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KNOWLEDGE EXCHANGE BRIEFING PAPER

# OPEN ACCESS BUSINESS MODELS FOR RESEARCH FUNDERS AND UNIVERSITIES

BY

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*Knowledge Exchange*

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*The author acknowledges with gratitude the assistance given by fellow-members of the Knowledge Exchange Open Access Working Group, both in correcting the author's errors and false judgements and in suggesting improvements to the draft text. Any errors which remain are solely the responsibility of the author.*

*This briefing paper has been written in cooperation with SPARC Europe.  
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## SCOPE

This study covers the types of business model used for open access to publicly-funded research content. Various organizational structures developed to offer open access to publicly-funded research content are examined from the perspective of publicly-funded institutions and organizations. Business models for publicly-funded institutions can be built from elements which a commercial business model may not include, particularly in respect of the inclusion of non-financial factors. While the cost of open access or any other research dissemination model remains important, the discussion around research dissemination now includes impact, value and benefits. Other non-financial factors – such as copyright assignment – are also understood to be key issues in designing a successful business model for publicly-funded research outputs. Thus in this document the description of each type of open access business model includes the factors which will determine the cost incurred in providing open access, the factors likely to be important in adopting the model, and a summary of the strengths and weaknesses of each open access model from the perspective of research funding agencies and institutions managing the funding of research dissemination. Most of the document relates to research outputs in the form of journal articles but brief descriptions are given of factors important in open access to research data and research monographs.

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## EXECUTIVE SUMMARY

This study of open access business models indicates that every form of open access to publicly-funded research and teaching outputs requires public funding. Private funding may provide partial support for some open access models (e.g. if an author pays for the cost of publishing in an open access journal) but no open access model can survive on private funding alone. In this respect open access business models are no different from the current subscription or licensing business models for academic journals, as the publishers of the journals are also dependent upon the purchase of subscriptions or licences by publicly-funded libraries. The factor distinguishing open access business models from subscription or licensing business models is the higher level of benefit from open access in relation to the cost to the taxpayer.<sup>1</sup> To a certain extent the level of benefit is related to the commitment to open access by funding agencies and institutions, clear policies and good management resulting in a higher number of open access publications and higher consequential benefits.

This study illustrates the considerable variety of business models within a common framework of public funding.<sup>2</sup> Open access through institutional repositories requires funding from particular institutions to set up and maintain a repository, while the business model for subject repositories often requires contributions from a number of institutions or funding agencies to maintain a subject repository hosted at one institution. Open access through publication in open access journals generally requires a mix of funding sources to meet the cost of publishing. Public or charitable research funding bodies may contribute part of the cost of publishing in an open access journal but institutions also meet part of the cost, particularly when the author does not have a research grant from a research funding body. To some extent the benefits follow the funding, institutions and their staff members being the primary beneficiaries from institutional repositories, while national research funding agencies may be the primary beneficiaries from the publication on open access of the research they fund. However, in addition all open access business models allow benefits to flow to communities which have not been part of the funding infrastructure.

Any open access business model contains elements which cannot be measured in monetary terms. In particular the impact of open access to research outputs can be described but cannot

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1 A seminal report on this topic is Houghton, J. et al, *Economic implications of alternative scholarly publishing models*, JISC, 2009 <http://www.jisc.ac.uk/publications/reports/2009/economicpublishingmodelsfinalreport.aspx>.

2 The validity of this environment of a variety of models within a framework of public funding is demonstrated by the case studies in *JISC Sustaining digital resources, Ithaka Case Studies in Sustainability*, JISC, 2009 <http://www.ithaka.org/ithaka-s-r/research/ithaka-case-studies-in-sustainability/ithaka-case-studies-in-sustainability>.

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always be quantified. The social benefits of open access, for example, cannot be itemised in a financial spread-sheet but should be seen as part of the business model, in that open access to research and teaching outputs brings benefits to previously disenfranchised individuals and communities. The identification of these benefits, even if numbers cannot be attached to them, should be an important feature of a business model for the public sector funding of open access. Another element which is difficult to measure in monetary terms is the degree to which a particular business model allows the authors, their institutions, or the funders of the content made accessible to remain in control of that content. The subscription and licensing models transfer control to the publishers of the content through the assignment of copyright. By contrast most open access business models allow control over the content to remain with the author or the funder, with use and re-use being licensed by the author or funder rather than by the publisher. The authors and funders of documents resulting from publicly-funded research have priorities on use and re-use of their content which would not appear in a business model designed for a commercial purpose, and the extent to which usage rights and re-use rights provide benefits beyond financial benefits should be identified in any open access business model.

The identification of both financial and non-financial benefits to funding bodies and universities will become a key factor in the long-term success of open access. A range of factors will determine whether particular models succeed or fail, but for both particular business models and for the open access movement as a whole, the ability to demonstrate that the potential benefits from open access are becoming a reality will assist sustainability. No funding agency or university will wish to withdraw support for a business model which is showing clear benefits over the current toll-access model for research outputs, particularly if the benefits identified from open access support sections of the economy outside research and higher education. Each model for open access has its own strengths and weaknesses and the opportunities for universities and funding agencies lie in maximising the strengths and minimising the weaknesses. Any one of the three principal structures for providing open access to publicly-funded research outputs – institutional repositories, subject repositories or open access journals – has the potential to deliver a sustainable service, but wise choices will have to be made between the various models possible within each structure. Combinations of different models – such as access through either a repository or an open access journal – may also meet particular needs.

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## 1. THE SCHOLARLY COMMUNICATION ENVIRONMENT

*A business model is more than a financial spread-sheet. It begins with an analysis of the environment in which the business – whether public or private – will operate and identifies the key factors which will affect the success of the business as well as the operating costs and indicators of success. The indicators of success come from the environment within which the business operates, whether profit for a commercial company or impact for a publicly-funded service.*

### 1.1 Business models are important in an era of change

Open access business models operate within a broader scholarly communication environment in which change is the key factor. For open access business models to be successful they need to be part of this changing environment, flexible and responsive. Scholarly communication processes are in a period of change in the production, dissemination and use of research and educational text and data. The drivers for change are the opportunities provided by the internet and electronic media, and the requirement from governments and official bodies to achieve value for money, possibly reducing costs but also increasing the impact of publicly-funded research and education.

Achieving value for money has grown in importance as the volume of research publications has increased at a time of constraints upon public finances. Against this background the topic of business models has acquired an importance for *all* stakeholders in the research and education “business” which it only had for selected stakeholders during the last century. Commercial publishers have always been concerned with business models for books and journals but authors and institutions rarely became involved with the business model for the published outputs of research or teaching, unless through a university press or a society journal. Librarians have always been aware of the cost of books and journals but were rarely - even as members of publishers’ library advisory committees – aware of how the prices they paid related to the cost of publishing. Such lack of awareness of the business models in scholarly communication has become unacceptable in an environment of accountability for public funds. In the context of open access to publicly-funded research and teaching outputs, the compilation of a business model enables comparisons to be made of costs and benefits from alternative routes to open access.

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## 1.2 The nature of open access business models

The term “business models” can be applied to the strategies underpinning all public expenditure, strategies which will include a range of financial and non-financial elements. A university may decide to set up a repository to archive its research outputs, and the repository should have a budget, a financial plan, a workplan, goals and objectives, possibly revenue-generation and all the components of a commercial business model - except for a requirement to make a profit measured in monetary terms. Likewise a funding agency may support a large subject repository in order to maximise the impact of the research it funds. A business model in the context of a publicly-funded academic body can be seen as an expression of its overall strategy and as a contribution to the institution’s responsibility to account for the public funding it receives. For the alternative route to open access, i.e. the publication of open access journals, making a profit is compatible with open access for a publisher, provided that for the funding agencies and institutions a competitive environment enables value for money to be identified for expenditure from the public purse.

Non-financial factors are recognised as important in business management: “Non-financial measures offer four clear advantages over measurement systems based on financial data. First of these is a closer link to long-term organizational strategies. Financial evaluation systems generally focus on annual or short-term performance against accounting yardsticks. They do not deal with progress relative to customer requirements or competitors, nor other non-financial objectives that may be important in achieving profitability, competitive strength and longer-term strategic goals. For example, new product development or expanding organizational capabilities may be important strategic goals, but may hinder short-term accounting performance.”

Ittner, C. and Larcker, D. Non-financial performance measures, Knowledge@Wharton, Dec 6 2000  
<http://knowledge.wharton.upenn.edu/article.cfm?articleid=279> .

## 1.3 Beyond cost and price

The changes in the scholarly communication environment are enabling issues to be explored which go beyond cost and price. The publication of research and teaching outputs touches upon aspects of academic life which superficially have nothing to do with business models but which are major factors in the environment within which scholarly publishing sits. An example is the use by the academic community of research assessment procedures linked formally or informally to the Thomson Reuters impact factor ratings of journals, a practice which has led directly or indirectly to higher prices being paid for the high impact factor journals described as “must-have” journals, i.e. “must-have” because of their importance in research assessment not necessarily because they represent good value for money.

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This report covers such environmental issues in so far as they influence the various business models. The report also recognises “political” drivers in determining the value of various business models. One key factor in the success of any business model is the extent to which the “owners” of the business are able to control decisions vital for the success of the business. In the business of disseminating research outputs, the “owners” are the research and higher education organizations and institutions. It can be argued that over the past fifty years universities and funding agencies have allowed control of the publication of publicly-funded research and teaching outputs to pass into the hands of commercial entities. A question to be addressed is about control of the business of disseminating research outputs through open access. Which of the new business models allow greater control by the academic community of the key decisions in the research dissemination structure? Business models are about how decisions are made as well as about funding or sustainability.

Key decisions to be made by authors, funding agencies and universities for the successful operation of all open access business models are:

- Is access alone required to research outputs or is the unrestricted re-use of the research outputs for future research and teaching world-wide also required?
- Should exploitation of publicly-funded research outputs by commercial companies be encouraged and if so under what conditions?
- How can the copyright in publicly-funded research outputs be managed to enable these requirements?
- How can the model chosen be made sustainable?

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## 2. BUSINESS MODELS FOR OPEN ACCESS INSTITUTIONAL REPOSITORIES

*The environment within which institutional repositories are set up and operate is complex and has many stakeholders both within and without the institution. This complexity makes it vital for institutional managers to be clear about why they wish to set up a repository, what they expect the repository to do, and how they will measure its costs and benefits. The key factor for success in establishing an institutional repository is strong support from within the institution.*

### 2.1 Why would an academic institution set up a repository?

Setting up an institutional repository gives an institution a high degree of control over the research outputs from its staff members and enables advantages to accrue to the institution. The advantages lie in managing its research and educational outputs in ways which bring the greatest institutional benefits and which provide the best opportunities for impacts outside the institution. An institution is able to set up a repository with policies and procedures which suit its own strategy and environment. For this reason there are many possible roles for an institutional repository.

Each of the reasons for setting up a repository carries implications for the content, design and funding of a repository, and the institution needs to be clear about the implications of different roles for a repository, while being prepared to change or add roles as the scholarly communication environment develops. Institutional repositories may contain many differing types of content in different formats and versions. The acquisition of each of these types of content carries implications for the resources required to list, store and make available the content from the repository. Repository managers may need to balance the benefit of a mediated approach to content acquisition in growing the repository against the higher cost of mediation over self-archiving by authors. In addition each item will have its own individual rights environment agreed with the author and/or publisher. The issues of rights and permissions are key factors in determining which versions of journal articles are held by an institutional repository, and resolving these issues can add significantly to the staff costs in running a repository. A straightforward way of handling IPR issues – such as through the use of Creative Commons licences<sup>3</sup> – is therefore in the interests of publicly-funded institutions.

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3 A variety of licences are available at <http://creativecommons.org/>.

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Possible roles for an institutional repository, including any of the following, or any combination:

- To collect together all the publications and other research and teaching outputs as a permanent record of the institution's achievements but without any specific use in mind
- To report the publications and other research and teaching outputs to funding agencies in support of new grant applications
- To report the publications and other research and teaching outputs to funding agencies as part of an audit of expenditure
- To demonstrate to governments or taxpayers the impact of the institution outside its walls (a purpose which will require the compilation of metrics)
- To increase the impact of particular research or teaching programmes through exposure of publications and other outputs on open access
- To increase the impact of individual members of the institution's staff through the exposure to potential academic and commercial users of the individual's publications and other outputs on open access
- To reduce the cost and increase the benefits from the dissemination of the institution's research and teaching outputs
- To make a contribution to the world-wide movement for open access to publicly-funded

## **2.2 Measuring costs and benefits for institutional repositories**

Given the huge range of size, content and functions of institutional repositories, any attempt to provide an "average" cost of maintaining an institutional repository or "average" usage statistics as indicators of benefits carries very little meaning. Many journal articles, e-mail messages and blogged information on this topic are available via the internet, revealing wide variations across different parts of the world.

Two publicly-available sources for repository statistics enable some comparisons to be made. Firstly the Primary Research Group (PRG) publication "The Survey of Digital Institutional Repositories 2011"<sup>4</sup> does provide some parameters within which many repositories operate successfully:

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4 Available for a single-user payment of US\$95 from [PrimaryResearch.com](http://PrimaryResearch.com) .

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- The mean number of journal articles in the repositories in the PRG survey was 7523 plus a further 6888 articles from non-refereed publications
  - The mean annual budget for the repositories in the PRG survey was US\$75,413
  - The mean number of downloads from the repositories in the PRG survey in 2010 was 981,192 though the median was 168,468.

In making comparisons using the PRG data it should be remembered that the PRG data comes from repositories in several countries with widely varying labour costs and policy environments.

A second source of repository statistics is available without charge from [http://www.open\\_doar.org/](http://www.open_doar.org/). OpenDOAR does not provide information about the cost of running a repository but it does provide information about the content in individual repositories and also charts on repositories by country and by policy framework, for example those repositories having a recorded preservation policy. OpenDOAR also covers a wider range of repositories, around 1800 repositories in more than 90 countries. This wide coverage should enable any institution wishing to set up a repository to identify an existing repository in their region and approach that repository for further information on costs and benefits. As a rule of thumb, repositories in North America appear to cost more to set up and maintain than repositories in Europe and repositories in large research institutions appear to cost more than repositories in teaching institutions. This factor may be related to the volume of content in the repository, and there may be a corresponding higher level of benefits for large research institutions.

Sample of US repository costs: “Implementers report a range of start-up costs from \$8,000 to \$1,800,000, with a mean of \$182,550 and a median of \$45,000. Planners report a range of \$12,000 to \$160,000, with a mean of \$81,667 and a median of \$75,000. The range for ongoing operations budgets for implementers is \$8,600 to \$500,000, with a mean of \$113,543 and median of \$41,750. Only two planners knew their budgets for ongoing operations—\$100,000 and \$133,000, with a mean and median of \$116,500.”

Source: ARL Spec Kit 292 Institutional Repositories 2006 available through <http://www.arl.org/resources/pubs/spec/complete.shtml>

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Sample of Australian repository costs (note the difference between the costs quoted in the literature and actual costs): “A review of the literature suggests average repository establishment costs of around AUD 9,000 and annual operating costs ranging from a low of around AUD 4,000 to a high of around AUD 80,000 per year (mean AUD 41,000). Assuming a 5 year depreciation of establishment costs, mean annual costs per archive would be around AUD 42,500, implying that the total costs of operating institutional repositories for all higher education institutions in Australia might be of the order of AUD 2 million a year. However, it should be noted that canvassing a small number of local examples unveiled annual costs of up to AUD 275,000. These cost levels would suggest that the total cost of operating institutional repositories for all higher education institutions in Australia might be up to AUD 10 million a year at the upper end. Taking account of the policy, advocacy, management and operation of a substantial institutional repository, and fully costing staff time involved, suggests that individual institutions might expect repository costs to be of the order of AUD 200,000 a year.”

Source: Houghton, J. et. al. Research communication costs in Australia, emerging opportunities and benefits Melbourne 2006 <http://eprints.vu.edu.au/538/1/wp24.pdf> .

Sample of European repository staffing costs: “Dear list, I asked: roughly how many IT staff are dedicated to supporting your repository? I have had a range of answers back from 18 institutions, of which 2 were in the US, one each from Australia, the Netherlands and Switzerland, and the rest from the UK. It was interesting that several mentioned that their IT support was out-sourced to EPrints.org; they usually gave the IT support as zero, but since there is a support fee charged I translated that roughly into 10% FTE. On that basis, the mode (most common) answer was 10% FTE (but if you counted those sites as actually zero, then the mode would have been 50% FTE). The median answer was 50% FTE (ie there were as many answers below as above this). The average was 82% FTE, influenced by one very high answer, which I strongly suspect I have mis-interpreted. If that answer were halved, the average would drop to 71% FTE and the other figures would be unchanged. Summing up the figures another way, there were 8 sites with < 50% FTE, 5 sites with 50% or up (but less than 100%), and 5 sites with 100% FTE or more.”

Source: Email from Chris Rusbridge to JISC Repositories list 11/04/11.

Sample of European technical costs: “The software can be installed on a standard server, costing about Euro2,100. It should take a technical officer between 2 and 5 days to get it all working, at a probable cost of approximately Euro1000. Experience from the SHERPA project shows that further customisation work is required during the first 6 months of the repository’s life. This includes developing the ‘look and feel’ of the service, and ensuring it is fitted into the support and maintenance procedures of the institution. We estimate this adds up to 15 person days’ work over the course of 6 months, a possible cost of about Euro3000. Thereafter, ongoing technical work can normally be absorbed within an institution’s standard maintenance routines.”

Source: DRIVER Information about building open access repositories <http://www.driver-support.eu/tech/index.html>

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The measurement of costs and benefits should be an integral feature of the business model for any institutional repository. The costs and benefits identified will vary according to the purposes for which a repository has been established. An institutional repository business plan should include an analysis of the costs and benefits for each repository function. In general the greater the content in the repository and the broader the range of functions, the greater will be the benefits to the institution. There is little benefit to be gained from a university which only contains a small percentage of an institution's research output and which receives little use. However, adding certain functions may bring a cost which outweighs the benefit. Some basic metrics which, whether for internal or external accountability, a repository manager should be able to provide are: the equipment and personnel costs in setting up and maintaining the repository, the one-off and recurrent costs in preserving the text and data in the repository to ensure long-term availability of the content, the number of internal and external hits upon the repository web-site, the number of downloads of full-text items in the repository, and the number of downloads of content which receive a particularly high level of use.<sup>5</sup> The identification of performance indicators could provide a structure to the calculation of benefits, which may otherwise be a random list of un-connected statistics.<sup>6</sup>

### 2.3 Changes in the roles of institutional repositories

As the scholarly communication environment changes, there is potential for institutional repositories to develop new roles. The acquisition of datasets by institutional repositories provides an opportunity for a new role in linking research data to the text of research reports. This role can best be developed in an open access environment in which both text and data are accessible without financial, legal or technical restrictions. This new role is not to be undertaken lightly, as it will involve new skills, new partnerships and additional costs, but As the scholarly communication environment changes, there is potential for institutional repositories to develop new roles. The acquisition of datasets by institutional repositories provides an opportunity for a new role in linking research data to the text of research reports. This role can best be developed in an open access environment in which both text and data are accessible without financial, legal or technical restrictions. This new role is not to be undertaken lightly, as it will involve new skills, new partnerships and additional costs, but repository managers could make a strong case in their business model on the basis of benefits to future academic research.<sup>7</sup>

The growing volume of content in institutional repositories and the growing cost of purchasing content published by existing publishers are factors which have led some

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5 This statistic can be used for various purposes, such as to "advertise" individual or institutional success.<sup>6</sup> An approach to the use of PIs in repository management is described in Cassella, M. Institutional repositories: an internal and external perspective on the value of IRs for researchers' communities, LIBER Quarterly 20 (2) 2010 <http://liber.library.uu.nl/> .

6 An approach to the use of PIs in repository management is described in Cassella, M. Institutional repositories: an internal and external perspective on the value of IRs for researchers' communities, LIBER Quarterly 20 (2) 2010 <http://liber.library.uu.nl/> .

7 An encouraging approach to this topic comes from Gail Steinhart in her presentation entitled "Small is beautiful: data curation for the rest of us" available at <http://www.arl.org/sparc/bm~doc/steinhart.pdf> .

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institutions to consider using their repository to publish some of the research and teaching content from their own authors. Some libraries and archives have also encouraged the repository to publish images of manuscripts and rare books in order to make that type of content more widely available than if it would be locked away in a rarely-visited building. Entering the world of publishing is a big step for any repository and a clear business plan will be needed.<sup>8</sup> Often the business model used for such developments is a partnership between a library, a university press and an academic department. Costs will vary considerably according to the type of material. A decision will need to be made on whether or not to charge for the published content. Even if the repository operates on the basis of open access, there may be certain types of content – e.g. a teaching pack – for which a charge may be considered reasonable, although the cost of collecting payments will need to be built into the business model.

An emerging role for institutional repositories is in demonstrating the value of the institution itself and the research and teaching conducted within the institution. If a repository is able to collect a high proportion of the research and teaching outputs from an institution, a potential student or researcher applying to the institution will see in the publications in the repository a picture of the strengths of the institution in particular disciplines. Likewise the statistics on use of the repository can be incorporated by university managers into any report to funders on the impact of the research and teaching carried out in the repository. In this way the repository acquires a marketing or advertising role on behalf of its parent institution. This development could be both part of the repository's business model and of an institution's broader approach to the collection and use of management information.

#### **2.4 A tailor-made business model**

It will be seen from the multiple factors identified above that the compilation of a business model for an institutional repository has to be tailor-made to the situation within each institution. Certain factors may be common to many institutional repositories, such as the acquisition of copies of research articles, but even within such a common factor different institutions will make different choices, for example on the version of the research article they seek to acquire. Different choices will also be made on the range of usage statistics to be kept (although the need for some standardisation has been recognised)<sup>9</sup>, and on whether or not to move into areas such as publishing. No two institutional repository business models will be identical, although many institutional repository business models will have features in common. Most will fall into one of the five basic models outlined by Alma Swan and Chris Awre in the "Linking UK repositories" report of 2006 (see below), although the definition of

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<sup>8</sup> A useful resource for any university considering entry into the world of repository publishing is SPARC's Campus-based Publishing Resource Center available at <http://www.arl.org/sparc/partnering/>.

<sup>9</sup> See for example the work of the Publisher and Institutional Repository Usage Statistics (PIRUS) project <http://www.jisc.ac.uk/whatwedo/programmes/pals3/pirus.aspx>.

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“publicly-funded” is now much broader than JISC funding alone.<sup>10</sup>

“Repository services might adopt a range of appropriate business models. Here we focus on five:

- institutionally-supported: appropriate for digitisation, repository provision, preservation at some levels and overlay journal production
- publicly-funded (e.g. from top-sliced money allocated by the JISC): appropriate for all advisory services for interim ‘catch-all’ repositories, metadata creation and enhancement, resource discovery, technology transfer and bridging services
- community-supported: appropriate for subject- and media-specific repository provision, usage, assessment, and meta-analysis services and publishing services (particularly where mediated by learned societies)
- subscription-supported: appropriate for access and authentication, preservation and resource discovery services
- fully-commercial models (including advertising-supported, merchant and utility models): appropriate for digitisation, repository provision and hosting, technical advisory services, metadata creation and enhancement, technology transfer, and all output-level services (access/authentication, usage statistics, preservation, monitoring and meta-analysis services, resource discovery, bridging services, overlay journal production and publishing services”.

Swan, A. & Awre, C. Linking UK repositories, JISC 2006 <http://www.jisc.ac.uk/publications/reports/2006/linkingukrepositoriesreport.aspx>

## 2.5 Institutional repository collaboration

Some institutions have collaborated to set up a joint repository to reduce costs.<sup>11</sup> The savings on set-up costs in this model are unlikely to be substantial, as repository software is available without payment and the hardware required is fairly basic. Savings on recurrent costs could be made through collaboration if a small institution did not have sufficient content to justify the staff costs in maintaining a repository alone. An alternative strategy for a small institution would be to outsource the repository function to one of the commercial repository management services available. The risk for an institution in not maintaining its

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10 More up-to-date information on this topic from Alma Swan, including a valuable bibliography, is contained in Swan, A. *Business planning for digital repositories*, in M. Collier *Business planning for digital libraries*, Leuven University Press, 2010, ch.11. The same volume (chapter 13) also includes a study of both “green” and “gold” OA models by David Prosser *Business models for open access publishing and their effect on the digital library*.

11 For example, the White Rose Consortium <http://eprints.whiterose.ac.uk/docs/information.html> .

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own repository could be in losing the flexibility to tailor the repository services to its own requirements.

## 2.6 Strengths and weaknesses of the institutional repository model

Many of the strengths of an institutional repository are linked to its position within one institution. Unfortunately many of the weaknesses are also linked to that single-institution situation.

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### Strengths of institutional repository models

- A strong base and clear purpose through being part of a long-term institution
- Costs borne within existing financial structure
- Benefits clearly related to institution's research outputs
- Repository policies can be integrated with institutional strategy and repository data fed into institutional research information systems
- Supportive environment enables growth in OA content
- Authors pay more attention to deposit policy from their own institution
- Copyright issues handled as part of institutional research policies



### Weaknesses of institutional repository models

- Content linked to one institution makes sense in teaching environment but not in an international research environment
- Some researchers feel greater affinity with international research groups than with their own institution
- Repositories need services strong on interoperability and cross-searching to be of value to international research
- No single institution is able to resist a publisher's demand for a long embargo or copyright restrictions
- No single institution able to effect changes in research assessment to have repository content recognised

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### 3. BUSINESS MODELS FOR OPEN ACCESS SUBJECT REPOSITORIES

*Subject or disciplinary repositories operate within a different environment from institutional repositories. The focus for policies, procedures, costs and benefits is not a single institution but either a specific group of funders or a disciplinary community.*

#### **3.1 Why would a group of research funders or researchers working in the same research area wish to set up a repository?**

As with any form of open access to publicly-funded research or educational content, the motivation of the supporters of open access subject repositories provides the foundation for the business model. Two large subject repositories provide examples of different approaches to business models, although as each service develops the differences may lose their significance. Arguably the longest-running open access subject repository is the high energy physics repository arXiv.<sup>12</sup> This is a true “bottom-up” repository, being founded and used by many researchers as a service to themselves. Although one individual researcher - Paul Ginsparg - was instrumental in setting up the database, and although one institution – the Los Alamos National Laboratory – hosted the service initially, arXiv has proved successful because virtually all researchers in the subjects it covers have willingly deposited preprints of the published papers into the database and have used it as their most regular source of information about new research. This community support has determined the “self-help” nature of the business model used for arXiv.

The group of medical research funders establishing UK PubMed Central (UKPMC) have taken a “top-down” rather than a “bottom-up” approach. Like the physics community, they have been motivated by the need of their researchers to have barrier-free access to the latest research, but in order to set up the open access database for research papers they have had to develop a more formal business model. The reasons for this difference between the physics and biomedical open access business models lie in the different characteristics not only of the communities themselves but also in the different characteristics of the publishers of research outputs in the two areas. Size is one factor, the number of research papers in biomedicine being much greater than in physics, making a “self-help” approach more difficult to organise and fund. Another factor is that biomedical research outputs are largely published by publishers who have been wary of open access databases, whereas in physics the publishers have adopted a positive approach to the arXiv database. The physics community is used to

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<sup>12</sup> The arXiv web-site is at <http://arxiv.org/> .

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working within a preprint culture, whereas biomedical research is based upon more formal publication structures. These factors have given UKPMC a more formal “feel” than arXiv, although both are having to face up to contractual and sustainability business issues.

A further difference between the arXiv approach to a subject repository and the UKPMC approach is that the needs of the funders of UKPMC for management information have added to the design requirements and therefore to the cost of the service. The managers of arXiv require information about use of the database, as do UKPMC managers, but UKPMC funders also need to track publications resulting from the research grants they make to institutions and individual researchers. Like arXiv the primary purpose of UKPMC is to provide a service to researchers and support future research, but the needs of funders introduce a secondary layer of purpose for UKPMC and is likely to do so for any large new subject repository. As each new purpose adds layers of both cost and benefit it is important that these issues are understood in making comparisons between the business models of different types of subject repository. The subject repository landscape is not as complex as the institutional repository landscape but it is not as uniform as it may at first appear.

### **3.2 Content**

The single factor which all open access subject repositories have in common is that each item in the repository is in the particular subject area for which the repository has been established. Most but not necessarily all content in subject repositories is research content, generally research outputs from taxpayer-funded research, and most but not necessarily all are versions of journal articles. The issue of which version of journal articles are included is as important an issue for the business model of a subject repository as it is for an institutional repository. Staff costs are incurred in resolving and monitoring rights issues even when there is a direct relationship between the author and the repository management (use of a Creative Commons licence greatly simplifies this relationship) but those costs increase when some or all rights are owned by a third party such as a publisher.

The content of a subject repository has the potential to be its greatest strength and contribute most to the value of the repository. It is no coincidence that arXiv was one of the first open access repositories to be set up and that arXiv is one of the longest-running repositories. Its longevity is due to the value it provides to the research community and that value is due in no small part to the comprehensive nature of its open access coverage in the subjects it covers, the fruit of the support the database has received from the international physics community. A physics repository based in a single country could not have made the same impact as arXiv has made. The importance of international coverage is also seen in UKPMC, which – despite its title – is in effect an international database through its shared coverage with the US PubMedCentral. It is questionable whether access to UK research reports alone would have justified the high cost of setting up UKPMC. The combined coverage of the US

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and UK databases at the time of writing is over two million full-text articles, making it an indispensable resource for scholars across the world. And yet the value of the UKPMC on its own has been enhanced by unique services to the UK research community, services such as data mining and links to research grants. In the world of subject repositories size matters, providing a broad content base upon which valuable services can be built.

### 3.3 Measuring costs and benefits in subject repositories

The institutions and managers of the large subject repositories have until recently paid little attention to metrics in order to justify the cost of the repository, instead benefits being described in terms of improvements in research and management information for funders and for researchers. For arXiv its success has until recently been treated as so obvious as not to require any analysis. The arXiv FAQ page at its original LANL site <http://lanl.arxiv.org/help/faq/statfaq> contains the question “Do you plan to use download statistics in any way?” with the single-word answer “Yes”, indicating that the database managers may have realised that one day they may need to use metrics but had not felt the need to do so at that time. It is noticeable that the new Cornell University site for arXiv at <http://news.library.cornell.edu/news/arxiv> does contain metrics to illustrate its value, reporting more than 2.5 million article downloads per month, and a group has now been set up to ensure the long-term sustainability of the database.

### 3.4 Subject repository business models

The business model for each of the subject repositories described below relies upon public or charitable funding, but the structure of the business model varies considerably from subject repository to subject repository. In many cases the public or charitable funding is not formalised but relies upon the initiative of individual scholars. Where the business model is established on a formal basis the future maintenance and development of the subject repository appears more secure, as more attention is paid to the development of revenue streams.

### 3.5 The arXiv business model

The publication by Cornell University Library of the arXiv Business Model White Paper is an indication of the maturity and success of the arXiv repository.<sup>13</sup> The repository was set up in 1991 as an informal resource for the needs of a particular research community. Over time both the subject coverage and the user community expanded as the value of the repository was recognised, and the growth in content and use made the resourcing of arXiv a serious matter for whichever institution hosted the repository<sup>14</sup>. Although critics of arXiv treated the development of a business model for arXiv as a sign of failure and of the impossibility of maintaining such a substantial free service, the Cornell University Library initiative was in fact

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13 The White Paper is available at <http://arxiv.org/help/support/whitepaper> .

14 The arXiv repository contained over 600,000 items at the time of writing this report: source OpenDOAR [www.opendoar.org](http://www.opendoar.org) .

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a sensible response to the success of arXiv. If arXiv was to continue to provide such a valuable service it had to be put on a sound financial footing with clear operating principles and a governance structure.

The Cornell arXiv Business Model White Paper illustrates the elements that need to be put in place for an open access subject repository, elements which contain some similarities to a commercial business plan but also important differences. The Business Model White Paper begins by setting out the background to the arXiv repository, not as an irrelevant piece of history but as a guide to the mission and objectives the academic community have for the repository. This is an essential feature of a non-commercial business plan, identifying the cultural environment within which the costs and benefits of the service need to be situated. The Cornell White Paper proposes “a collaborative business model that will engage the institutions that benefit from arXiv”. In this respect the business model matches the nature of the repository, as the growth of the repository is based upon collaboration, each depositor acting on her/his own initiative rather than being mandated to deposit by an employer or funder.

When the arXiv repository was based at the Los Alamos National Laboratory, the cost of maintaining that repository was borne entirely by that institution. The Cornell proposal is that the funds for the maintenance of the repository should come from institutional users of the repository content. The new business model still relies upon public funds but coming from a wider range of institutions. A deliberate decision was taken that the funding should not come from individual users of the repository. This is realistic, in that the institutions have funds not available to individual users, but over time this decision may change the character of the repository from a “bottom-up” initiative to a “top-down” service. The Cornell business model for arXiv is still unusual in that the host institution – Cornell University Library – will provide up to 75% of the annual costs in year 1, reducing to 15% in year 4 but thereafter remaining at that level. This is extraordinarily generous and in the current economic climate this model may not be sustainable.

### **3.6 The UK PubMed Central business model**

The UKPMC business model contains some elements in common with the new arXiv business model but in other respects is very different. Unlike arXiv, UKPMC had no existing successful service upon which to build a business plan. The quality of the database benefits greatly from the US PubMedCentral, but the additional features in UKPMC and the lack of existing funding for a UK service have necessitated a business model fitting the particular situation. The initiative to establish UKPMC came from the principal UK funders of biomedical research who contributed GB£1.3 million to the initial cost and invited bids from organisations and companies to set up and run the service over the first three years. This formal bidding for

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contracts was essential for a new service in an era of accountability for public and charitable funds.

The UKPMC web-site<sup>15</sup> contains a page on “Development Activities” outlining the new services for researchers and for funders which make UKPMC unique and very different from arXiv. UKPMC is much more than a repository, and its value lies as much in the services surrounding the content as in the content itself. At the time of writing the service has successfully completed its first three years and is moving into a second phase of development, with new contracts awarded through a new round of funding from the existing funders. One feature of the UKPMC development is that the funders have been able to involve publishers – for example in agreeing re-use rights for some of the content – while operating from a position of strength. The size and influence of the biomedical funders has given them a strength in negotiation which funders in other subject areas or individual institutions have not been able to achieve.

### 3.7 Other subject repositories

OpenDOAR, the Directory of Open Access Repositories<sup>16</sup> lists 220 “disciplinary” repositories at the time of writing this report. Most of the repositories listed are fairly small, containing perhaps a few hundred items. The smaller repositories are often based within HE institutions, so in some respects they are similar to institutional repositories albeit with a narrower scope. This is not to undervalue their importance to the disciplinary communities they represent, and like the larger subject repositories they are supported from research or teaching resources because they meet a community need. Their costs are likely to be low, relying upon unpaid support from researchers or teachers in the discipline, and their impact is difficult to measure in a cost-benefit way. Academic stories of their value to researchers, teachers or learners may provide a more important guide to their importance.

The larger disciplinary repositories are maintained by a variety of international, national and local organizations and institutions, and their roles are very varied. Repositories managed by two national library repositories illustrate the variety of content in subject repositories. The Library of Congress manages “American Memory”, a collection of over 275K items in a variety of formats as “a digital record of American history and creativity”<sup>17</sup>. The value of the collection lies both in its heavy use for learning and research and in its preservation function. The “Archival Sound Recordings” repository maintained by the British Library is more specialized in respect of the format it collects but has the same dual purpose of increasing access to and preservation of national collections<sup>18</sup>. The centralised French approach to

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15 <http://ukpmc.ac.uk/> .

16 <http://www.openoar.org/> .

17 <http://memory.loc.gov/ammem/about/index.html> .

18 <http://sounds.bl.uk/About.aspx> .

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national subject repositories can be seen in the HAL repository, conceptually a single repository but in practice a series of linked repositories managed by CNRS and other organizations and using a common platform to ensure interoperability. The business model for HAL is a model which uses public funds provided by central government to support the national research infrastructure, lifting the funding above the priorities of particular institutions. Few countries in the Western world have such a centralised national approach to research infrastructure, although it may be that a country such as China could adopt a similar model.

More common are subject repositories with a narrower scope than arXiv but also resulting from action by an international community of scholars. Although these are often large repositories receiving heavy use from researchers across the world, their business models are not clear. As an example, the Crystallography Open Database<sup>19</sup> was established by a group of scholars to hold data sets submitted by scientists in the field plus data published in open access crystallography journals. The Database benefits from and also feeds back into the work of various national crystallography institutions and is managed by an institution in Vilnius, Lithuania. The funding for the database Philpapers is no more clear, although the web-site<sup>20</sup> does identify three “sponsors”. It is stated that “PhilPapers’s software has been developed in-house” but without any indication of which of the three sponsors has contributed the software development. Equally unavailable is any information about the level of use of such repositories. These and other important subject repositories illustrate a high level of initiative by scholars in establishing valuable resources for their communities, but the lack of any information about a formal business model may indicate a vulnerability to changes in academic circumstances, such as a move of a key individual to another institution. It is difficult to imagine how such repositories would receive formal public funding in the current economic climate and they may continue to rely upon the financial equivalent to “a wing and a prayer”. More positively the existence of such repositories does illustrate the potential for valuable services to be developed in a low-cost digital environment which could not be developed in a high-cost print environment.

### **3.8 Strengths and weaknesses of the subject repository models**

Each subject repository model has its own strengths and weaknesses but there are some common factors, frequently related to the size of the repository and/or the size of the discipline.

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19 <http://www.crystallography.net/> .

20 <http://philpapers.org/help/about.html> .



**Common strengths of subject repository models:**

- Strong support from researchers
- International content, often representing high proportion of research in the field
- Sometimes close links with funding bodies
- Sometimes understanding of importance of re-use rights
- Potential to develop services based upon content



**Common weaknesses of subject repository models:**

- May not have strong links with research funders
- May be small databases even if comprehensive in the field covered
- May not have the “clout” with publishers to insist upon re-use rights
- May not have the funding to develop services around the content

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## 4. OPEN ACCESS PUBLISHING BUSINESS MODELS

*In open access publishing models, research reports and data are published in journals edited and made accessible by publishing houses. The process of publishing open access journals has many similarities with the process of publishing subscription journals, but the business model differs in requiring no payment from the users of the journals. Instead the cost of publishing an open access journal is met from public or private funds, either as part of a grant to establish the journal or via authors after acceptance of an article for publication but before the journal is published. Publishers are now developing innovative business models for open access (such as the PLoS One model), opening up new opportunities for funding agencies, institutions and researchers.*

### 4.1 Why would an author wish to publish a research paper in an open access journal?

The motivation of authors is the first key to the type of business model represented by open access journals. Authors require academic recognition and reward for their research and in the current scholarly communication environment recognition and reward provided by publication in an established journal. Currently dissemination solely through an institutional or a subject repository does not provide the author with the same level of academic recognition or reward, although that situation may change over time as repositories become more established. Factors important to authors considering publication in an open access journal will be that it is peer-reviewed and that the members of the editorial board are well-respected in the discipline covered in the journal. Faced with a choice between publication in a subscription-based established journal and an open access established journal, both being of approximately equivalent prestige, the next factor for an author will be the availability of funds to pay the open access publication charge. The business models for many open access journals are not dependent upon payments by authors or their funders but rely upon a grant to the publishing organization from public or private funds. For publication in a journal reliant upon the payment of publication charges, the availability of public or private funds to authors becomes a vital factor in the open access publishing business model.

Interesting information on this topic is available in a preprint<sup>21</sup> from David Solomon and Bo-Christer Björk reporting responses from a survey of 429 authors on their choice of an open access journal, the author publication charge (APC) for the journal chosen and the source of

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21 Solomon, D. and Björk, B.-C., Publication fees in open access publishing, 2011, pre-print version of article currently under consideration by the Journal of the American Society for Information Science and Technology available at <http://www.openaccesspublishing.org/apc/>.

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funding the author used to pay the APC. The results suggest that the level of the APC did not influence the author's choice greatly – factors such as the scope of the journal, its quality and speed of publication being significant – but that the level of the APC did affect the choice of funding source to pay the APC. Authors used a variety of funding sources to pay the APC but 66.7% used a grant or contract to pay an APC over US\$2001 whereas only 30.3% used a grant or contract for an APC between US\$1001 and US\$2000. The use of institutional funds showed an opposite effect, institutional funds being used for the smaller APCs. This situation may change as competition between publishers affects the level of the APC and as funding agencies or institutions make available various levels of grants for APCs.

#### **4.2 Why would a research funder or institution support publication in an open access journal?**

If open access publishing is to grow, research funders and institutions need to know that they are getting good value from that form of open access. In the open access publishing business model, the cost of the publication charge needs to be matched by greater value from publication in an open access journal than would be obtained from publication in a subscription-based journal. This may be a question about quality, although many open access journals are now recognised to be of equivalent or greater quality than their subscription counterparts. It is also partly about the overall cost of an open access publishing structure compared with the overall cost of the current subscription-based model, and greater clarity on costs is being achieved. Research funders and institutions may look at the cost of all the journal subscriptions and licences they pay for to obtain access, and compare that cost with the cost of securing access through open access outlets to the publications their researchers really need. As important as the cost of open access publishing is the impact of open access journals upon research productivity, institutional profile and benefit to economic growth. The theoretical benefits of open access publishing are now clear through the work of Professor John Houghton and others<sup>22</sup> but real-life examples of benefits are needed<sup>23</sup> in order to effect a large-scale transition away from subscription-based journal publishing into open access journals.

In their wish to ensure the most effective dissemination of the research they fund, funding agencies may move beyond support of existing journals and set up their own open access journals. Three powerful funding agencies – the Howard Hughes Medical Institute, the Max Planck Society and the Wellcome Trust – have decided to set up a new open access journal. In the press release<sup>24</sup> the President of the Howard Hughes Medical Institute refers to the “need for a different, more appropriate and efficient publishing model”. Whether or not the new

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22 Dr Alma Swan has followed up the work of Professor John Houghton (op.cit) in Swan, A. Modelling scholarly communication options: costs and benefits for universities, JISC 2010 <http://ie-repository.jisc.ac.uk/442/> .

23 An early example of a study of which many more are needed comes in the study Houghton, J. et al, Access to Research and Technical Information in Denmark, DEFF 2011. [http://openaccess.kb.se/wp-content/uploads/2011/05/Access\\_ReportFINAL-DOK1827240-2.pdf](http://openaccess.kb.se/wp-content/uploads/2011/05/Access_ReportFINAL-DOK1827240-2.pdf) .

24 <http://www.wellcome.ac.uk/news/media-office/press-releases/2011/wtvm051897.htm> .

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Extract from the Knowledge Exchange press release on the study by Professor John Houghton and others on Access to Research and Technical Information in Denmark DEFF 2011.  
<http://knowledge-exchange.info/Default.aspx?ID=62&M=News&NewsID=115>

“Small and medium enterprises constitute a substantial part of the national economy are important for innovation and growth. It is therefore important that they have access to and use of research findings. This report examines the needs and use of scientific and technical information among knowledge-based SMEs in Denmark. It turns out however that it is difficult to access research articles, patent information, scientific and technical standards, technical information and market intelligence. Entry barriers and delays cost companies money. The report states that on average it takes 2.2 years longer to develop or introduce new products without access to the products of academic research. For new products a delay of 2.2 years will mean that an average company loses about 36 million DKK in revenue. The report concludes that there is a need for easier and cheaper access to research articles, patents, laws and regulations and market information.”

journal succeeds, the expression of the need from these funding agencies carries a message about the determination of research funders to establish a research dissemination structure to fit their strategic objectives.

#### **4.3 Society and university journals moving to open access**

A significant part of the open access publishing movement, both in terms of the number of journals and in their role as not-for profit publishers, are the academic societies and academic institutions publishing their own journals. Society journals have a noble history within journal publishing, societies being the first research journal publishers and still being the communities within which many researchers collaborate. Likewise universities have a proud record of publishing through their own presses or through faculty or departmental publications, often with as much prestige attached to the publication as that from any commercial publishing house. It should come as no surprise therefore to learn that 1181 of the 6543 journals in the “Directory of Open Access Journals” in July 2011 were published by university presses or departments and that 428 were published by academic societies, the combined university and society output representing one in four of all open access journals published. The success of so many not-for-profit journals in establishing an open access business model is a testimony to the feasibility of open access for societies and universities.

It is all the more regrettable, therefore, that many societies and universities have taken the option of handing over their publishing activities to for-profit companies following a toll-access business model. While societies’ wish to maintain their contribution to their subject dis-

cipline from journal profits is understandable, the effect is to put even greater pressure upon the budgets of libraries buying from the companies supplying the society journals. Alternative options are available to societies and universities to improve access to their publications and to have a sustainable business model, either by using free open access software or by using the services of a larger open access publisher. Not-for-profit organisations such as the Public Knowledge Project<sup>25</sup> are available to assist societies and universities in making a transition to an open access business model. Using the services of a for-profit open access publisher can be a viable and sustainable business model for a society or university while still reaping the benefits of open access for research and teaching.<sup>26</sup> At a strategic level, it is important that institutions and funding bodies take a holistic instead of a piecemeal view of the publications written by their researchers and of the various dissemination opportunities open to those authors, enabling informed choices to be made. This is the approach adopted by the University of Utrecht in its Igitur service.

## Igitur

A model demonstrating a coordinated approach to university publishing.

“Igitur, Utrecht Publishing & Archiving Services, is the department of the University Library that promotes digital publishing. Igitur assists scientists, research groups and scientific communities in determining an optimal publication strategy and in the realization of total e-publishing solutions in close collaboration with the client. Increasing access to scientific information is central in Igitur’s strategy.”

<http://www.uu.nl/university/library/en/igitur/Pages/default.aspx> .



Societies and universities moving to an open access model have an advantage in that they are close to authors, authors frequently being a member of a society which publishes. This gives the author no advantage in securing publication, as peer review will operate as rigorously as in any commercial publication, but the relationship gives the society an advantage in managing the publication process in an academic-friendly manner. Control over future use of a publication remains within the academic community instead of being handed over to a commercial company. The responsibility for the future of the journal remains with the society or university instead of being dependent upon whether a commercial company still considers the journal to be contributing to its overall profit level.

25 The PKP web-site is at <http://pkp.sfu.ca/> .

26 The ALT guide Journal tendering for societies can help societies in making good decisions <http://repository.alt.ac.uk/887/> .

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#### 4.4 Defining clear relationships between authors, publishers and users

Open access publishing business models are frequently described under the collective name of “author pays”. This description is inaccurate and can mislead authors considering publication in an open access journal. Many open access journals do not make a charge for publication, their costs being met by a sponsoring institution. When a charge is required, it is true that the publication contract is between the publisher and an individual author but only a minority of published articles are paid for from the author’s own pocket. When the author does pay the open access publication charge from her or his own pocket, a small element of private funding is introduced into a research publication process that is largely funded from the public purse. A second element of private funding may enter the business model through corporate advertising in open access journals but that element is also on a relatively small scale. Under the subscription model large pharmaceutical companies make a significant contribution to the journal publishing business model in the biomedical area and as yet no equivalent large private contribution is apparent for the open access business model.

For the open access publication model to work efficiently clear procedures are required, so that the author knows that he or she can make the necessary financial commitment to the publisher, and so that the publisher knows that the open access publication charge will be met. Similar clarity is required from the publisher on the procedures for publication. In order to maintain the quality of research journals and avoid the risk of “vanity publishing”, it is important that the payment procedures are separated from the quality-control procedures, so that the decision on whether or not to publish is not influenced by the ease or difficulty of securing payment. It would be tempting for a publisher to accept an article for publication more readily if the author were known to have easy access to funds, whether public or private. Equally important is clarity from the publisher on the rights of users of content for which an open access publication charge has been paid. Use of a Creative Commons Licence familiar to academic users would ensure that clarity, enable full re-use of the content without further payment, and enable libraries to preserve the content.

#### 4.5 Funding from research funders for publication in open access journals.

Many research organisations across the world now support open access to the outputs from the research they fund and actively encourage the use of research grants for that purpose. The first signs of that support came through the signatories to the Berlin Declaration<sup>27</sup>, which was initiated by the Max Planck Society, immediately supported by all other German research organisations and before long supported by their equivalents in a number of other countries. Signatories to the Berlin Declaration were encouraged to put their support into practice by encouraging their grant-holders to publish their research on open access. Since the launch of the Berlin Declaration in 2003 an annual series of Berlin Conferences<sup>28</sup> has received reports on

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27 <http://oa.mpg.de/lang/en-uk/berlin-prozess/berliner-erklarung/> .

28 <http://oa.mpg.de/lang/en-uk/berlin-prozess/berlin-konferenzen/> .

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the implementation of the Berlin Declaration principles, discussing practical issues for authors, research organizations and institutions across the world.

The signatories to the Berlin Declaration have adopted differing policies and procedures in their support of open access. The Max Planck Society<sup>29</sup> has provided centralised services which will enable Max Planck researchers to disseminate their work on open access. Some other Berlin Declaration signatories have provided earmarked financial support for authors wishing to publish in open access journals.

**The Deutsche Forschungsgemeinschaft (DFG) has an open access publishing programme targeted at universities, whereby DFG will provide 75% of article processing charges if the university meets the remaining 25% of the charge. The DFG sets conditions for universities wishing to take advantage of this initiative, in particular that grants will only be made for articles published in fully-open access journals with article processing charges no higher than 2000 euros. These conditions are an indication on the new research publishing environment in which major funders such as DFG will work with institutions and authors, enabling the academic community to regain control of the dissemination of publicly-funded research outputs.**

The clarity of the information provided by research funding agencies to their grantees is a vital factor if researchers are to take advantage of open access publication. The web-site of the Netherlands Organisation for Scientific Research (NWO) provides excellent guidance for researchers on NWO's policy, the rationale behind that policy, and the practical arrangements for their grantees in applying for open access grants from NWO's "Incentive Fund", a name for a fund which itself carries a positive message.<sup>30</sup> The NWO open access information is also effective for carrying an unambiguous message from the Chair of the NWO Governing board, Jos Engelen: "In the world of science Open Access publishing is a compelling business model – opposing it is a waste of time."

Amongst the charitable foundations supporting academic research, the Wellcome Trust stands out for its open access policies and for its practical support for open access publication. The Trust provides clear guidance about its open access policy on its web-site<sup>31</sup>, with guides and FAQs directed at different stakeholders. Awards are made by the Wellcome Trust to 31 UK universities to meet the open access publication costs of Wellcome Trust-funded authors in those institutions, a procedure which reduces administrative costs and more importantly involves those institutions in the open access funding process. The existence of the Wellcome

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29 Information on the Max Planck Society open access policy is available at <http://oa.mpg.de/> .

30 The NWO open access information is available at [http://www.nwo.nl/nwohome.nsf/pages/NWOP\\_86AFST\\_Eng](http://www.nwo.nl/nwohome.nsf/pages/NWOP_86AFST_Eng) .

31 <http://www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Open-access/index.htm>  
The NWO open access information is available at [http://www.nwo.nl/nwohome.nsf/pages/NWOP\\_86AFST\\_Eng](http://www.nwo.nl/nwohome.nsf/pages/NWOP_86AFST_Eng) .

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Trust awards has encouraged some institutions to set up their own open access budget, adding funds to cover authors not funded by the Trust. Wellcome Trust also makes direct grants to authors outside the 31 award-funded institutions so that no researcher funded by the Trust need feel that they are unable to publish on open access for lack of funds. More controversially, the Trust has entered into an agreement with Elsevier whereby the publisher deposits Elsevier-published articles from Wellcome-funded authors into UKPMC in return for a fee currently set at US\$3000.<sup>32</sup> The advantages from the Wellcome-Elsevier agreement are that the publisher's version is available on open access from or close to the date of publication and that full non-commercial re-use rights are included, but the level of the fee paid is high by comparison with the APCs charged by most publishers.

#### **4.6 Funding from universities for publication in open access journals**

The need to enable an efficient flow of funds into open access publishing is recognised by many higher education institutions but few have as yet established a dedicated fund for open access publication or procedures for their researchers to apply for such funding. The open access emphasis within most universities is upon institutional repositories rather than upon open access journals, although many institutional policies do allow for publication in open access journals. Concern has also been expressed by some large institutions at the possible high cost which would be incurred if all authors agreed to pay the current charges for open access publication while the institution continued to meet equally-high costs for library subscriptions and licences to journals, particularly "big deals" for journal packages. The success of a business model for open access journals – from an institutional perspective – depends upon fluidity between open access costs and subscription or licensing costs. Institutions cannot afford both ways of funding access to journal content. Achieving that fluidity depends partly upon overcoming budgeting inertia within an institution, and partly upon a willingness by publishers to adopt flexible charging mechanisms, so that institutions do not pay both an open access publication charge and a subscription or licensing charge for the same content.

A useful source of information for any institution considering an open access fund is the SPARC Guide to "Campus-based open-access Publishing Funds".<sup>33</sup> The experience of two institutions, one on either side of the Atlantic Ocean, illustrates both the potential and difficulties in establishing a dedicated fund for the payment of open access publication charges. The experience at the University of California Berkeley indicates that starting with a provisional budget does open up publishing opportunities which would be difficult for researchers to take advantage of without even a provisional budget. In establishing the California Digital Library<sup>34</sup>, the University of California has also set up the kind of

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32 A description of the Agreement is available at [http://www.elsevier.com/wps/find/authorsview.authors/wellcome\\_trust\\_authors](http://www.elsevier.com/wps/find/authorsview.authors/wellcome_trust_authors) .

33 The web-page <http://www.arl.org/sparc/openaccess/funds/> contains a guide written by Greg Tanenbaum, FAQs, implementation advice and case studies. Although the content is largely US-based, the web-page does link to the equivalent UK guidance on this topic from Universities UK and the Research Information Network <http://www.rin.ac.uk/our-work/research-funding-policy-and-guidance/paying-open-access-publication-charges>.

34 The wide range of services offered by the California Digital Library can be found at <http://www.cdlib.org/> .

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infrastructure which will be necessary to look at the funding of different types of content under varying business models, providing the flexibility of funding between subscriptions, licensing and open access (both commercially-published and campus-published content) which modern libraries need.

**The University of California Berkeley** set up a pilot fund of US\$100K in 2008 of which US\$72K was used during the 18-month trial period to fund publication charges for 52 articles by Berkeley researchers. It is reported that the existence of the fund was welcomed by Berkeley authors. It is a common feature of open access developments that they take time to reach their full potential, because word of such developments has to spread through a large author community and because of the time-lag between completion of a research paper and publication. The Berkeley average cost of US\$1385 for the 52 papers from the open access fund should not be taken as a typical figure for all institutions setting up such a fund. The Berkeley payments covered costs for articles published in fully open access journals and costs for open access to articles in “hybrid” journals, the costs varying considerably between the two types of journal. In other institutions the balance between fully-open access and “hybrid” will be different, making comparisons difficult.

A European example of a university recognising the need for an open access publication fund and undertaking a trial is the University of Nottingham. Like many UK universities, Nottingham established an institutional repository for the deposit of its researchers’ publications, and the university still finds value in this route to open access. However, as is also the experience in many universities, Nottingham found that in the current scholarly communication environment an institutional repository could not bring it all the benefits from open access. The open access mandates set by the major UK research funders could not be met fully through the institutional repository owing to the embargoes and other restrictions set by journal publishers. If Nottingham were to pursue both the repository and the open access journal routes to open access, the university management sensibly recognised that an open access publication fund would be required.<sup>35</sup> The fund was set up initially as a pilot with only GB£20K but it was recognised that to fund article publication charges for all of the university’s 4000 publications would require the re-structuring of the university’s information budget, probably with money being transferred from the library periodicals budget into the open access publication fund. The situation in both Berkeley and Nottingham probably suggests the future direction for open access publishing business models, that the funding will be provided by both institutions and funding agencies, with choices being exercised between the funding of subscriptions and the funding of open access.

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<sup>35</sup> For a description of the rationale and process behind the Nottingham open access fund see the paper available at <http://www.biomedcentral.com/download/info/FinalNottinghamCaseStudy.pdf> .

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#### 4.7 Models resulting in open access publication in a “hybrid” journal containing both open access and subscription articles

Many longstanding publishing houses were hostile to the development of open access in all its forms. However, a number of publishers began trials in what became known as a “hybrid” model, under which the publisher’s principal source of revenue remained library subscriptions but a number of articles were published on open access in selected journals at the request of authors.<sup>36</sup> The key policy issues in this model are the extent to which the model allows “double-dipping” by publishers receiving both subscriptions and open access publication charges, and the conditions attached to the open access articles. On the first issue, libraries have tried to secure pledges from publishers that the cost of subscriptions will be reduced in proportion to the amount of open access income received. In response publishers using this model have declared that they have no intention of increasing their income through the hybrid model, but many have either been unable or unwilling to identify specific reductions in subscription costs which result from open access income. Clear commitments on this issue have been made by Oxford University and the American Institute of Physics but until there is greater openness from all publishers on this issue, the hybrid model will not be regarded as providing value for money to funding agencies and institutions.

#### 4.8 Are all open access journals fully open access?

Uncertainties have surfaced about the conditions attached to use of the articles in open access journals for which an open access publication charge has been paid.<sup>37</sup> These uncertainties have appeared in relation to both fully open access and hybrid open access journals. Not all open access journals are able to meet the definitions of open access set out in the Budapest Open Access Initiative or the Bethesda Statement on Open Access Publishing.

**Budapest Open Access definition of open access: “By “open access” to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.”**

<http://www.soros.org/openaccess>

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36 For an example of one of the first initiatives of this kind see Richardson, M. Experimenting with Open Access Publishing: An Overview, a presentation at the Oxford Open Access Workshop, June 13, 2006, <http://www.oxfordjournals.org/news/martin%20r%20presentation.pdf>.

37 An excellent outline of this issue is available in MacCallum C.J. (2007) When Is Open Access Not Open Access? PLOS Biology 5(10): e285. doi:10.1371/journal.pbio.0050285 .

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**Bethesda Declaration** definition: “An Open Access Publication is one that meets the following two conditions:

1. The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.

2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).

<http://www.earlham.edu/~peters/fos/bethesda.htm>

#### **4.9 Strengths and weaknesses of the open access publishing model**

The basic questions for research funders and universities to ask in considering support for open access publication are:

- how much are publishers of open access journals asking us to pay in author publication charges (APCs)?
- what are we receiving in return for that payment?

The answers to those two questions illustrate the strengths and weaknesses in the open access publishing model, which can either represent good value or poor value for funders and institutions.



**An OA publishing model provides good value for research funders and universities if:**

- The level of the APC is such that the total cost of research dissemination is no higher for OA publishing than for other models
- The quality of the journal is recognised to be good in a research assessment exercise
- The payment covers not only free access but also free and unrestricted re-use of the content
- The impact of research articles published in the OA journal is greater than the impact achieved through other research dissemination models
- The publisher's administration of the payment and publishing processes is efficient  
Copyright issues handled as part of institutional research policies



**An OA publishing model provides poor value for research funders and universities if:**

- The level of the APC is set so high as to be more expensive than other open access dissemination models
- The quality of the journal does not meet the standards set by research assessment bodies
- The open access payment is for access only
- The impact of research articles published in the OA journal is less than could be achieved through the use of other research dissemination model
- The publisher's administration of the payment and publishing processes creates problems for authors and funders

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## 5. BIG DEALS FOR OPEN ACCESS PUBLICATION

*Various initiatives have been launched following negotiation between publishers, individual universities and library consortia to purchase open access publication charges in bulk, or to adopt a new model for academic publishing. These initiatives are the open access equivalent to the “big deals” for the licensing of large numbers of toll-access journals.*

### 5.1 Why would universities and library consortia wish to negotiate a large contract with publishers for open access?

The principal advantage in a large-scale contract is a saving in the cost of negotiation and administration for all stakeholders. For authors wishing to publish in an open access journal time is saved in arranging an individual open access publication payment. For universities and for publishers the administrative cost of handling large numbers of micro-payments is avoided. For publishers also a large purchase of open access charges has the same benefit as a licensing “big deal” in providing cash up-front instead of waiting for payment to come in after publication. For consortia there is also the possible attraction of negotiating the purchase of open access charges at the same time as toll-access journal subscriptions or licences. Negotiations between publishers and library consortia in recent years have become very expensive, often with specialised negotiators being employed by library consortia and company lawyers being used regularly by publishers. From the perspective of library consortia negotiating with publishers producing a mix of subscription and open access content, it makes sense to look at the provision and cost of the two types of content as one purchase. Library consortia have purchased journals for library users for many years. There is no reason in principle why libraries should not act as bulk purchasers of open access publication charges for academic authors.

The principal disadvantage in this approach is that it continues the separation of academic authors from the purchase of the content they write and use. Many researchers are not aware of the high cost of the journals libraries purchase on their behalf. They are not involved in the negotiations undertaken by library consortia and usually they do not see the cost of the journals appear in their research budget. This situation does not enable researchers to assess the value of the content purchased for them, nor to decide whether one journal may be of greater value than another. Perpetuating this structural flaw into the open access environment would not enable authors to take informed decisions about the value of publication in one open access journal rather than another. Faced with a choice between two open access journals of equivalent prestige, the author may then wish to look at the level of the open

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access publication charge, and will not be able to do so if the negotiation of the purchase of such charges has already been negotiated by a library consortium. One journal may provide an author with better editorial facilities than another, and the author's judgement of such distinctions will be better-informed if the cost of the publication charges appears in the author's own research budget.

## 5.2 Examples of large-scale open access publishing models.

The open access publisher BioMed Central realised the advantages for the publisher and the author in "pre-selling" large numbers of open access publication charges and offered an institutional membership model. Under this model a university institution would commit to meet the publication charges for authors from the institution. The problem with this model for the libraries handling the institutional membership was that they were not able to budget for a specific cost, because the number of authors taking up the open access offer was unknown. The model continues and has now been modified to meet earlier concerns (it is now available in two forms, "Prepay Membership" and "Shared Support Membership"<sup>38</sup>) but there is no sign that it will be adopted by other publishers.

Another publisher to negotiate open access publication charges on a large scale has been Springer. In 2007 Springer announced that they had signed a letter of intent with the consortium of Dutch libraries, UKB, under which articles from authors in the UKB institutions would be made available on open access under an existing "big deal" contract between Springer and UKB, pending the negotiation of a new contract covering future publications by UKB authors in Springer's open access programme.<sup>39</sup> The attraction of this model for both Springer and for UKB was that it would not disrupt access for UKB libraries to Springer journals under the "big deal" licence, while enabling both parties to explore the potential of open access, possibly leading to a combined open access and licensing deal. Very little information is publicly-available on the progress of this arrangement but for whatever reason the deal has not progressed. More progress has been made in a similar deal struck in 2007 between Springer and the University of Göttingen.<sup>40</sup> It seems as if this arrangement between one university and one publisher finally led to a broader commitment to open access. Not only did the Max Planck Society negotiate a similar contract with Springer, but also the Deutsche Forschungsgemeinschaft initiated a funding programme aimed at German universities to help them cover open access publication charges.<sup>41</sup> This is an example of the way experimentation in open access business models has led to new and more effective models.

Equally a very old model of donations has enabled open access to an essential work of

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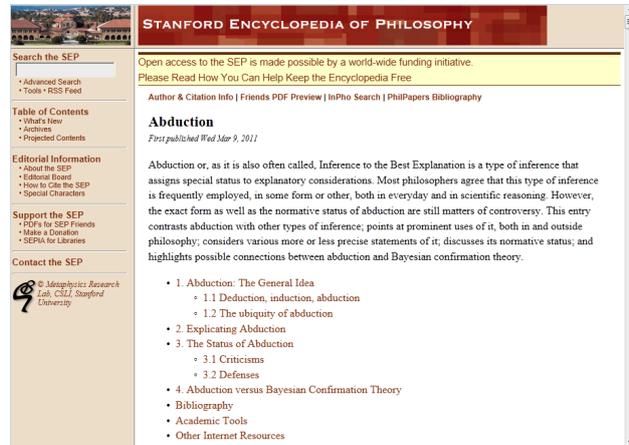
38 Information available at <http://www.biomedcentral.com/info/about/instmembership> .

39 Information about this deal was circulated by Suber, P. in Open Access News blog, June 22 2007 <http://www.earlham.edu/~peters/fos/2007/06/oa-project-from-springer-and-library.html> .

40 Information on this deal is available at [http://www.sub.uni-goettingen.de/ebene\\_2/oa\\_journals/springer.html.en](http://www.sub.uni-goettingen.de/ebene_2/oa_journals/springer.html.en) .

41 A broad range of information on open access possibilities for researchers in Germany is available at [http://open-access.net/de\\_en/homepage/](http://open-access.net/de_en/homepage/) .

reference for philosophers. The Stanford Encyclopedia of Philosophy (SEP) was faced with declining revenues from sales to libraries and its editors, knowing its world-wide academic value, made the bold move to seek funding from a wide range of grant-giving bodies, academic and library organizations, not as subscriptions to content that was purchased by subscribers but as donations to enable access throughout the world to a resource which would otherwise have disappeared.<sup>42</sup> The funding received has been used to set up a “permanent operating fund” which will be used to fund the publication for the foreseeable future. Not only has this valuable reference work been saved but its value has been enhanced through the adoption of an open access model. The articles in the Encyclopedia are written by high-ranking philosophers who receive no payment for their contributions. It is not an “author pays” model but an “author gives” model from which the world of philosophy benefits. It would be worth publishers of reference works and even research monographs in other disciplines looking at the SEP model to see if it could be applied in their field.



#### Stanford Encyclopedia of Philosophy (SEP):

- Motivation to enable valuable publication to continue
- World-wide initiative
- Large donations from a variety of grant-awarding bodies, academic and library organizations used to set up permanent operating fund
- Contributions from unpaid authors provides content
- Resulting in open access to a valuable resource

A further model which superficially appears very different to the SEP model but which shares some of the SEP attributes is SCOAP3, the Sponsoring Consortium for Open Access Publishing in Particle Physics.<sup>43</sup> Like SEP this is a world-wide initiative, with commitment from funding agencies and libraries across the globe. Unlike SEP, SCOAP3 is not a response to a threat but a response to an opportunity to provide open access to all the major research reports published in toll-access journals. The business model uses the combined resources of funding agencies and libraries currently committed to toll-access journals to negotiate with publishers on the

<sup>42</sup> Further information about SEP is available through the web-site <http://plato.stanford.edu/>.

<sup>43</sup> For information about this initiative see the web-site <http://scoap3.org>.

## Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP3):

- Motivation to provide open access to physics journals
- World-wide initiative
- Current funding of physics journal subscriptions to be switched to consortium funding of open access journals
- Contributions from unpaid authors provides content
- Resulting in open access to a valuable resource

terms for open access to the high energy physics literature. As with SEP content, the SCOAP3 content is effectively provided to the journals without payment to the authors. If SCOAP3 succeeds the result will be the same as that for SEP – viz. open access to a valuable resource – but using a different business model. It should be noted that the model for SCOAP3 is very different from that for arXiv, even though the two initiatives are working in the same subject area, arXiv being a repository model for preprints and SCOAP3 being an open access journal model for refereed and edited articles. SCOAP3 could be described as an open access equivalent to a toll-access “big deal”, but with control over pricing and re-use rights returning to academic authorities.



### 5.3 Strengths and weaknesses of large-scale open access publishing models

The models covered in this section are very varied. The only features they have in common is that they are large in respect of content and they cover content which is published formally, rather than preprints. They also vary considerably in terms of their success to date, often reaching a point at which further developments cannot be assured. This situation may be due to the weaknesses in the model outlined below.



#### **Strengths of large-scale publishing models:**

- Large group of purchasers can negotiate favourable pricing and licensing terms
- Economies of scale in administration of deals
- High impact when successful because of size of deal



#### **Weaknesses of large-scale publishing models:**

- Continued separation of end-users from negotiations which affect them
- Difficulty in reaching agreement amongst disparate set of purchasers
- Long time-scale from initiation to completion of large-scale purchasing project

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## 6. BUSINESS MODELS FOR OPEN RESEARCH DATA

*Research communities are recognising the need for good management of research data, so that data gathered to support past research can be re-visited and used to inform new research. Business models have yet to be developed in this area but there are three key areas which future business models for open data will have to consider: ownership, preservation, and access and re-use rights.*

### 6.1 The ownership of research data.

Deciding in any particular situation who owns research data is a complex issue. Many researchers would claim that they own the research data they have compiled, but this claim may be disputed by agencies funding the research, by the Principal Investigator for the project, or by the institution hosting or employing the research team. Various factors will come into play in resolving these various claims, and it will be difficult for any stakeholder to compile a sustainable business model for open research data until the decision on ownership has been resolved between the parties concerned. It will be important for the compilers of an open data business plan to recognise that database rights, moral rights and publication rights may need to be acknowledged.

“The answer to the question “who owns the rights in research data?” is very complicated. An individual piece of data (a fact) has no protection, but collections of data may enjoy database rights, copyright, or both sets of rights, depending on circumstances, though in many cases the owners choose to waive their rights. The situation is made even more complex by the question of whether the data has been collected by you alone, whether it has been a team effort by your research group, or whether all or part of the data comes from outside your research group. Since to attract database rights one must have invested significant effort and resources into creating the collection of data, it is less likely that data an individual has collected will enjoy such rights than a collection of data collected by team effort. If the data the researcher(s) wish to use has been created all or in part by a third party, then permission is needed from those third parties. Some collections of data are not restricted because their owners have chosen to waive their rights in the data; however, getting permission to copy and use third party data where copyright and database rights have not been waived could be a lengthy process.”

Copyright matters for UK researchers, teachers and learners, JISC, 2009,  
<http://www.jisc.ac.uk/media/documents/aboutus/workinggroups/scgcopyright handbook.doc>

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## 6.2 The preservation of research data.

If research data is to be made available to future researchers, sound arrangements have to be put in place for its preservation. The arrangements to be put in place will be a vital part of any sustainable business plan for open research data, and no business plan for open research data could claim to be sustainable without setting out arrangements for preservation of the data. The structural, technical and financial issues to be resolved for the preservation of the text of research reports are already complex, and the inclusion of the data underpinning any research report adds a new layer of complexity. The importance of the issues is recognised but as yet no readily-applicable solutions are currently available for any researcher wishing to ensure that the data compiled during the research process is preserved.

“Data has always been fundamental to many areas of research but in recent years it has become central to more disciplines and inter-disciplinary projects and grown substantially in scale and complexity. There is increasing awareness of its strategic importance as a resource in addressing modern global challenges and the possibilities being unlocked by rapid technological advances and their application in research. However, there are several significant challenges facing the UK academic community relating to the long-term curation, storage, retrieval and discovery of research data. One of these challenges is developing a better understanding of the costs involved in long-term preservation of research data. The Keeping Research Data Safe2 (“KRDS2”) project aims to build on previous work on digital preservation costs for research data contained in the first Keeping Research Data Safe (“KRDS1”) report (Beagrie et al 2008).

It has identified and analysed collections of long-lived research data and information on associated preservation costs and benefits and provides a larger body of material and evidence against which existing and future research data preservation cost modelling exercises can be tested and validated.”

Beagrie, N. et al, Keeping research data safe 2, JISC, 2010  
<http://www.jisc.ac.uk/publications/reports/2010/keepingresearchdatasafe2.aspx>

## 6.3 Access and re-use rights for research data.

Access to and re-use of research data will require the granting of a licence by the owners of the research data. In 2007 some of the issues involved in drafting and making available such a licence were recognised in the “Protocol” published by the Science Commons movement<sup>44</sup>. Licences made available by Creative Commons for text have been used for research data and Creative commons has also implemented a number of legal tools for access to open research

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<sup>44</sup> See the “Protocol for Implementing Open Access Data” from Science Commons available at <http://sciencecommons.org/projects/publishing/open-access-data-protocol/>.

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data in specific subject situations.<sup>45</sup> Also available is the Open Database Licence (ODbL) from the Open Knowledge Foundation.<sup>46</sup> However, it would be naïve to suggest that use of either Creative Commons licences or the ODbL licence can resolve all the issues researchers are likely to encounter in accessing and re-using scientific data. More work is needed in this important area.

“We do recommend CC0 for scientific data — and we’re thrilled to see CC0 used in other domains, for any content and data, wherever the rights holder wants to make clear such is in the public domain worldwide, to the extent that is possible (note that CC0 includes a permissive fallback license, covering jurisdictions where relinquishment is not thought possible)..... However, where CC0 is not desired for whatever reason (business requirements, community wishes, institutional policy...) CC licenses can and should be used for data and databases, right now (as they have been for 8 years) — with the important caveat that CC 3.0 license conditions do not extend to “protect” a database that is otherwise uncopyrightable.”

Contribution to the Creative Commons blog by Mike Linksvayer February 1st 2011,  
<http://creativecommons.org/weblog/entry/26283>

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<sup>45</sup> Further information is available at <https://creativecommons.org/science> .

<sup>46</sup> <http://opendatacommons.org/licenses/odbl/> .

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## 7. BUSINESS MODELS FOR RESEARCH MONOGRAPHS

*The development of sustainable business models for research monographs has lagged behind the developments for journals. Historically university presses have played an important role in publishing research monographs and they have the opportunity to continue this role in an open access environment.*

### 7.1 Understanding the research monograph environment

The availability of publication outlets for research monographs is crucial to the careers of researchers in humanities and social sciences and to research assessment opportunities for universities with departments in those disciplines. The world of humanities and social science has been hit hardest by the growth of “big deals” for STM journals, which have sucked library funds away from the purchase of research monographs. The same disciplines have been slowest to adopt open access opportunities, believing (falsely as will be demonstrated below) that open access models would prove too costly for departments or individuals with small research budgets. Compounding these difficulties have been uncertainties over the future of university presses, the principal publishers of research monographs. However, a number of initiatives are showing ways forward both for university presses and for researchers wishing to publish research monographs on open access.

### 7.2 Early Australian and US initiatives

On 30 January 2008 Colin Steele sent a valuable message to the SPARC OA Forum list<sup>47</sup> describing the case for open access publication of research monographs and also the experience of the Australian National University Press (ANU) in publishing a large number of research monographs on open access. This initiative could be described as a “subsidy” model because the funding for the publications is a line in ANU’s information budget. However, it is a “subsidy” which is yielding considerable “profit” in the form of world-wide impact for the university’s research, the ANU monographs being downloaded 1.16 million times between January and November 2007.

Also early in the field of open access to research monographs was the US National Academies Press (NAP), which has made its monograph series freely available on its web-site since 1996. An interesting feature of the NAP experience is that the monographs were published for sale rather than open access and – proceeding cautiously – the NAP found that sales were not

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<sup>47</sup> The text of the message is available at <https://mx2.arl.org/Lists/SPARC-OAForum/Message/4193.html> .

In his message of 30/1/2008 Colin Steele outlined the rationale for the ANU initiative: “There are two crucial issues. Firstly that the Press is seen as an essential part of the scholarly communication infrastructure and is not “isolated” within the University and secondly, that the Press relies on the existing ICT infrastructure of the Division and the University. The aim here is to reflect that there is no point in supporting key academic research if there is no means of distributing and accessing it effectively. The ANU publishing framework has a distributed editorial model with twenty E-Press Editorial Boards, supported locally, spread across the university and then supported centrally by a set of ICT services. It has been argued by some STM publishers that this use of university infrastructures constitutes a hidden subsidy to university presses. This overlooks however, the much larger subsidies the other way, to the same multinational publishers from university infrastructures - in addition to their receipt of university scholars’ original research “free of charge”, and the fact that traditional print subsidies fail to alleviate the access and distribution problems.”

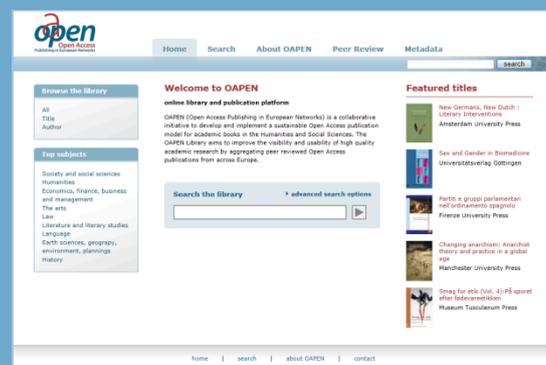
harmful by the free availability of PDFs of the monographs. However, perhaps because of the model of making books for sale also available for free, the use and re-use conditions for the PDFs are governed by conditions possibly more restrictive than under full open access publication.<sup>48</sup> Nevertheless this model may be suitable for other research bodies publishing publicly-funded research monographs.

### 7.3 OAPEN and the Open Monograph Press

Two recent initiatives may point to new models for open access research monograph publishing. OAPEN (Open Access Publishing in European Networks) was funded by the European Commission between September 2008 and February 2011 and is currently operating as an independent foundation.<sup>49</sup> The new business model for the OAPEN organization is based upon funding from publishers and research institutions which join as partners or which

“OAPEN (Open Access Publishing in European Networks) is a collaborative initiative to develop and implement a sustainable Open Access publication model for academic books in the Humanities and Social Sciences. The OAPEN Library aims to improve the visibility and usability of high quality academic research by aggregating peer reviewed Open Access publications from across Europe.”

<http://www.oapen.org/home>



48 Information about the use of PDFs is available on the NAP web-site at [http://www.nap.edu/about/about\\_pdf.html](http://www.nap.edu/about/about_pdf.html).

49 See the OAPEN Newsletter for May/June 2011 available at <http://project.oapen.org/index.php/news>.

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place their monographs in the OAPEN Library. The business model for the publishers of the monographs is based upon the higher impact and other benefits that will come through the increased exposure and use from open access. The current partners – many of them university presses – are using public funding to support their strategy of increasing the impact of publicly-funded research reports.

The Open Monograph Press initiative launched by Professor John Willinsky<sup>50</sup> aims to use the opportunities provided by new technologies to re-model the research monograph from a paper-based product into a network-based resource. The technologies will provide publishers of monographs with a flexible, low-cost framework to reduce the large “first-copy” costs associated with traditional publishing. Print on demand will still allow for users wishing to have paper copies but the initiative could change traditional thinking about the research monograph. The key element in this approach lies in the use of open source software which is freely available, not only to reduce costs but also to encourage collaboration between different publishers and institutions involved in the publishing of research monographs. The Press will encourage flexibility in the use of various software modules to meet needs in different situations. Some university presses have expressed interest in adopting the Open Monograph Press approach and time will tell whether the initiative catches on. Different business models – including purchase or subscription - could be combined with the software systems but the motivation for the initiative is unashamedly to facilitate open access to research monographs.

#### **7.4 Strengths and weaknesses of open access research monograph publishing**

It has become clear that the old structures and methods for the publishing of research monographs cannot be sustained, even with substantial public funding. The choice facing the academic community world-wide is between allowing the research monograph to disappear, possibly being replaced by a system of chapter-by-chapter dissemination through a repository, or using new technologies to move to a new form of the research monograph, not restricted in size but designed primarily to be an electronic resource available on open access. One advantage to treating the electronic version as the primary version is that it enables the high cost of print to be taken out of the basic financial calculation, by dealing with print-on-demand as a separate account, without the cost of unsold print copies distorting the main budget.

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<sup>50</sup> The initiative is described in Willinsky, J. Toward the design of an open monograph press, *Journal of Electronic Publishing* 12 (1) 2009, available at <http://quod.lib.umich.edu/jjep/3336451.0012.103?rgn=main;view=fulltext> .



### **Strengths in open access research monograph publishing:**

- Authors and universities need a sustainable system for research monograph publishing
- Authors and universities need a publishing system which provides good value and high impact
- New technologies provide opportunities for the needs of authors and universities to be met
- Interoperability of open source software could enable collaboration between various stakeholders in research monograph publishing.



### **Weaknesses in open access research monograph publishing:**

- Conservative approaches to research monograph authoring and publishing could reduce the take-up of new models
- A reduction in commitment to the humanities at all levels of education could make even low-cost publishing difficult to fund or sustain
- International collaboration in monograph publishing may be difficult to achieve owing to a multiplicity of models

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## 8. CONCLUSION

*Successful open access business models are about the relationship between public funding and public and private benefits. A key issue in the sustainability of open access models will be the extent to which the public funding is seen to be delivering benefits within and without the academic community.*

### 8.1 Public funding but both public and private benefits

Every form of open access to publicly-funded research and teaching outputs requires public funding. Private funding may provide partial support for some open access models (e.g. if an author pays for the cost of publishing in an open access journal) but no open access model can survive on private funding alone. In this respect open access to publicly-funded research and teaching content is no different from subscription or licensed access to the same content, as the cost of subscriptions or licenses is largely met from the public purse through institutional libraries. Some parts of the private sector – e.g. pharmaceutical companies – do purchase their own subscriptions to publicly-funded research outputs but there is no evidence that this element of private funding reduces the cost of subscriptions or licences for universities or other publicly-funded institutions. Rather the evidence<sup>51</sup> is that the cost of access to publicly-funded research and teaching outputs for both public and private sectors could be reduced through a switch away from subscriptions and licensing to open access. It is important to note that once open access is established the private sector of any national economy will benefit from the public funding of open access. Open access benefits flow to both public and private sectors.<sup>52</sup>

### 8.2 Public funding flowing through a variety of open access business models

While public funding is at the heart of all business models for open access to publicly-funded research and teaching outputs, the form in which that public funding is used varies considerably according to each type of access model. There is no single successful business model to be recommended for any form of open access but a variety of business models to be explored in particular situations. The model chosen in a particular situation may even take elements from different open access structures, as for example in the “overlay” model, which builds an open access journal upon institutional or subject repository content.<sup>53</sup>

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51 Houghton, J. et al, Economic implications of alternative scholarly publishing models, JISC, 2009 <http://www.jisc.ac.uk/publications/reports/2009/economicpublishingmodelsfinalreport.aspx> .

52 A related topic is the evidence of the value of the “fair use” provision in US copyright legislation, which the Computer and Communications Industry Association has shown to be of considerable value to the US economy. See <http://www.cciainet.org/index.asp?sid=5&artid=158> .

53 A good example is the RIOJA Project <http://www.ucl.ac.uk/lis/rioja/> .

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The roles of institutional repositories, their funding and their benefits vary so considerably that it is impossible to identify an average cost or a typical level of benefits with any confidence. The most reliable action for any institution wishing to set up a repository would be to approach another institution with a similar research and teaching profile and ask for information about costs and benefits. The public funding for open access institutional repositories is largely hidden within the public funding of higher education institutions across the world, and where it is identified specifically some specific costs may be identified but not others. Likewise the benefits to the institution which could be used to justify the cost are not commonly quantified. This situation may change in time as open access grows and running a repository requires a more significant part of an institution's budget. The lack of clarity in funding and in the quantification of benefits makes comparisons between institutional repositories difficult.

Subject repositories also vary considerably in size and scope. The size of some of these repositories and the participatory nature of the business model they commonly use has required a more formal approach, with specific financial contributions provided by the partners being identified. However, even within this model there can be variety, for example on whether the cost is divided according to the research income of each partner, or according to the level of usage, or on arbitrary basis. As with institutional repositories more mature business models may develop for subject repositories as they become an essential feature of the scholarly communication landscape. The sources for funding subject repositories are either or both from funding agencies or from institutions, with funding agencies being more dominant in biomedicine and institutions more dominant in humanities and social sciences. However, again generalisations disguise a complex environment.

Funding agencies and institutions jointly underpin the open access publishing business models in both fully open access and hybrid open access journals. The variety within these models comes through the funding conditions set by the funding agencies and the institutions. Most set an upper limit on the level of the article publication charge they will support, others will only support fully-open access journals, and there is also variety in the IPR arrangements, particularly in the level of re-use upon which the funder insists. It seems likely that as the open access publishing environment matures, a level of coordination between funders will result in more standardisation in the level of publication charges and re-use rights. There may also be more standardisation in the metrics used to quantify the benefits to funders and institutions from expenditure on open access publishing, although the nature of the benefits will vary from funder to funder and from institution to institution. A funding agency may be more concerned with the citations gained for the publications from the research it funds, while an institution may be more concerned about the role of open access in improving its position in the international league table of universities. One common feature of all open access business models in which funding agencies and institutions are involved is that those agencies and institutions are exercising greater control over the dissemination of publicly-funded research

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than those agencies and institutions have ever done hitherto. Toll-based dissemination of publicly-funded research has been left to unequal contracts between author and publisher, contracts which arguably have not been in the public interest.

### **8.3 Are open access business models sustainable?**

The sustainability of any open access business model depends upon factors which also determine the sustainability of the toll-access models for the dissemination of publicly-funded research. A rise or fall in the level of public funding of research can affect the sustainability of either a subscription or an open access journal. Changes in the topics within each subject discipline have caused the demise of particular subscription journals and could also cause the demise of an open access journal. Efficiency of management can benefit any open access service as it can benefit any commercial operation. Changes in strategic priorities within funding agencies or institutions can also affect open access repositories in the same way as any other part of the organization. In addition to such general factors, there are also opportunities managers of open access content can explore to achieve sustainability. The collaboration between Ithaka and the JISC Strategic Content Alliance is revealing examples of business models for publicly-funded content which are strong on sustainability.<sup>54</sup>

Any public body wishing to minimize the potential effect of such changes upon their open access strategy will need to ensure that the benefits from open access are visible and understood by decision-makers. The potential benefits from open access are allowing clear water to be seen between toll-access to publicly funded research outputs and open access. While that clear water is visible and the benefits from open access are seen to be greater than the benefits from toll-access, the risks to open access business models will be minimized. Turning the potential benefits from open access into real benefits for all stakeholders, and making those benefits visible, must be a strategic priority for all managers of open access content.

### **8.4 The future for open access**

While public funding of open access has to continue if open access is to continue, and will continue if the benefits from open access are visible, it is less clear which form of open access will continue and under which business model. The business model underpinning open access publishing has been slow to develop due to the time taken to convince all stakeholders of the feasibility of this model, but it may prove to be the dominant model in the long-term. The institutional repository model was the first to develop and still has the potential to provide institutions with good value but could be vulnerable to cuts in public expenditure if it is seen to provide more benefits to a single institution than to national economies. The subject repository model seems most suited to the larger disciplinary areas but could morph into the open access publishing

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<sup>54</sup> The Ithaka/SCA collaboration began with a report: Guthrie, K. et al. Sustainability and revenue models for online educational resources, SCA/Ithaka, 2008. The ongoing collaboration has also produced Maron, N.L. and Loy, M. Funding for sustainability, JISC, 2011. These and other business modelling publications from the Strategic Content Alliance are available through <http://sca.jiscinvolve.org/wp/business-modelling-publications/>.

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model, as funding agencies are the key drivers for the subject repositories in the larger disciplines.<sup>55</sup>

Each model for open access has its own strengths and weaknesses and the opportunities for universities and funding agencies lie in maximising the strengths and minimising the weaknesses. Any of the three principal structures for providing open access to publicly-funded research outputs – institutional repositories, subject repositories or open access journals – has the potential to deliver a sustainable service, but wise choices will have to be made between the various models possible within each structure. More unpredictable are the effects of further technological and cultural changes upon scholarly communication. Open access is the product of the internet age - and in mid-2011 it can be written confidently that open access is here to stay – but what could be the effect upon the forms of open access and the business models underpinning them of technological or cultural developments we have yet to see? It was no coincidence that SPARC adopted the slogan “Create Change” for its early work on scholarly communication, and open access developments have been about change, using the opportunities provided by technological or cultural change to effect changes in business models. Change will not cease as open access becomes the dominant model for research dissemination, but rather open access business models will themselves have to change if the benefits from open access are to continue to grow.

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55 For an analysis of some of the factors likely to affect the future of various open access models see the report by CEPA commissioned by RIN, Research Libraries UK, the Wellcome Trust, the PRC and the JISC Heading for the open road available at <http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/heading-open-road-costs-and-benefits-transitions-s>.

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