly used to set the access prices for their journals without fear of competition. It has led to pricelists that show no relation to quality (in terms of impact) or to quantity (in terms of volume). But they may also [withdraw articles](#)³⁶ from their website or re-publish them in [fake journals](#)³⁷. As holders of the copyright, they are in a position to permit more-or-less free access to one of the versions of the article, be it the pre-print, the post-print, or the published version (usually PDF), or a combination of

these. They can set embargo periods on this release and define various reuse conditions, for example for inclusion in course packs, posting in repositories or on personal or institutional websites, usage for interlibrary document supply, for translations or reuse in a commercial setting. More often than not, the reuse conditions are unclear and publishers sometimes apply different conditions to different journals. The [RoMEO/SHERPA](#)³⁸ website gives a bewildering overview of these conditions for more than 600 publishers, categorizing them according to the article version that ultimately may be freely circulated. It turns out that today [63% of their 10.000 journals](#)³⁹ allow free circulation of the post-print, usually after an embargo period of a half year or one year, sometimes longer.

This permission is the basis of Green OA. The idea is that, immediately upon its acceptance, authors self-archive the post-print of their article in an (institutional) repository. The repository manager, usually the institution's library, promptly circulates the metadata, followed by free access to this manuscript after the embargo period. During the embargo period, the metadata may feature a request button that generates an e-mail to the author requesting a personal copy of the article. The spontaneous uptake of this form of parallel publishing of post-prints by their authors has been quite low. Under the relentless urging of Stevan Harnad, the number of [mandates](#)⁴⁰ to do so is growing. Unmandated self-archiving of pre-prints goes back as far as 1991, when Paul Ginsparg started [arXiv](#)⁴¹ for high-energy physicists. Later, a number of other disciplines such as mathematics and astronomy came on board.

OA discouragements

From a business point of view it is understandable that conventional publishers have defended their business model. Over time they have circulated a variety of anti-OA arguments, most of which can easily be countered. Those arguments include:

1. OA is not for prime material

OA is supposedly fit only for “grey” literature and second-class articles. This is now an outdated argument as the number of prestigious OA journals is expanding all the time. And, earlier, [the Cream of Science](#)⁴² project in the Netherlands showed that repositories may have excellent material.

2. OA is vanity publishing

If so, it will be corrected by the market.

3. OA is unaffordable for the poor

In cases of economic hardship, most OA publishers waive the publication fee if there is any. Two-third of OA journals do [not charge a fee at all](#)⁴³.

4. OA does not give any citation advantage

The debate about the alleged citation advantage of OA publications has been long and sometimes passionate. Nowadays, it is accepted that “young” OA articles do have a substantial citation advantage. The debate about older OA articles is still open as there are not yet enough older OA articles to test the hypothesis.

5. OA equals government control

This is one of the two arguments in the anti-OA [PRISM campaign](#)⁴⁴ of the American Association of Publishers (AAP). The argument has never been explained. It might be just a hoax.

6. OA ruins peer review

This is PRISM’s other argument. It can easily be refuted by referring to the Directory of Open Access Journals [DOAJ](#)⁴⁵, which produces a list of over 4000 peer reviewed OA journals.

7. OA publishing is unsustainable

So far, no OA publishers have gone bankrupt.

8. OA means extra costs in a transition period

It is curious to also hear this argument from the publisher’s side. Indeed, institutes that begin publishing their articles in OA and pay publication fees still pay their subscriptions/licences as well. However, the Springer experiments in the Netherlands, Germany and the US show the way forward. Publishers are perfectly able to remove this objection.

9. OA means a loss of jobs

The new OA distribution process is indeed so simple that some of those concerned in the traditional distribution process may lose their jobs, for example lawyers (who draft licensing contracts), marketeers and contract officers, and ICT staff (who shield the databases against unauthorised users). This development is part of the dynamics of innovation; new jobs will be created elsewhere.

All these rumoured objections have not prevented others from taking up OA initiatives. The Latin-American [SciELO](#)⁴⁶ group publishes 650 Open Access journals; [BioMedCentral](#)⁴⁷ offers 200, and [Hindawi](#)⁴⁸ 150 journals. As of October 2008, Open Access publishers have their own association [OASPA](#)⁴⁹. A few traditional publishers such as Springer, Oxford University Press and Blackwell have gone hybrid, i.e. they now give authors the choice of publishing their articles via Open Access in all their journals at an extra fee. Even Elsevier is on the list, with [thirteen](#)⁵⁰ of its 2000 journals.

Funders and OA

Maximising the socio-economic and cultural impact of public R&D investments is one of the main reasons for research funders to [mandate Open Access](#)⁵¹ to the publications of the research they fund.

Houghton studies

Funders may be even more inspired to mandate Open Access after the [Houghton studies](#)⁵² of the economic effects (on a national scale) of a transfer from the traditional Toll Access-based publishing to Open Access publishing. The studies not only analyse the cost savings on the production side but also estimate the economic benefits of improved access to knowledge in the case of OA. The studies have been carried out for Australia (2006), the UK (2008), the Netherlands (2009), and Denmark (2009). (A study for Germany is expected next year.)

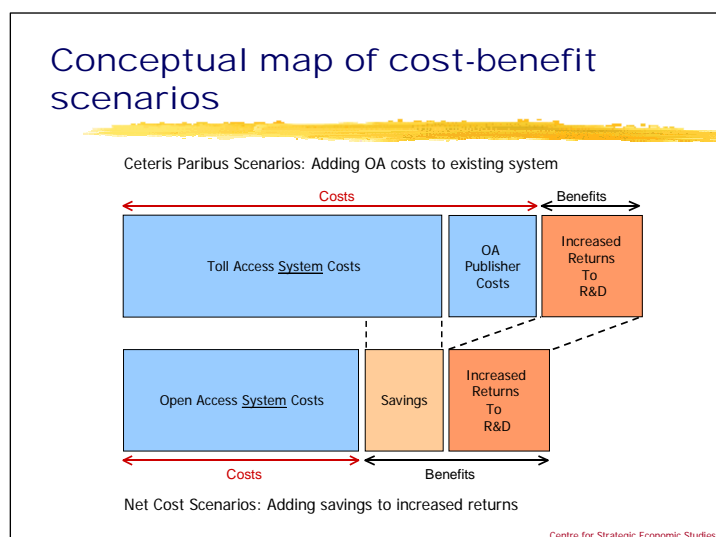


Figure 2. Two OA scenarios: Gold and Green.

Basically, two scenarios are studied: Ceteris Paribus and Net Cost. The first assumes that the current subscription system (Toll Access) remains intact and that additional costs are incurred to "free up" the articles, either by paying more to their publisher or for paving the "Green" road (self-archiving via repositories). The idea of the Net Cost scenario is to replace the Toll Gate system by the Open Access system (the "Golden" road). This produces not only the economic benefits of Open Access but makes the publishing system itself cheaper, thus bringing together the best of both worlds. It is nevertheless interesting to learn that, although publishing costs as such increase in the process of parallel publishing (the Green road), the economic benefits of OA outweigh these extra costs and there is a positive net result (Figure 2.) Roughly speaking, parallel publishing of an article via the Green road costs 3% to 12% of the subscription price (depending on the efficiency of the self-archiving system), while publishing directly in Open Access via the Gold road reduces the cost by 35%.

The Houghton studies were able to estimate the increased return (economic benefits) for a country as a consequence of Open Access to research results. Savings on the cost side were also calculated and are dependent on the chosen system, i.e. parallel OA publishing (“Green”) or direct OA publishing (“Gold”). They are also influenced by the chosen scenario: a country-based (“Ceteris Paribus”) approach or a worldwide (“Net Cost”) one. For easy reference, the amounts given in the following table are limited to the national savings in the context of a worldwide approach. (All amounts in M€ per annum, circa 2007).

	Denmark	Netherlands	United Kingdom
Increased return on R&D	41	78	250
System savings Gold	70	133	481
System savings Green	29	51	127

Mandates

So far, there has been only one OA [national mandate](#)⁵³. It was imposed by US legislation in 2007 and concerns the publication of research that has been financed by the National Institute of Health. This institute has an annual research budget of 20 billion dollars, resulting in 80,000 articles per year. The publications must be made available by Open Access no later than 12 months after publication. To date, publishers have given in, albeit under protest, and there have been attempts to [reverse the NIH law](#)⁵⁴. The European situation is different. *“While existing declarations and initiatives form a solid basis to build on, explicit common national funding body principles, for example on open acces, are still missing.”*, observes the European Commission in June 2009 as the outcome of a [questionnaire](#)⁵⁵ among the member states.

However, there are institution or funder based mandates in a great variety. Most do have opt-out clauses: Open Access is mandated in so far as the publisher permits it or ‘as soon as possible’. Basically, this involves more-or-less strong recommendations, nevertheless expressing the desire for Open Access. A few rigorous mandates come from large research funders like the [Wellcome Trust](#)⁵⁶ or the [European Research Council](#)⁵⁷.

A typical example is the European Commission’s [Open Access Pilot in the Seventh Research Framework Programme FP7](#)⁵⁸. FP7 is the Commission’s €50 billion research programme, running from 2007 to 2013. The pilot applies to research in the following areas: Energy, Environment, Health, Socio-economic Sciences, ICT, e-Infrastructures, Science in Society, and Humanities, and covers approximately 20% of the FP7 budget. The Commission requires Open Access to all peer-reviewed articles resulting from research in these areas within six or twelve months of publication. If we estimate that every €100,000 of research funding results in one peer-reviewed article, the FP7 pilot will provide Open Access to something like 100,000 articles in seven years. All articles must be deposited in institutional or subject-based repositories.

In order to enable authors to meet these publishing requirements, the Commission reimburses the publication fee for articles published in Open Access journals. The Commission has also granted the [OpenAIRE](#)⁵⁹ proposal for the provision of a [pan-European repository](#)⁶⁰ where authors who do not have an institutional or subject-based repository at their disposal (“orphan authors”) can store their article.

Currently, Open Access journals represent some 15% of the market of scientific and scholarly publishing. Statistically, this means that 15,000 articles of the FP7 pilot meet the requirements of the Commission. As copyright holders, their authors can deposit these articles in a repository immediately upon their publication in compliance with the Commission's requirements.

The remaining 85,000 articles have to follow the Green road to Open Access. They still have to be published in a subscription-based journal, which involves assignment of copyright to the publisher. And then the authors "*should make their best efforts to negotiate copyright and licensing conditions that comply with the Open Access pilot in FP7*" says the Commission in its [Open Access Pilot leaflet](#)⁶¹. Authors can discover exactly what this means by going to the [RoMeo/SHERPA](#)⁶² website. To help authors the Commission has published [model amendments to publishing agreements](#)⁶³ plus accompanying cover letters to their publisher in all European languages. Yet, the Commission's main supportive step is still missing.⁶⁴

Authors and OA

Authors at rich institutions have always lived in an Open Access environment *avant la lettre*. For them, both publishing and reading were free and they therefore did not originally have any natural inclination to OA. Only very few early birds like Andrew Odlyzko and Stevan Harnad recognised the flaws of the traditional publishing system in a digital world and advocated new approaches. Others gradually followed. In 2001, 38,000 authors in the biomedical disciplines signed the [PLoS open letter](#)⁶⁵. Since 2007, 28,000 academics have signed the [EC petition](#)⁶⁶ (more than 700 on behalf of their organisation). Studies by [Alma Swan](#)⁶⁷ have demonstrated author preparedness to comply with Open Access mandating.

The main motive for authors to be in favour of OA is their wish to see their publications circulated and reused as widely as possible. In this wish, personal interests and ethical reasons meet. Open Access generates more citations and thus contributes to the author's prestige, which in turn benefits their career and makes research proposals more likely to be granted. Open Access also recognises the argument that most research is financed by public money, so that authors may find it unethical to restrict access to results to colleagues at rich institutions only.

Authors may encounter obstacles to publishing their articles in Open Access.

(1) There may be no appropriate OA journal available. This may be true both as regards the subject concerned and as regards the impact factor of the available journals. These concerns are realistic, although both the disciplinary coverage and the impact factors of OA journals have grown considerably over the past few years. The Directory of Open Access Journals demonstrates a stable growth of more than two new OA journals a day, and the impact factors of a number of OA journals are excellent.

(2) If there is no appropriate OA journal, authors can publish their article in a conventional journal that requires assignment of their copyright. In that case, it is the publisher that defines the access and reuse conditions for the article. [About 63%](#)⁶⁸ of the conventional journals allow archiving of the post-print version of the published article in the institutional repository, and permit Open

Access to this manuscript after an embargo period, usually of six months or a year. In fact, this Green road to OA is a form of parallel publishing by the authors next to traditional subscription-based publishing. This makes it ultimately unsustainable, but for the time being it may be opportune. Its proponents speculate that after Green OA has reached a certain critical mass, publishers will give in, discontinue the subscription model entirely, and switch to the Open Access model.

Copyright

Copyright is the right of the maker of a work – the author of a publication, the creator of data – to define the conditions for making a copy of that work. Copyright can be wholly or partially assigned to others, for example to publishers. However, the law usually permits people to make a copy of a published work for their personal use – for example for study or research – and to cite limited parts of it.

Basically, most issues regarding digital copyright in academia can easily be dealt with. Discussions often start “Would I be allowed to?”. The only one who can decide is the holder of the copyright, and there are two ways to find the answer: (1) asking and (2) testing.

Re 1. Most problems arise because people in academia are inclined not to ask the copyright holder but lawyers or librarians instead. This usually results in speculative, disclaiming, or elusive third-party abstractions, which in turn provoke others to respond, thus creating the perfect environment for a whole realm of committees, seminars, reports, and statistics. The best thing is to find out who the copyright holder is – although for orphan works this is by definition impossible – and then approach them and ask. One can then negotiate, if one is in a position to do so. That is all. In general, authors (who still own the copyright if they have published in an Open Access journal) are permissive and utilise [Creative Commons licences](#)⁶⁹, and conventional publishers are restrictive.

Re 2. When a situation is less clear, trial-and-error testing is not uncommon in an academic environment. Why not also apply this methodology to opaque matters of access to or reuse of publications? Do what you think is needed, be candid about it, and see what happens. This approach has been the basis of successful initiatives like [arXiv](#)⁷⁰ or [Cream of Science](#)⁷¹. Gradually, a growing number of authors are playing the “[Don't ask, don't tell](#)”⁷² game. They still publish in conventional subscription journals but at the same time distribute their articles online as if they were published in Open Access. They are not aware of or choose to ignore the copyright fine print. Some people seem to be frightened to do so. As always, those who are frightened limit their own scope and those who are bold extend it. This is a fact of life and has nothing to do with copyright. And again: committees, seminars, and reports do not provide a remedy.

Having said this, it might be interesting to create a database of relevant facts where authors can register concrete copyright practices like “My publisher (name) accepted the following copyright statement” or “I did this and then that happened”, thus sharing their experiences.

Above all, authors should realise that the only legal right that a publisher really needs is the right to publish their manuscript. All other rights that the author

assigns to the publisher are gifts in kind that boost the economic position of the publisher, especially when the transfer is an exclusive one. There are a number of copyright statements that limit the transfer of rights to a publisher to what is necessary for publication, for example [JISC-SURF's Licence to publish](#)⁷³, [SPARC's Author Addendum](#)⁷⁴ or the '[Model amendment to publishing agreement](#)'⁷⁵ of the European Commission (available in all European languages). Some prestigious scientific journals have begun by themselves to provide authors with standard licences to publish that do not require authors to assign their copyright to the publisher e.g. [Nature](#)⁷⁶ and [Science](#)⁷⁷.

Enhanced publications

The character of publications is now changing as authors increasingly come to understand and apply the full potential of digital publishing and to make data sets, algorithms, videos, blog entries, and even post-publication reviews part of their (dynamic) article. New standards for the structuring and exchange of these "compound" or "enhanced" publications are being developed by Herbert van de Sompel and others under the name [OAI-ORE](#)⁷⁸, Open Access Initiative - Object Reuse and Exchange. Commercial parties such as Microsoft are building [Technologies for the Scholarly Communications Lifecycle](#)⁷⁹ with tools for authoring, publishing, and archiving enhanced publications. The underlying paradigm is that the components of such [enhanced publications](#)⁸⁰ are autonomous open web resources glued together by RDF triples and presented in a resource map. Unlike hyperlinks, RDF triples are two-way links that describe the relationship between the linked objects in a short object-predicate-subject sentence. The linked object consequently "knows" by "whom" and "why" it is linked to. Citations are automatically registered and qualified. These smart links have their own inference rules. They become an inherent aspect of web resources and mean a step forward towards the semantic web.

Needless to say, this approach becomes unworkable when all these web resources have their own access restrictions. Where Open Access may be desirable when it comes to more citations, it becomes imperative in the new publishing paradigm – "Publishing 2.0" – that comes with e-science (figure 3, taken from [Understanding the Semantic Web](#)⁸¹)

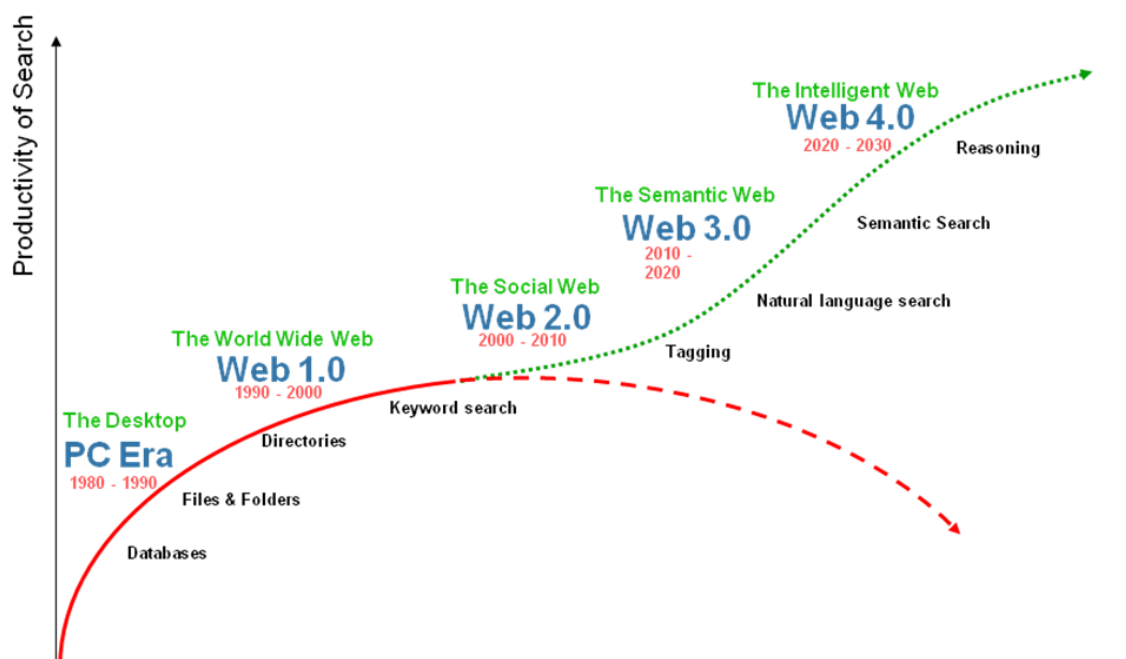


Figure 3. Developments in searching the web

Service providers and OA

Generic services

Services range widely, from mini – for example personal websites – via meso – for example institutional websites, publisher websites or disciplinary community portals – to macro services like [Google Scholar](#)⁸², [BASE](#)⁸³, [OAIster](#)⁸⁴, [Europeana](#)⁸⁵ or [iTunes U](#)⁸⁶. In the educational domain the [OpenCourseWare Consortium](#)⁸⁷ has to be mentioned. One nice mini-service is [Publish or Perish](#)⁸⁸, supplied by the Australian Anne Will Harzig. This collects all the articles of an author in Google Scholar and automatically generates a number of indexes for that author, for example the h-index. Google Scholar itself would become more useful for Open Access if it were to create a subset (“*Google Scholar Open*”) that only generates hits that give Open Access to the full text. An interesting meso-service is supplied by [eIFL](#)⁸⁹, an organisation that encourages transitional and developing countries to participate in the OA movement.

Disciplinary services

For researchers specific services for their own discipline or subject are more interesting than broad generic services. Today, such a specific service can easily be generated from institutional repositories via harvesting and filtering techniques (provided good quality metadata is available). However, in some disciplines sizeable open access services were developed prior to the introduction of the OAI Protocol for Metadata Harvesting. These services still have an established place in their community.

The oldest one is [ArXiv](#)⁹⁰ from 1991, originally set up for the high-energy physics community and later adapted by some adjacent disciplines. Characteristically, it circulates open preprints i.e. articles submitted to a journal for publication. The researchers are fully satisfied with this early information about new developments. Subsequent publication of the article is only used by them to participate in the official circuit of citation indexes and impact factors. Currently, the [SCOAP3](#) project of CERN is aiming at converting the core journals of their discipline to Open Access.

The [RePEc](#)⁹¹ service (Research Papers in Economics) started in 1997. It is a collaborative effort of hundreds of volunteers in 68 countries to enhance the dissemination of research in economics. Its distributed database links to over 700.000 articles and working papers, most of which are freely downloadable. An appealing complementary development is the EC-funded [NEEO project](#)⁹² of the Nereus consortium, specifically aiming at access to the complete curriculum of over 900 leading economists in Europe.

[PubMed Central](#)⁹³ (started 2000), [UK PubMed Central](#)⁹⁴ (2007) and PubMed Central Canada (anticipated fall 2009) give open access to millions of articles and manuscripts in the biomedical and life sciences. As of 7 April 2008 all articles resulting from research funded by NIH must be made publicly accessible in PubMed Central not later than 12 months after their publication. Wellcome Trust and a [group of UK funders](#)⁹⁵ have limited the embargo period of their articles to 6 months.

A tardy parallel development is seen with respect to research data. [GenBank](#)⁹⁶, [Protein Data Bank](#)⁹⁷ and the [Virtual Observatory](#)⁹⁸ for astronomy provide

immensely used services for their respective disciplines. But, despite a "[Declaration on Access to Research Data from Public Funding](#)⁹⁹" of the OECD ministers in 2004, a broad generic approach of the issue has not emerged so far. This time it are not reluctant publishers that hold up progress; a major problem is the lack of common standards and protocols according to an investigation in [Nature](#)¹⁰⁰.

Professional services

In addition to OA-based end-user services, services for OA professionals are emerging. [PKP](#)¹⁰¹ delivers widely used open source journal systems, conference systems, and harvesting tools. [SWORD](#)¹⁰² offers a lightweight depositing protocol. [OpenDOAR](#)¹⁰³ and [ROAR](#)¹⁰⁴ are moderated registries of OA repositories. [OASIS](#)¹⁰⁵ – the Open Access Scholarly Information Sourcebook by Alma Swan and Leslie Chan – and the German [Open-Access.net](#)¹⁰⁶ provide an overview of the current developments on practically all relevant OA issues. Peter Suber's [Open Access News](#)¹⁰⁷ accurately registers and comments the OA news; [SPARC](#)¹⁰⁸ and [SPARC Europe](#)¹⁰⁹ are library alliances to promote Open Access.

[DRIVER](#)¹¹⁰ is a European project that services both end-users and professionals. For end-users, it enables searching of the content of over 200 repositories, with approximately one million documents, not only in the usual way (by author, keyword, document type, publication date, or personal profile) but also by repository, country, language, community, collection or subject. For professionals, DRIVER offers general support (including a [wiki](#)¹¹¹ and a FAQ); a [Harvesting service](#)¹¹²; Open source software (under the name [D-NET](#)¹¹³); a [Mentor service](#)¹¹⁴ for novices in the repository world (including a [tutorial](#)¹¹⁵); [Metadata guidelines](#)¹¹⁶ reflecting the agreements that must be made to augment the interoperability of the various repositories; a [Validator](#)¹¹⁷ that tests and reports on the repository's compliance with the OAI-PMH protocol and the metadata guidelines; and finally [Studies](#)¹¹⁸ on business models, OAI standards, copyright, and an [inventory of repositories in the EU](#)¹¹⁹.

To conclude

For all OA developments – be they institutional, national, disciplinary or global – three components are always vital for success: a robust interoperable **infrastructure**, sustainable **end-user services** and a critical coverage of good **content**. Although necessary, these components are not enough. Open Access to knowledge is not yet commonplace in the academic world and established interests, prejudice and traditions stand in its way. Therefore **awareness raising** must play an essential role in the period ahead.

Although OA needs an integrated approach of practically all stakeholders in the research life cycle their responsibilities and priorities may differ.

Infrastructure typically lies in the domain of the co-operating (national and institutional) libraries with their long tradition of organizing academic content and offering perennial access. Ultimately **end-user services** come down to a form of publishing in the genuine sense of the word, which is 'making public' and adding value. So, 'publishing agents' are the lead actors in this domain. The availability of the research results or **content** can be required by those who define the research conditions i.c. the funders. When they ignore the issue – as

they have done in the past - their stance often results in access restrictions and complex licensing models by third parties i.c. publishers. Finally, raising **awareness** is a policy item, hence a direct responsibility of a body that represents the relevant policy makers (Research Councils, HE institutions and National Library) in a national OA steering committee.

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⁷ Open Access Initiative Protocol for Metadata Harvesting.

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⁸ ROAR <<http://roar.eprints.org/>>.

⁹ JISC, Innovation in the use of ICT for education and research <<http://www.jisc.ac.uk/>>

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<<http://www.surffoundation.nl/en/themas/openonderzoek/Pages/default.aspx>>

¹¹ Denmark's Electronic Research Library

<<http://www.deff.dk/default.aspx?lang=english>>

¹² Norwegian Open Research Archive

<<http://www.ub.uit.no/wiki/openaccess/index.php/NORA>>

¹³ Irish University Association <<http://www.iua.ie/iua-activities/Librarians.html>>

¹⁴ Knowledge Society Agency, Portugal <<http://www.infosociety.gov.pt/>>

¹⁵ National Library of Sweden <http://www.kb.se/OpenAccess_english/>

¹⁶ National Library of New Zealand <<http://www.natlib.govt.nz/about-us/current-initiatives/past-initiatives/national-research-discovery-service>>

¹⁷ Australian Research Online <<http://research.nla.gov.au/>>

¹⁸ Knowledge Exchange <<http://www.knowledge-exchange.info/>>

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²⁰ Cream of Science project in the Netherlands

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²⁴ OCLC, OAIster database <<http://www.oclc.org/oaister/>>

²⁵ Sherpa/RoMEO. Publishers with Paid Options for Open Access.

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<<http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1680>>.
- ⁶⁴ One of the standard mechanisms for the EC to make its policies operational is to put out tenders and calls for bids or proposals. In this manner, the Commission has called for tenders for the provision of a pan-European repository for orphan authors in FP7. Why not call for proposals to establish new high-quality Open Access journals as well? Such a call would follow up on the main policy recommendations (“Aim at a ‘level-playing field’ in terms of business models in publishing.”) of the EC’s [Study on the Economic and Technical Evolution of the Scientific Publication Markets of Europe](#). The expected number of articles to be published could make it appealing for publishers to submit proposals. Of course, existing publishers can bid as well as newcomers. Such an invitation to tender could be put out not only by the EC but also by (consortia of) funders or universities alike which have developed distinct Open Access policies (e.g. have signed the Berlin Declaration). It should be emphasised that there are few risks for the initiator of such a call. At worst there are no proposals (or none that can be accepted), meaning that the status quo is maintained. The best-case scenario concludes with a well-filled register of accredited OA platforms (for example journals) that comply with the funder’s conditions and can be used by authors without concern or hassle.
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