PUBLIC SUPPORT FOR SCIENCE AND INNOVATION:
PRODUCTIVITY COMMISION DRAFT RESEARCH REPORT
A RESPONSE TO THE COMMISSION FROM ELSEVIER
December 21, 2006

Elsevier welcomes the opportunity to comment on the Productivity Commission's Draft Research Report, *Public Support for Science and Innovation*. We share The Commission's overarching conclusion that innovation is critical to sustain Australia's growth and to address future economic, social and environmental challenges, and we support The Commission's objective of seeking viable and sustainable ways to further innovation.

Elsevier is a major Science, Technology and Medical (STM) publisher, and has been so for well over a century. Our objective is to continue to develop the growth, quality and efficiency of peer review publication and enhance access to published research materials. We invest heavily to do so, spending several hundred million dollars every year to collate, review, edit, correct, produce, disseminate and maintain archives of some 250,000 high quality articles in around 1,800 trusted, specialized, peer-reviewed journals. Since 1995 we have also invested some $500 million in electronic distribution and digitization programs that are dramatically increasing the effectiveness and efficiency of researchers and practitioners.

We have a significant presence in Australia:

- In 2005 we published approximately 7,000 articles by Australian researchers, with almost 2,000 acknowledging support of the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). We have approximately 1,400 Australian editors and editorial board members. We are also proud to publish on behalf of many Australian societies, such as Sport Medicine Australia, the Australasian Society of Cardiac and Thoracic Surgeons, and the Australian College of Critical Care Nursing.
- Our electronic products are widely used at Australian universities, research institutions, and hospitals. Approximately one million faculty and students at 54 Australian academic institutions can access our journals through ScienceDirect. MD Consult, our online resource for doctors, is used in over half of Australian medical teaching facilities and hospitals.
- In addition to the editors and reviewers mentioned above, we have nearly 100 Australian employees.

In this submission we respond specifically to "Section 5.7 Scientific Publishing" in the report, which concludes: "*there appears to be scope for the ARC and the NHMRC to play a more active role than they currently do in promoting accessibility to the results of research they fund, such as through their funding conditions.*" We also address the recommendation by The Commission at the conclusion of Section 5 that "*Published papers and data from ARC and NHMRC-funded projects should be freely and publicly available.*"

In this response we (1) give a brief overview of the current dynamics of Science, Technical and Medical (STM) publishing to ensure that there is a complete understanding of the benefits that the system delivers. We then (2) discuss three approaches that we believe the ARC and the NHMRC may be considering as it seeks ways to implement The Commission's recommendation. We comment on the potential implications of each action and suggest recommendations to either mitigate associated risks or capture opportunities.

1. THE CURRENT DYNAMICS OF STM PUBLISHING

STM publishing is a finely-balanced, high quality system that works well. Its rapid transformation is delivering ever wider access at increasingly lower costs. Some 2,000 STM publishers worldwide—including large commercial, small commercial, university presses and learned societies—co-exist in a network that annually produces around 1.5 million peer-reviewed articles in some 23,000 journals.

The STM industry is making a dramatic transition as it migrates from a print world to a mixed print and electronic world. This transformation is the result of significant investments by publishers. The results of the end-to-end digitization of publishing systems have been a dramatic increase in the number of journals and articles accessed, significant improvements in researchers' productivity, falling costs per journal and per article for libraries, and continued maintenance of excellent standards of quality control and preservation.

Taking each of these dimensions in turn:

a. Access: dramatic increase in the number of journals and articles accessed

- We estimate that over 90% of scientific and medical researchers globally have access to the STM journals that they need, many through electronic distribution platforms such as ScienceDirect which now holds eight million articles and is available to over 17 million users worldwide, an increase of 79% since 2001.
- Over 75% of researchers globally indicate that access to scientific journals has become easier compared to five years ago, while the majority indicate that they have "good to excellent" access.[i]
  - Researchers rank "access to research journals" twelfth on their overall lists of concerns while availability of funding for research is their number one concern.[ii] (Respondents ranked "cutting red tape" fifth on the list of items that would increase their productivity).
  - Twenty four of the largest research intensive universities in Australia have access to over 95% of the articles published by Elsevier through institutional site licenses.
- Access in developing countries has also increased dramatically, and at little or no cost to beneficiaries, through initiatives such as HINARI and AGORA.[iii]
- Public access is also very good, particularly in Australia where the public has immediate, free access to current STM journals via the open door policy of most university libraries. All Elsevier's ScienceDirect licences, for example, explicitly allow members of the public to have walk-in access to Elsevier online databases and materials subscribed to by a library.[iv]
- Publishers are continuing to innovate to further improve these excellent access levels, for example by making articles of some journals available free on their websites 12 months after publication, and by participating in initiatives like Patient INFORM to make medical articles free to the public via patient organizations.

b. Productivity: significant improvements for researchers

- Functionality and efficiency have dramatically improved for readers, who can now perform complex searches of journals, immediately retrieve and print full text articles, link instantly to other cited articles, export text to other databases and programs, and receive e-mail alerts when new journal issues are released. Voluntary cross-publisher initiatives such as CrossRef have broadened the impact of these benefits for researchers.
- As a result of these productivity benefits, Science is the only information sector where the portion of their time that researchers spent analysing (vs. gathering) information increased from 2001-2005, according to a recent study by Outsell Inc.[v] No other information sector in the study experienced a similar productivity improvement. Compared to the print-only era, scientists now read 25% more articles per year from almost twice as many journals, and they do so using up a smaller portion of their time.[vi]

c. Unit prices: falling costs per journal and per article for libraries

- The effective price paid per journal accessed has fallen dramatically due to concomitant developments in licensing alternatives, consortia buying, and various volume discounting arrangements, e.g. license arrangements that have developed in response to customer requests and that provide access to a publisher's entire portfolio of journals at moderate additions to previous expenditure.
- For example, data from a LISU study in UK showed a greater than 20% decrease in average price paid per journal accessed by UK institutions between 1999 and 2005 whilst at the same time the number of journals purchased per institution has nearly doubled.[vii]
- The effective price paid per article has also fallen dramatically as the number of journals accessed has increased and as electronic usage has exploded. Australian researchers will download nearly 12 million Elsevier articles in 2006, with institutions paying on average $2.25 AUD per article downloaded, less than one third of the average price paid per article only four years ago.

d. Quality control and preservation: continued maintenance of excellent standards

- STM publishers, via peer review and active intellectual property rights management, have been highly effective in protecting the quality and integrity of research while effecting this e-transformation, and continue to invest in mechanisms to improve standards further, e.g. via electronically enabled peer review systems.
- While peer review on its own cannot determine whether any given paper under consideration is "correct", it filters out grossly unreliable interpretation, inadequate data or incorrect attribution of authorship. Fraud and malpractice are rare. Scientists, medical practitioners and those that they serve rely on peer-reviewed STM journals because they trust their integrity, knowing that such journals aggregate, filter and validate author submissions independent of any outside influence.
- Journals preserve the scientific record for future generations of researchers to build on. Professional publishers and libraries archive over one million peer reviewed journal articles every year. Over the last hundred years they have archived over 35 million articles, which continue to be available for use today. At current growth rates an additional 50 million articles will be added in the next 25 years. Publishers have

licensed organisations such as the Royal Library of the Netherlands and Portico to provide digital archival support for researchers and library customers.
- In recent years, Elsevier alone has invested considerably to preserve, digitize and disseminate past issues of its 1,800 STM journals, some of which date back to the 1820s.

In summary, STM publishing is a remarkably efficient system, one that would likely be considered among the most efficient public and private partnership arrangements in the world. The global scholarly journals system delivers these benefits to researchers, institutions and the public for an amount that is less than 1% of the total amount spent on R&D development each year.

We do not claim that the current STM publishing system is perfect. The E-revolution transition is far from complete. However, the current trends, as described above, are all heading rapidly in a very favorable direction for the scientific research community in terms of dissemination, productivity and cost. It is important to recognize the major contributions that STM publishers make to medical and scientific communities. Publishers need to recoup the significant investments that they make to deliver these contributions. STM publishing works well and there is a balance to maintain in considering changes to the system, particularly as it is in a rapid state of transition from print to electronic.

2. THREE APPROACHES THE ARC AND THE NHMRC MAY PURSUE TO IMPLEMENT THE COMMISSION'S RECOMMENDATION

The Commission's report notes that "*there appears to be scope for the ARC and the NHMRC to play a more active role than they currently do in promoting accessibility to the results of research they fund, such as through their funding conditions.*" It also concludes at the end of Section 5 that "*Published papers and data from ARC and NHMRC-funded projects should be freely and publicly available*." We anticipate the ARC and the NHMRC may seek to implement The Commission's recommendation by taking any or all of the following three actions:

1. Supporting the creation of a network of institutional and subject-area repositories where authors can archive their manuscripts
2. Mandating or requesting authors to archive the manuscript versions of published articles resulting from their research
3. Working with publishers to determine a viable manuscript posting policy

We comment on the potential implications of each action and suggest recommendations to either mitigate associated risks or capture opportunities.

1. <u>The ARC and the NHMRC could support the creation of a network of institutional and subject-area repositories where authors can archive their manuscripts</u>

We anticipate the ARC and the NHMRC may be considering supporting the creation of a network of repositories because this approach was recommended in a recent report to the Department of Education, Science and Training by Houghton et al. [viii] and is cited in The Commission's report. The report advocates that the government support development of "fully integrated institutional repositories or relevant subject-based archives based upon open access standards." It asserts that a fully integrated system can be achieved for 10 million AUD, and that once established a net 5% increase in researcher efficiency and access would result.

While we fully agree that access to research and researcher efficiency can result in considerable social returns, we do not believe that funding a network of repositories is the way to achieve these objectives. On the contrary, we believe that a network of repositories (i) would have no impact on access, (ii) would decrease researcher productivity, (iii) would compromise quality levels, and (iv) would be wasteful of public funds. We discuss these points in more detail below.

i. <u>Access</u>: A network of institutional repositories (IRs) may not improve access levels beyond the excellent levels already provided by the current publishing system:
- In contrast to the 90%+ levels of access provided to Australian researchers by the current publishing system, IRs provide extremely thin coverage. IRs collectively provide access to just 2% of research articles. Individual repositories contain a tiny fraction of this small amount.[ix]
- To the extent the Australian government believes access is a problem, it would be far more efficient to work with publishers to close a less-than-10% gap in the current publishing system than to attempt to close the 98% coverage gap of IRs. It is inconceivable that this 98% gap would ever be closed, and attempting to do

so would open up the current system to potentially widespread plagiarism and other forms of corruption that the current model guards against.
- Moreover, because the NHMRC and the ARC support research that is reported in approximately 8,000 articles annually, at best its proposal would only increase access levels in IRs to this portion of the literature, leaving more than 99% of articles untouched by the proposed actions.

ii. Productivity: If a system of IRs became the primary means of disseminating research, it would significantly reduce the productivity of multiple stakeholders in the Australian science research community:
- Readers are not well served by IRs which hold a tiny portion (2%) of the full body of literature that they need access to and which remains in the archive at the discretion of local institutions.
- Readers' efficiency will fall if they must spend time locating articles from incomplete IR collections fragmented among dozens of repositories operating on different software platforms with varying policies and service levels. It will further be reduced as authors check whether posted versions have been altered since being subject to rigorous peer review.
- Authors' productivity will fall as they have to spend time uploading articles to repositories: our research finds that only 8% of authors have archived one or more research papers in an IR.[x] These low levels of voluntary participation show that authors find posting to IRs to be inconvenient, time-consuming and without benefit. One North American repository librarian notes: "IRs fail to appear compelling and useful to the authors and owners of the content."[xi]
- Institutions are not well served by using IRs as parallel publishing platforms: if IRs continue not to be used because they're inconvenient for authors and researchers, they will become costly to maintain and administer for no additional benefit.

iii. Quality Assurance: A network of repositories could lead to a reduction in quality assurance levels. Authors are concerned about the credibility of content in repositories. A recent Elsevier survey of nearly 3,000 researchers showed that less than 35% totally trusted the content of IRs. While publishers maintain full control over the definitive published versions of articles in journals, the content management strategy of IRs is largely an unexplored arena.[xii]
- Documents on IRs are unprotected and can be altered to differ from the published versions that were subject to rigorous peer review controls. Subject and institutional repositories contain many different versions of documents such as annotated copies of published journal articles, amended accepted author manuscripts, and unaltered manuscripts. As a result, documents held in repositories do not provide readers with the high levels of quality assurance that peer reviewed articles on publishers' websites do.
- Neither publishers nor universities can possibly monitor all the diverse repositories and the materials they contain to guarantee their accuracy or authenticity. Even if repositories supposedly contain the definitive final articles, they can always be altered without detection. In the current system where the final published article only resides in one place, publishers can and do explicitly guarantee the authenticity and accuracy of the definitive published journal article and the research data captured therein.
- Authors are concerned that IRs will facilitate plagiarism: a researcher's claim to authorship is hard to protect when a permanent definitive record does not exist. In the recent Elsevier survey one author who was representative of an informed view noted: "My experience locally is very unpleasant, as the usual ethics are not applicable and constant plagiarism is the acceptable behaviour." Another noted: "Plagiarism is a major concern."
- It is doubtful whether a network of institutional repositories could preserve articles indefinitely. In contrast, publishers and libraries have provided the archiving function effectively for researchers for centuries.

iv. Cost effectiveness: A network of repositories would be an inefficient use of public funds because it would significantly increase the amount that research institutions pay for articles that they can already access, and therefore it would unnecessarily burden taxpayers.
- The cost for research institutions to establish and run IRs is significant. Australian taxpayers are paying over $60 million AUD to establish institutional repositories. Despite this expenditure, we calculate that only 17,900 manuscripts have been deposited in Australian institutional repositories (many of which are working papers, or conference proceedings) – an effective cost of $3,400 AUD per manuscript deposited.[xiii]
- Once operational, Houghton et al. estimates that it would cost AUD 10 million annually to maintain a network of IRs. If all 40,000 manuscripts published annually by Australian researchers were archived (which Houghton recognizes would not be possible), this would correspond to paying AUD 250 for each manuscript deposited. To put this in context, Australian research institutes pay around $2.25 AUD to access an Elsevier article via the current subscription system. A network of IRs is an extremely expensive and inefficient way to provide access to manuscripts: the current publishing system already enables most researchers to access

the definitive version guaranteed by the publisher on the publisher's website for less than one hundredth of the cost of IRs on a per article basis. [xiv]

- Moreover, likely average costs per manuscript deposited to IRs will be significantly higher than 250 AUD. Firstly, depositing rates to IRs may be significantly less than desired as many authors do not see value in depositing their manuscripts to IRs. In addition, future costs of IRs are uncertain but appear likely to increase. Significant technical expertise and resources will be required to develop and maintain repositories over time as a recent study noted: "One of the likely largest costs over the long term will be the costs associated with long-term preservation, for instance data migration and conversion. However, they are not only among the largest costs, but also by far the least known and indeed least knowable. So a commitment to host an IR amounts to an implicit commitment to an unknown amount of work at some point in the future."[xv] If the belief is that repositories will experience significant increases in usage, then the cost structure to maintain and upgrade their archives with search and retrieval capability will become an order of magnitude greater, more comparable to those of commercial publishers today.

Recommendation: We strongly recommend that The Commission does <u>not encourage funding a system of repositories</u> because this action may not increase access levels, would decrease researcher productivity, would lower quality levels, and would be highly expensive.

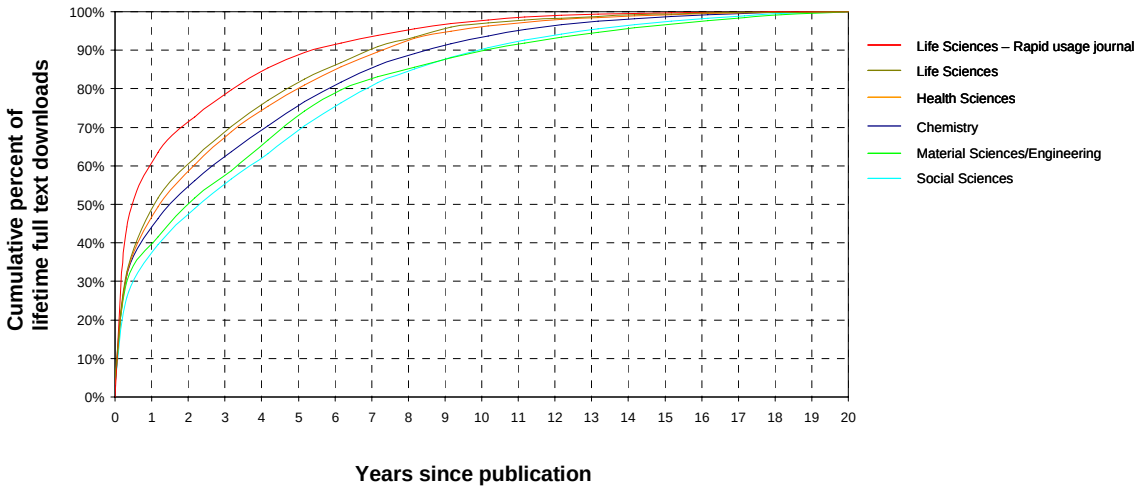
2. <u>The ARC and the NHMRC may mandate authors to archive their manuscripts of published articles</u>

Currently, the 2008 researcher guidelines by the NHMRC and the ARC (see Endnotes[xvi]) pose significant risks to STM publishing by encouraging authors to deposit their publications in an institutional or subject area repository, thus creating a dual and duplicative publishing process that does not increase access levels, risks compromising quality, and is costly. The ARC further encourages authors to deposit their publications within 6 months, and requires researchers to provide justification if they choose not to archive their publication within 6 months (a stipulation that some have considered to effectively be a mandate[xvii]).

If the ARC and the NHMRC were to mandate that authors had to deposit their manuscripts it could result in a significant loss of the investment in peer review and could lead to breakdowns in this intricate and vital system. Some journals may choose to cease reviewing and accepting articles that in their view have unsustainable terms attached. Niche publications in specialized fields with small local reader bases and concomitant higher prices would especially be at risk. The result would be less choice for Australian authors who would have fewer journals in which to publish and a reduction in the system's overall quality and capacity. The possible reduction in number of peer-reviewed journals cannot be good for authors, research readers, the general public, the ARC or the NHMRC.

Our analysis shows that across all fields an article is used over an extended period, often extending twenty years after an article was originally published. If a significant proportion of specialized journals' articles are publicly available within several years of publication then libraries may cancel titles if they know their readers can access many of the articles contained within them.[xviii] For example, after 6 months, approximately 30%-40% of a typical article's total lifetime downloads have occurred (Figure 1). In some fields such as Social Sciences, significantly less than 30% of lifetime usages have occurred. Even after 5 years typically 20% to 30% of an article's lifetime usage remains.

Figure 1. Lifetime usage of journal articles by subject area (source: Elsevier)



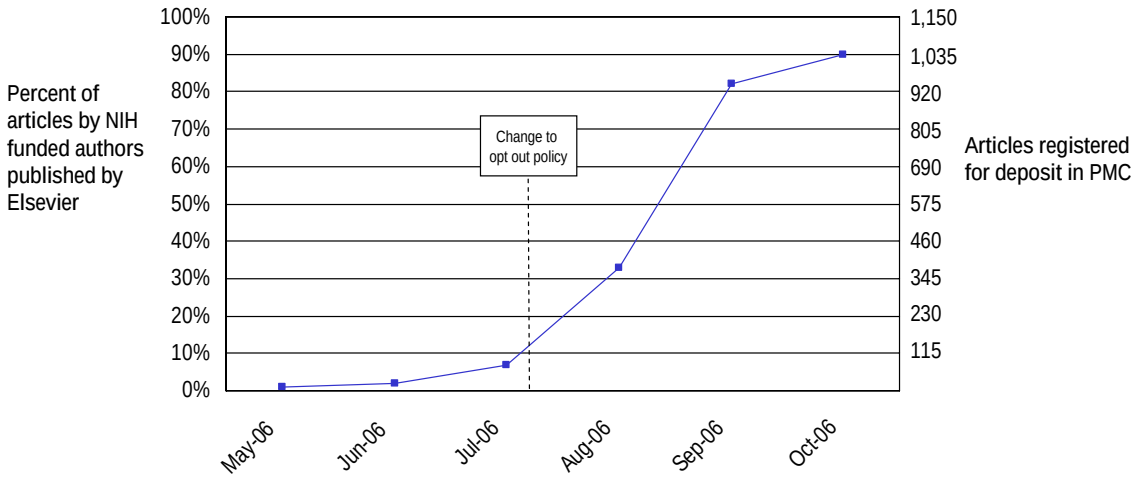
If learned societies' journals' revenues are reduced, so too will be their ability to fund meetings and conventions, scholarships and grants, lecture series, advocacy for research and health policy, and the provision of health information to the public via print and electronic materials. It is likely that a reduction in journal revenues would endanger the continuation of certain societies and smaller publishers.

Recommendation: We recommend The Commission encourages the ARC and the NHMRC to request, but not require, authors to self-archive their manuscripts, and to make it clear to the funded researcher that there will be no penalty for not self-archiving. Implementing the policy as a request would allow researchers to have a choice about how to use their time most productively. Moreover, we urge The Commission to recognize that a 6 month embargo is a dangerously short time frame to apply as a one-size-fits-all guideline across all subject areas and journal types. Requiring researchers to post manuscripts within 6 months of final publication could have severe unintended effects. A more cautionary approach would be to recommend that authors self-archive their manuscripts 12 to 24 months following final publication, depending on the article's subject area.

3. The ARC and the NHC could work with publishers to determine a viable manuscript posting policy

Funding bodies like the NIH and the Wellcome Trust have taken into consideration points made by a wide variety of STM constituents, including publishers. As a result, publishers have subsequently worked with those funding bodies to ensure the success of their archiving policies. For example, Elsevier has actively worked to support the NIH's policy of requesting NIH-funded authors in Life Sciences to archive their manuscripts to PubMed Central (PMC) within 12 months of publication. (Note that NIH supports primarily Life Sciences research, so a request to post manuscripts within 12 months of final publication appears to be a viable and sustainable policy). Since May 2005, Elsevier implemented a new author agreement to enable NIH-funded authors to meet NIH's request. Elsevier took on the task of manuscript submission to PMC on behalf of its authors. In July 2006, to further support the NIH policy, Elsevier began directly depositing all NIH-funded articles unless the authors specifically request otherwise (i.e. 'opt out' of the NIH submission process). This change in procedure has reduced the administrative burdens on authors and has significantly increased the manuscript deposit rate (see Figure 2).

Figure 2: Article deposits by Elsevier to PMC on behalf of NIH funded authors
Number of articles registered for depositing to PMC



The ARC and the NHMRC may be considering implementing a policy such as The Wellcome Trust (WT), which has established an agreement with many publishers, including Elsevier. Under the agreement with Elsevier, WT-funded authors who publish in Elsevier journals can comply with the Wellcome Trust policy requirement that authors post their manuscripts to PMC within 6 months of publication by paying a fee to the journal. The Wellcome Trust will refund authors who pay the fee—typically $3,000 per article—for immediate release of the published journal article to non-subscribers. The fee contributes towards recouping the investments made in peer review and other publishing processes, costs that have traditionally been recouped via subscriptions. Upon final publication, Elsevier sends to PMC the sponsored manuscript (a version of the accepted manuscript that reflects all author-agreed changes that arise from the peer-review, copy-editing and proofing processes) and authorizes its public posting there immediately. Elsevier simultaneously makes the final published journal article freely available to both non-subscribers and subscribers via Elsevier's websites such as ScienceDirect.

Recommendation: We encourage The Commission to recommend that the ARC and the NHMRC work collaboratively with publishers to achieve public access goals to research outputs. This follows the precedent of other funding bodies and ensures innovation, while protecting the sustainability and integrity of STM publishing. Elsevier's and other publishers' agreements with Wellcome Trust could serve as a model to consider if the ARC and the NHMRC intend to require authors to post manuscripts to repositories as early as 6 months following final publication.

In summary, we welcome innovation and seek to work collaboratively with the Productivity Commission, the ARC and the NHMRC to help meet the Australian government's objectives while also ensuring that its innovations are sustainable. We sincerely hope that The Commission will consider our input, thereby enabling The Commission to achieve its desired goals while preserving the integrity and quality of a finely-balanced, well functioning system.

Sincerely,

Fergus Hall
Managing Director
Elsevier Australia

Youngsuk Chi
Vice Chairman
Elsevier

ENDNOTES

[i] Ian Rowlands, Dave Nicholas and Paul Huntingdon "Scholarly Communication in the Digital Environment: What Do Authors Want?" Centre for Information Behaviour and the Evaluation of Research, department of Information Science, City University (now at UCL), 18 March 2004, see http://www.ucl.ac.uk/ciber/ciber.php

[ii] *Journals and Scientific Productivity: a case study in immunology and microbiology,* by Rowlands and Olivieri, May 2006, www.publishingresearch.org.uk

[iii] For HINARI see http://www.who.int/hinari/about/en/ ; For AGORA see: http://www.aginternetwork.org/en/

[iv] Included in section 1.2 of the academic licence. Note that the Elsevier sample licence is available online at info.sciencedirect.com/samplelicense. Note also that some libraries elect not to allow public walk-in use of any of its information resources.

[v] Outsell I-Market Hot Topics, vol 1, May 6, 2005: "2001 vs 2005, Research study reveals dramatic changes among information consumers"

[vi] Original data at www.dlib.org/dlib/october03/king/10king.html shows the average number of articles read by scientists was 150 in 1977 and 216 in 2000-2003. Cited by Carol Tenopir in presentation at web.utk.edu/~tenopir Discovering the Magic: Faculty and Student Use of Electronic Journals "Scientists appear to be reading from more journals—at least one article per year from approximately 23 journals, up from 13 in the late 1970s and 18 in the mid 1990s".

[vii] Claire Creaser, Sally Maynard and Sonya White, "LISU Annual Library Statistics 2006" Library and Information Statistics Unit, Loughborough University, See: http://www.lboro.ac.uk/departments/dils/lisu/

[viii] John Houghton, Colin Steele and Peter Sheehan, Research Communication Costs in Australia: Emerging Opportunities and Benefits, Center for Strategic Economic Studies, Victoria University, 2006

[ix] Elsevier analysis based on the holdings of all institutional repositories registered on DOAR, 12/06.

[x] Data from Elsevier Survey of over 6,000 authors globally (sampled randomly and representatively from independent source -ISI) shows that 8.2% of authors have deposited an article in an institutional repository. This is similar to data from the Ciber study (see endnote xiv above), which found that 5% UK scientists had deposited papers accepted for publication and 4% had deposited papers submitted (but not yet accepted) for publication.

[xi] University of Rochester Librarians cited in N.F. Foster, S. Gibbons, Understanding faculty to improve content recruitment for institutional repositories," DLib magazine, January 2005.

[xii] Data and quotes from Elsevier survey of researchers selected globally and randomly as part of their routine market feedback surveys. Over 2700 researchers responded. 33% of researchers trusted content in institutional repositories.

[xiii] Based on 12/06 review of 50 Australian institutional repositories registered on DOAR. The 50 repositories hosted 100,000 digital records, 17 repositories hosted approximately 17,800 manuscripts of research papers, conference proceedings and working papers, the remaining repositories did not host manuscripts.

[xiv] "Minister announces financial support for RQF." Press release from the Department of Education, Science and Training Media Unit, December 18, 2006.

[xv] Publisher and Library/Learning Solutions (PALS) Pathfinder Research on Web-based Repositories, Final Report MarkWare Consulting Ltd. January 2004, p.24. Long term costs associated with preservation will include ongoing hardware costs, maintenance and tape backup, additional hardware storage to support new content (especially if authors are mandated to archive instrument or simulation data reported in articles), IR software development costs, and faculty time to enter and maintain article metadata Expected yet unaccounted for ongoing costs discussed in interviews with 6 leading academic libraries operating IRs. Mackenzie Smith, MIT Libraries associate director for technology and DSpace project director, believes new professionals will need to run IRs. She states "We will have to create a new profession of 'data curator'--a combination of scientist (or other data specialist), statistician, and information expert."

[xvi] The following guidance is provided to authors for funding commencing 2008.

- The NHMRC: "To maximise the benefits from research, findings need to be disseminated as broadly as possible to allow access by other researchers and the wider community. The NHMRC encourages researchers to consider the benefits of depositing their data and any publications arising from a research project in an appropriate subject and/or institutional repository wherever such a repository is available to the researcher(s). "Section 16.2. Project Grants funding policy for funding commencing in 2008 (http://www.nhmrc.gov.au/publications/_files/profundingpol.pdf). National Health and Medical Research Council. 2006
- The ARC: "The ARC therefore encourages researchers to consider the benefits of depositing their data and any publications arising from a research project in an appropriate subject and/or institutional repository wherever such a repository is available to the researcher(s). If a researcher is not intending to deposit the data from a project in a repository within a six-month period, he/she should include the reasons in the project's Final Report. Any research outputs that have been or will be deposited in appropriate repositories should be identified in the Final Report." Section 1.4.5.3. Discovery Projects: Funding rules for projects commencing in 2008, (http://www.arc.gov.au/pdf/DP08_FundingRules.pdf) The Australian Research Council, 2006.

[xvii] Registry of Open Access Repositories Material Archiving Policies (ROARMAP) classifies the ARC and the NHMRC polices as funder mandates for authors to archive their manuscript.

[xviii] Recent research by the Publishers' Research Consortium demonstrates this: Lbrarians, in considering subscriptions or cancellations, viewed a 6-month embargo very similar to no embargo at all. Only 4% of the librarians who would not subscribe to a journal with no embargo, would subsequently subscribe to a journal with a 6-month embargo. Self-Archiving and Journal Subscriptions: Coexistence or Competition? An International Survey of Librarians' Preferences. Becket, C.; and Inger, S. Publishing Research Consortium,