CHAPTER TWENTY-ONE

TOWARDS A NATIONAL INFORMATION POLICY: DISCUSSION AND RECOMMENDATIONS IN THE REVIEW OF THE NATIONAL INNOVATION SYSTEM[1]

Anne Fitzgerald

Advances in information and communication technologies in the last decade or so – greatly increased computing power and storage capacity, grid and cloud computing, high speed broadband networks, the internet and web 2.0,[2] simulation and virtual worlds – have brought about an information revolution, leading to fundamental changes in the way information (especially digital data) is collected or generated, shared and distributed.

The internet and digital technologies ('information and communications technologies' or ICTs) are re-shaping research, innovation and creativity. The interoperability, interactivity and immediacy of the internet provides a platform for innovation in activities as diverse as scientific research, the delivery of social services (including health and education), access to entertainment products and production of creative materials. Not only has there been a revolution in the way information of all kinds is created, used and disseminated, but developments of this kind are set to continue – and, more likely, to accelerate – into the future. These developments are of immediate relevance for a wide range of creators and users of digital content, including those involved in scientific research, the creative industries, and curators of cultural and historic collections, the public sector and members of the general community. New technologies enable

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[1] This chapter provides a background to the consideration of information policy in the Review of the National Innovation System, chaired by Dr Terry Cutler., which was commissioned by Senator Kim Carr, Minister for Innovation, Industry, Science and Research in January 2008. After holding public consultation sessions in all Australian capital cities, convening a series of expert roundtables on specific issues, and receiving around 700 written submissions, the review panel published the green paper, 'Venturous Australia: building strength in innovation' on 28 August 2008 (see
www.innovation.gov.au/innovationreview/Documents/NIS_review_Web3.pdf). The author was an external advisor to the review and provided this material to the panel on 8 July 2008. It includes a an overview of developments in information policy in Australia and internationally which was initially prepared for the expert roundtable on Information Policy and Information Markets convened at QUT by Dr Cutler on 30 May 2008, as well as material derived from comments at the public consultation sessions in March and April 2008 and the written submissions to the review (available at
www.innovation.gov.au/innovationreview/Pages/home.aspx). As such, this material provides some context to the discussion and recommendations in chapter 7 of 'Venturous Australia' (especially recommendations 7.2 to 7.14) (see www.innovation.gov.au/innovationreview/Documents/NIS_review-chapter7(1).pdf). In order to provide an accurate account of the material available to the review panel, the material has not been further updated since it was provided to the panel in July 2008.

[2] See Tim O' Reilly, *What is web 2.0?*, 2005, at
www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html.

data and information to be used in innovative ways, resulting in increased productivity and competitiveness, reduction of risk and the emergence of new business models.

Developments in technology have fundamentally changed the way science and research are organised, 'by linking the creativity of individuals and allowing organisations to collaborate, pool distributed computing power and exploit new ways of disseminating information'.[3] Now, vast amounts of digital data generated through research, observational projects[4] and instruments can be accessed online via distributed networks. Developments in information and communication technologies have made it possible to carry out research and address complex problems in ways that were not previously possible. Quality research now often involves virtual communities of researchers participating in large-scale web-based collaborations, opening their early-stage results to the research community and interacting with other researchers who can analyse the data or combine it with other datasets, with the objective of accelerating discoveries.[5] Governments and public sector bodies are centrally involved in information markets, not only because of their role as major providers of research funding, but also because they are themselves significant producers and users of information and content across a very broad range of scientific, social, cultural and economic activities. Much of the information and content generated by governments and publicly-funded researchers is of value and relevance to the broader community as it provides the basis of evidence-based policy and decision-making, for example, in relation to health and social welfare. The impact of technological convergence is readily apparent in relation to the creative industries, giving rise to a digital economy in which arts, science, innovation and the economy are interconnected. Here, there is a blurring of the traditional boundaries between cultural and economic, commercial and community.[6] New ways of producing, using and distributing digital materials underpin the creative economy in which user-generated creativity and the participative web are central features.[7]

Economic research has highlighted the importance for innovation of information flows and the availability of information for access and re-use.[8] Information is crucial to the efficiency of

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[3] OECD, *Policy Brief: The Future of the Internet Economy*, June 2008 at p. 4.

[4] For example, the Integrated Marine Observing System (IMOS) project established under the National Collaborative Research Infrastructure Strategy (NCRIS) (see www.imos.org.au) and its Queensland-based node, the Great Barrier Reef Ocean Observing System (see announcement by Minister Carr on 9 May 2008 at minister.innovation.gov.au/SenatortheHonKimCarr/Pages/NEWMONITORINGSYSTEMFORTHEGREATBARRIERREEF.aspx).

[5] An example is the NCBI's GenBank which published the data gathered by the Human Genome Project. See Innovation Review submission 211 (Professor J Zobel). Another is the sequencing of the platypus genome which was carried out by Washington University with funding from the National Institutes of Health (NIH). The platypus genome is accessible at genome.wustl.edu/genome.cgi?GENOME=Ornithorhynchus%20anatinus and resources for exploring the sequence and annotation data are available through browser displays at Ensembl (www.ensembl.org), UCSC (genome.ucsc.edu) and the NCBI (www.ncbi.nlm.nih.gov). See also the Microbial Commons project, described at www.microbialcommons.ugent.be/

[6] See Axel Bruns, Blogs, *Wikipedia, Second Life, and Beyond: From Production to Produsage*, Peter Lang, New York, 2008

[7] On the concept of user-led generation, see *Innovation Review Submission no. 410* (Darren Sharp, Smart Internet CRC)

[8] See for example, J Stiglitz et al., *The Role of Government in a Digital Age,* Computer and Communications Industry Association, Washington DC, 2000; Carl Shapiro and Hal Varian, *Information Rules: A Strategic Guide to the Networked Economy* (1999); Peter N Weiss, *Borders in Cyberspace: Conflicting Public Sector Information Policies*

markets and drives innovation.[9] Enhanced information flows promote creativity, innovation and productivity.[10] The changes in information markets and a growing appreciation of the 'power of information'[11] have led to a reassessment of the value of information, with a shift in focus away from the immediate financial income that may be obtained by selling information as a commodity, towards the wider social and economic benefits to be obtained from the use of the information.[12] The economic and social benefits flowing from access to publicly funded research results and public sector information have been considered in research studies in Australia and elsewhere. Houghton, Steele and Sheehan concluded in their 2006 report,[13] *Research Communication Costs in Australia: Emerging Opportunities and Benefits,* that open access models of scholarly communication have the potential to increase the economic and social returns from public investment in R & D.[14] Other studies supporting open access to public sector information on social and/or economic grounds include *Commercial Use of Public Information* (2006) commissioned by the UK Office of Fair Trading,[15] *Models of Public Sector*

and their Economic Impacts (2002); T Cutler, *Innovation and open access to public sector information,* paper presented at the National Information Summit, Brisbane, 13 July 2007, at

datasmart.oesr.qld.gov.au/Events/datasmart.nsf/0/F9C327CB32E974E84A25732F00186486/$FILE/Terry%20Cutler.pdf?openelement ;N Gruen, *How to choose your job, your oncologist, your fund manager and your real estate agent,* paper presented at the International Summit on Access to Public Sector Information, Brisbane, 4 March 2008, at

datasmart.oesr.qld.gov.au/Events/datasmart.nsf/0/F72518B483FF0B944A25740F00833724/$FILE/Dr%20Nicholas%20Gruen.pdf?openelement; N. Gruen 'A National Information Policy?' (17 April 2008) *The Australian Financial Review*; P Crossman, *Productivity and Open Access to Public Sector Information,* paper presented at the International Summit on Access to Public Sector Information, Brisbane, 4 March 2008, at datasmart.oesr.qld.gov.au/Events/datasmart.nsf/0/1E57C7FF76AB43944A25740F00830250/$FILE/Peter%20Crossman.pdf?openelement

[9] N Gruen, *How to choose your job, your oncologist, your fund manager and your real estate agent,* paper presented at the International Summit on Access to Public Sector Information, Brisbane, 4 March 2008, at datasmart.oesr.qld.gov.au/Events/datasmart.nsf/0/F72518B483FF0B944A25740F00833724/$FILE/Dr%20Nicholas%20Gruen.pdf?openelement;

[10] The Hon Kim Carr, Minister for Innovation, Industry, Science and Research, 7 February 2008, at minister.industry.gov.au/SenatortheHonKimCarr/Pages/THEREISMORETHANONEWAYTOINNOVATERESEARCHFORDISCOVERY,UNDERSTANDING,ANDAPPLICATION.aspx. Note that this speech was also reported in the Australian's Higher Education Supplement on 23 January 2008.

[11] The phrase 'power of information' was adopted as the title of the report produced for the UK Government in 2007 by consultants Ed Steinberg and Tom Mayo. See www.cabinetoffice.gov.uk/reports/power_of_information.aspx.

[12] Horst Forster (Director, 'Content', European Commission's Directorate General for Information Society and Media, European Commission), *Re-use of Public Sector Information: Change, Growth and Transformation*, paper presented at ePSIplus Conference 'PSI Re-use: Which Action Next?' Brussels, 13 June 2008, available at ftp.cordis.europa.eu/pub/ist/docs/dir_e/speech-hf-epsi-conference-130608_en.pdf.

[13] This report was commissioned by the then Department of Education, Science and Training (DEST).

[14] J Houghton, C Steele and P Sheehan, *Research Communication Costs in Australia: Emerging Opportunities and Benefits* (2006), at www.dest.gov.au/NR/rdonlyres/0ACB271F-EA7D-4FAFB3F7-0381F441B175/13935/DEST_Research_Communications_Cost_Report_Sept2006.pdf; see J Houghton, *Exploring the impacts of enhanced access to publicly funded research*, presented at the OECD's Working Party on the Information Economy Workshop, *The Socioeconomic Effects of Public Sector Information on Digital Networks*, Paris, February 2008, at www.oecd.org/dataoecd/11/20/40067323.pdf; see also J Houghton and P Sheehan, *The Economic Impact of Enhanced Access to Research Findings* , Working Paper No 23, Centre for Strategic Economic Studies, Victoria University, 2006, at www.cfses.com/documents/wp23.pdf.

[15] Office of Fair Trading, *Commercial Use of Public Information,* December 2006, see www.oft.gov.uk/advice_and_resources/resource_base/market-studies/public-information.

Information Provision via Trading Funds (2008) commissioned by the UK Treasury,[16] the European Commission's report *Web 2.0 in Government: Why and How?* (2008)[17] and CapGemini's *Information Opportunity Report* (2008).[18] The need for further detailed research on the social and economic benefits of enhanced access to publicly funded research results and public sector information and access and pricing regimes for public sector information is being addressed in work being undertaken by a range of organisations around the world, including the OECD[19] and the ePSIplus Network.[20] In Australia, studies are being undertaken by the Centre for Strategic Economic Studies at Victoria University[21] and in the Office of Economic and Statistical Research (OESR) in Queensland Treasury.[22] As part of the review of the PSI Directive, the European Commission commissioned MICUS Management Consulting to undertake a survey of the PSI re-use market across Europe, focusing on geographic information, meteorological information and legal information.[23]

INTERNATIONAL DEVELOPMENTS IN INFORMATION POLICY

Technological developments and economic theory have led, since the early 1990s, to greater interest in enabling access to and re-use of information and content produced or held by governments and publicly-funded research organisations. Much work has been done by national governments and international organisations on the development of policies and systems to enable information access and re-use. This has carried through into several high level policy statements on access to public sector information and publicly-funded research outputs which embrace open access as a core value (notably the Berlin Declaration (2003),[24] the Budapest

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[16] David Newbery, Lionel Bently and Rufus Pollock, *Models of Public Sector Information Provision via Trading Funds*, Cambridge University, February 2008, at www.berr.gov.uk/files/file45136.pdf.

[17] European Commission Joint Research Centre for Prospective Technological Studies (IPTS), *Web 2.0 in Government: Why and How?*, May 2008, at p. 39 and p. 45: '[4.8] …. It now becomes clear that besides opportunities for economic growth, there are significant opportunities for social benefits and public value [from PSI]. Citizens are able to build added-value services re-using public data (such as Planningalerts.com). This could change significantly the terms of the debate in favour of greater availability of public data'. Available at ftp.jrc.es/JRC45269.pdf.

[18] CapGemini, *The Information Opportunity Report: harnessing information to enhance business performance,* 2008, at www.uk.capgemini.com/for_you_to_use/thought_leadership/the_information_opportunity_report_2008/.

[19] See Paul Uhlir, Raed Sharif and Tilman Merz, *Measuring the Social and Economic Benefits: Review of the Literature and Future Directions*, presented at OECD WPIE workshop on public sector information, Paris, Feb 2008, at www.oecd.org/dataoecd/23/42/40170933.ppt#258,3,Benefits of PSI Access and Re-use

[20] Recommendation 6 of the ePSIplus Network's draft recommendations (version 18 May 2008) to the European Commission's review of the PSI Directive states: 'In the view of ePSIplus, no other course of action remains other than to continue and intensify work to establish and disseminate the economic case for low or no charges conclusively. The Commission should seek the support of at least one Member State in which conditions for longitudinal work can be established in at least one PSI sector, in order to create a convincing basis for effective dissemination to others'. See www.epsiplus.net/reports/epsiplus_recommendations_to_the_ec_s_2008_review_of_the_psi_re_use_dire ctive.

[21] See the Economic and Social Impacts of Open Access (Easi-OA) Research Agenda, Centre for Strategic Economic Studies, Victoria University, at www.cfses.com/projects/Easi-OA.htm.

[22] Dr Cook's research project, entitled *A review of rationales for allocating costs and payments in producing and supplying public sector information*, is being conducted as a project within the CRC for Spatial Information.

[23] See www.micus.de/psi_studie/index_en.html.

[24] See oa.mpg.de/openaccess-berlin/berlindeclaration.html.

Open Access Initiative (2002)[25] and the Bethesda Statement on Open Access Publishing (2003)[26], the development of open access digital repositories and online journals, the introduction of open access publication requirements by providers of research funding and leading research institutions[27] and increasing uptake in open source/open content models of copyright licensing for software (e.g. GNU/GPL) and digital content (e.g. Creative Commons and Science Commons). Open access requirements are increasingly being introduced by research funding organisations and research institutions worldwide.[28] In 2008 the US National Institutes of Health (the largest funder of basic biomedical research in the world, spending US$25 billion in 2005)[29] and two Harvard University faculties (the Law School[30] and the Faculty of Arts and Sciences[31]) introduced mandatory open access publishing policies, requiring peer-reviewed journal publications to be made available in open access repository.[32]

Internationally, some of the most significant initiatives have occurred in the European Union. Of particular relevance is the European Union's Directive on the re-use of public sector information (the EU PSI Directive), which was adopted by the European Parliament and Council on 17 November 2003. The EU PSI Directive, the culmination of efforts dating back to the late 1980s, is now being implemented throughout the European Union.[33] In the United Kingdom, implementation of the EU PSI Directive led to the establishment of the Office of Public Sector Information (OPSI) as the central body responsible for developing and managing the UK's system for public sector information access and re-use. A further initiative aimed at enabling the UK government to respond to the opportunities provided by digital technologies

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[25] See www.soros.org/openaccess/read.shtml.

[26] See www.earlham.edu/~peters/fos/bethesda.htm.

[27] Innovation Review submissions 211 (Professor J Zobel), 33 (B Cornell), 172 (Dr R Clarke).

[28] For an international listing of open access mandates, see ROARMAP at www.eprints.org/openaccess/policysignup/

[29] See grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html

[30] See www.law.harvard.edu/news/2008/05/07_openaccess.php

[31] Adopted 12 February 2008, See www.fas.harvard.edu/~secfas/February_2008_Agenda.pdf and www.eprints.org/openaccess/policysignup/fullinfo.php?inst=Harvard%20University%20Faculty%20of%20Arts%20and%20Sciences. In an important advance on previous practice, instead of requiring academic authors to deposit their publications in the institutional repository themselves (which requires individual academic authors to assume responsibility for negotiating copyright interests with their publishers) Harvard's Faculty of Arts and Sciences obtains a licence from faculty authors which allows Harvard to deposit and make available faculty authors' publications on their behalf. Importantly, the Faculty of Arts and Sciences' policy also provides that any transfer of copyright to a publisher is subject to the licence granted by the faculty author to Harvard.

[32] NIH's mandatory open access policy has received legislative backing by the *Consolidated Appropriations Act* 2008 (Division G, Title II, Section 218 of Public Law 110–161) which states: 'The Director of the National Institutes of Health shall require that all investigators funded by the NIH submit or have submitted for them to the National Library of Medicine's PubMed Central an electronic version of their final, peer-reviewed manuscripts upon acceptance for publication to be made publicly available no later than 12 months after the official date of publication: Provided, That the NIH shall implement the public access policy in a manner consistent with copyright law'. See NIH's *Revised Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research,* at grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html.

[33] See www.epsiplus.net.

for information creation and re-use was the *Power of Information Review*, conducted in 2007 by consultants Ed Steinberg and Tom Mayo.[34]

The EU has also adopted Directives dealing specifically with environmental and spatial information. On 28 January 2003 the European Council and Parliament adopted the Directive on Public Access to Environmental Information[35] which obliges public authorities to provide timely access to environmental information. The Directive establishing an Infrastructure for Spatial Information (the INSPIRE Directive)[36] was adopted by the European Parliament and Council on 14 March 2007. There is a degree of overlap between the spatial information covered by the INSPIRE Directive and the information covered by the Environmental Information Directive and the PSI Directive. As well as these Directives, the European Commission has issued Communications addressing issues relevant to open access in relation to a broad range of information types including scientific and creative materials online: the Communication on scientific information in the digital age: access, dissemination and preservation was issued in 2007[37] and the Communication on creative content online in the single market was issued in 2008.[38]

During the last decade the OECD,[39] through its Directorate for Science, Technology and Policy[40] and, in particular, the Working Party on the Information Economy (WPIE) within that Directorate,[41] has examined the social and economic implications of the development and use of information and communication technologies, the internet and e-business. The Working Party on the Information Economy (WPIE)[42] has focused on a range of issues including digital content and taken a leading role in the development of international policy on access to public

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[34] See www.cabinetoffice.gov.uk/reports/power_of_information.aspx. The Government's response was published in June 2007 – see:
cabinetoffice.gov.uk/publications/reports/power_information/power_information_response.pdf The Power of Information Task Force was established in March 2008 – see powerofinformation.wordpress.com/.

[35] Directive 2003/4/EC of The European Parliament and of the Council, 28 January 2003, On Public Access To Environmental Information And Repealing Council Directive 90/313/EEC OJL 041 , 14/02/2003 P. 0026 – 0032.
eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0004:EN:HTML.

[36] Directive 2007/2/EC of the European Parliament and the Council of 14 March 2007 establishing an Infrastructure for Spatial Information [2007] OJ L 108/1, 25 April 2007. The INSPIRE Directive entered into force on 15 May 2007. See www.ec-gis.org/inspire/directive/l_10820070425en00010014.pdf.

[37] Communication from the Commission to the European Parliament, the Council, and the European Economic and Social Committee on scientific information in the digital age: access, dissemination and preservation, COM(2007) 56 final.
ec.europa.eu/research/science-society/document_library/pdf_06/communication-022007_en.pdf.

[38] Communication from the Commission to the European Parliament, the Council, and the European Economic and Social Committee on creative content online in the single market, COM(2007) 836 final. ec.europa.eu/avpolicy/other_actions/content_online/index_en.htm

[39] For an overview of recent OECD activity in relation to digital content and public sector information, see www.epsiplus.net/reports/oecd_psi_reports_presentations

[40] www.oecd.org/department/0,3355,en_2649_33703_1_1_1_1_1,00.html.

[41] www.oecd.org/sti/information-economy.

[42] www.oecd.org/department/0,3355,en_2649_33757_1_1_1_1_1,00.html.

sector information and publicly funded research outputs.[43] In January 2004, a Ministerial meeting of the OECD Committee for Scientific and Technological Policy adopted the Ministerial Declaration on Access to Research Data from public funding, recognising that 'fostering broader, open access to and wide use of research data will enhance the quality and productivity of science systems worldwide'.[44] The Declaration is based on recognition that 'an optimum international exchange of data, information and knowledge contributes decisively to the advancement of scientific research and innovation'.[45] In December 2006, OECD Council endorsed the Principles and Guidelines for Access to Research Data from Public Funding developed by the OECD Committee for Scientific and Technological Policy[46] and in 2008 issued the Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information.[47] Both of these OECD documents were endorsed and adopted by the OECD Ministers at the OECD Ministerial Meeting on the Future of the Internet Economy in Seoul, Korea in June 2008.[48] Importantly, the principles stated in these documents have been included in the Seoul Declaration on the Future of the Internet Economy which was adopted by the OECD Ministers on 18 June 2008, in which the Ministers declared:

> WE SHARE a vision that the Internet Economy, which covers the full range of our economic, social and cultural activities supported by the Internet and related information and communications technologies (ICT), will strengthen our capacity to improve the quality of life for all our citizens by: ….
>
> • Developing an increasingly important platform for research, international science co-operation, creativity and innovation in many different sectors.
>
> • to contribute to the development of the Internet Economy, we will:

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[43] For example, on 4–5 February 2008 the WPIE co-hosted a workshop on *The Socioeconomic Effects of Public Sector Information on Digital Networks: Towards a Better Understanding of Different Access and Reuse Policies*, see www.oecd.org/document/48/0,3343,en_2649_33757_40046832_1_1_1_1,00.html.

[44] OECD, Committee on Scientific and Technological Policy, Ministerial Declaration on Access to Research Data from Public Funding C(2004)31/REV1,Art. 17, see t

www.oecd.org/document/0,2340,en_2649_34487_25998799_1_1_1_1,00.htm.

[45] See OECD, Committee on Scientific and Technological Policy, Ministerial Declaration on Access to Research Data from Public Funding C(2004)31/REV1, see

www.oecd.org/document/0,2340,en_2649_34487_25998799_1_1_1_1,00.htm.

[46] OECD, Recommendation of the Council concerning Access to Research Data from Public Funding C(2006)184

webdomino1.oecd.org/horizontal/oecdacts.nsf/Display/3A5FB1397B5ADFB7C12572980053C9D3?OpenDocument.

[47] The proceedings of a WPIE Workshop on public sector information, *The Socioeconomic Effects of Public Sector Information on Digital Networks: Toward a Better Understanding of Different Access and Reuse Policies*, held in Paris on 4–5 February 2008 are available at

www.oecd.org/document/48/0,3343,en_2649_33757_40046832_1_1_1_1,00.html . For background, see Graham Vickery and Sacha Wunsch-Vincent, *Digital Broadband Content: Public Sector Information and Content*, OECD Directorate for Science, Technology and Industry, DSTI/ICCP/IE(2005)2/FINAL, Committee for Information, Computer and Communications Policy, Working Party on the Information Economy 30-Mar-2006, available at www.oecd.org/dataoecd/10/22/36481524.pdf and Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking (2007) Organisation for Economic Co-operation and Development, available at www.oecd.org/dataoecd/57/14/38393115.pdf.

[48] See OECD, *Shaping Policies for the Future of the Internet Economy*, Annexes, available at www.oecd.org/dataoecd/1/28/40821729.pdf.

- Foster creativity in the development, use and application of the Internet, through policies that:

- Maintain an open environment that supports the free flow of information, research, innovation, entrepreneurship and business transformation.

- Make public sector information and content, including scientific data, and works of cultural heritage more widely accessible in digital format.

- Encourage basic and applied research on the Internet and related ICTs.

- Encourage universities, governments, public research, users and business to work together in collaborative innovation networks and to make use of shared experimental Internet facilities.

- Combine efforts to combat digital piracy with innovative approaches which provide creators and rights holders with incentives to create and disseminate works in a manner that is beneficial to creators, users and our economies as a whole.

- Encourage new collaborative Internet-based models and social networks for the creation, distribution and use of digital content that fully recognise the rights of creators and the interests of users.

- Strengthen the development of human resources to take full advantage of the Internet and related ICTs, and further develop ICT skills and digital and media literacy.[49]

INFORMATION ACCESS AND USE IN AUSTRALIA

As a member of the OECD and a signatory to the Seoul Declaration and associated documents, Australia is committed (although not strictly legally bound) to implementing the principles which they set out. However, the position as it has developed in Australia in relation to information access and use is fragmented and lacks a coherent policy foundation, whether viewed in terms of interactions within or among the different levels of government at the local, State and Federal levels, or between the government, academic and private sectors. The issue of information access and re-use has been considered by various government agencies and in reports commissioned by governments over the last 15 years. Some important practices and initiatives can be identified but they are loosely connected, deal with different aspects of access and re-use and lack any formal coordination. No comprehensive statement of policy, principle or practice relating to information flows has yet been developed by any tier of Australian government or for any information sector.[50] The difficulty – often the impossibility – of accessing government information – either by government or third party users – was raised in the Australian Spatial Consortium's[51] submission to the Innovation Review.[52]

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[49] OECD, *Seoul Declaration on the Future of the Internet Economy,* 18 June 2008, available at www.oecd.org/dataoecd/49/28/40839436.pdf.

[50] The Australian position can be contrasted with that in New Zealand, where the government published its national information policy in 1997.

[51] The Australian Spatial Consortium is made up of the six lead organisations in the spatial information sciences in Australia: , ANZLIC – the Spatial Information Council, ASIBA (the Australian Spatial

To some extent, Australia can be seen to have disengaged from the theoretical and practical developments on access to information that have been a central concern in many other countries (particularly the European Union and the United States) during the last decade or so. With some notable exceptions (which are discussed below), there has been a low level of awareness in Australia about steps being taken in other jurisdictions and by international organisations (such as the OECD) to enable greater access to public sector information and outputs of publicly funded research. In respect of developments in specific sectors (e.g. requirements for access to environmental information such as those applying under the Aarhus Convention[53] and the EU Directive on access to environmental information[54]) there is little evidence of awareness in Australia of such developments and their importance for public and private sector entities. While the Copyright Law Review Committee's review of Crown copyright in 2005 – 2006 provided an opportunity to examine the issue of access to public sector information, the CLRC was unable to contextualise its inquiry within the framework of international developments and ideas about access to and re-use of PSI.[55]

A recent acknowledgement of the need for a coordinated national approach towards information access and re-use is found in the proposal for a National Information Sharing Strategy (NISS) which was approved by the relevant Commonwealth, State and Territory Ministers at the meeting of the Online and Communications Council (OCC) on 29 June 2007. The NISS proposal, which is being carried forward by AGIMO, envisages the development of a standardised approach to information sharing to support the delivery of government services, for use by all portfolio areas at all levels of government.

To date, Australian activities aimed at enabling information access and re-use have been largely focused on two key areas: spatial data and publicly funded research outputs (whether in the form of publications or data). Much of the impetus for access to public sector materials has come from the spatial community, which has for many years been a proponent of the view 'that government held information, and in particular spatial information, will play an absolutely critical role in increasing the innovative capacity of this nation'.[56] The most advanced policy on data access is the *Spatial Data Access and Pricing Policy* (2001) developed by the Office of Spatial Data Management (OSDM)[57] which forms the basis of the free data download services offered by Geoscience Australia.[58] Other significant initiatives have also had their origins in demands for improved access to spatial data. An example is the Queensland Spatial Information

Information Business Association), the Spatial Sciences Institute (SSI), the Cooperative Research Centre for Spatial Information (CRC-SI), the Public Sector Mapping Agency (PSMA) and 43 Pty Ltd.

[52] Submission no. 307, Australian Spatial Consortium at p. 1.

[53] Convention on Access to Information, Public Participation and Decision Making, and Access to Justice in Environmental Matters, Aarhus, Denmark, 25 June 1998, see www.unece.org/env/pp/documents/cep43e.pdf. See FERN, *Accessing Environmental Information In and From the European Community: a practical guide to your right to know,* November 2007, available at www.fern.org/media/documents/document_4095_4108.pdf.

[54] European Directive 2003/4/EC on public access to environmental information. This has been implemented in the United Kingdom in the Environmental Information Regulations 2004.

[55] A useful analysis of the CLRC's inquiry is found in Professor G Greenleaf's submission (no. 504(R)) to the Innovation Review, at pp. 70–71.

[56] Submission no. 307, Australian Spatial Consortium, at p. 2.

[57] See www-ext.osdm.gov.au/osdm/policy/accessPricing/SDAP.pdf and generally www.osdm.gov.au/OSDM/Policies+and+Guidelines/Spatial+Data+Access+and+Pricing/default.aspx.

[58] See www.ga.gov.au/products/servlet/controller?event=DEFINE_PRODUCTS

Council's (QSIC) proposal for a Government Information Licensing Framework (GILF)[59] to provide a policy and legal framework supporting the sharing and re-use of spatial and other information (e.g. water data) within and across the various levels of government and between government and the private sector.[60]

Various initiatives relating to publicly funded research results have been developed within the Accessibility Framework for Publicly Funded Research which was established in 2004 as part of the *Backing Australia's Ability – Building Our Future through Science and Innovation* package.[61] The Accessibility Framework was designed to manage research information, outputs and infrastructure in order to enable them to be more readily discovered, accessed and shared. It aims to provide a regulatory environment that both enables and encourages the population of digital repositories in order to provide better access to information.[62] The Prime Minister's Science, Engineering and Innovation Council (PMSEIC) in *From Data to Wisdom: Pathways to Successful Data Management for Australian Science* (2006)[63] recommended that 'Australia's government, science, research and business communities establish a nationally supported long-term strategic framework for scientific data management, including guiding principles, policies, best practices and infrastructure'[64] and the adoption of 'mechanisms to enable the discovery of, and access to, data and information resources'.[65]

The Open Access to Knowledge (OAK) Law and Legal Framework for e-Research projects established as part of the Research Information Infrastructure Framework for Australian Higher Education under *Backing Australia's Ability* deal with the legal issues involved in managing open access publication of research papers and data so as to enable access and re-use.[66] A major project funded under the *Backing Australia's Ability* package is the National Collaborative Research Infrastructure Strategy (NCRIS). The NCRIS capability, Platforms for Collaboration, supports technological platforms that enhance researchers' ability to generate,

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[59] Queensland Spatial Information Council, *Government Information and Open Content Licensing: An Access and Use Strategy* (2006), available at
www.qsic.qld.gov.au/QSIC/QSIC.nsf/CPByUNID/BFDC06236FADB6814A25727B0013C7EE. For the report of the National Information Summit, Brisbane, 13 July 2007, see
www.qsic.qld.gov.au/QSIC/QSIC.nsf/0/D6C8E0616BC7FB414A2573B7000C42E5/$FILE/Conference
%20Report%20-%20National%20Summit%20Open%20Access.pdf?openelement

[60] See the comment on the Power of Information Task Force website, 27 June 2008, at
powerofinformation.wordpress.com/2008/06/27/australian-licensing-examples/; See also the West Australian government initiative, the Shared Land Information Platform (SLIP) which aggregates data government-wide and provides a data download facility.

[61] See
www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/accessibility_framework/
and backingaus.innovation.gov.au/ accessed 24 April 2008.

[62] See
www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/accessibility_framework/.

[63] Prime Minister's Science, Engineering and Innovation Council, Working Group on Data for Science, *From Data to Wisdom: Pathways to Successful Data Management for Australian Science,* (2006)
www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/Presentation_Data_for_Sci ence.htm; see also pandora.nla.gov.au/tep/75221.

[64] Recommendation 1.

[65] Recommendation 6.

[66] See www.oaklaw.qut.edu.au and www.e-research.law.qut.edu.au/.

collect, share, analyse, store and retrieve information.[67] A central component of the Platforms for Collaboration is the establishment of the Australian eResearch Infrastructure Council (AeRIC).[68]

Several universities (including QUT)[69] have introduced open access policies for academic publications and, in December 2006, the two major Australian public research funding bodies – the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) – announced the introduction of open access guidelines for published papers and data resulting from funded research projects, effective 2008.[70] Both policies encourage 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 [because in order 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.[71]

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[67] See www.ncris.dest.gov.au/capabilities/collaborative_investment_plan_platforms.htm. ; see also, *Towards the Australian Data Commons: A Proposal for an Australian National Data Service,* October 2007, at www.pfc.org.au/pub/Main/Data/TowardstheAustralianDataCommons.pdf and Innovation Review submission no. 339, National Collaborative Research Infrastructure Strategy (NCRIS) Committee.

[68] Final Report of the e-Research Coordinating Committee, *An Australian e-Research Strategy and Implementation Framework,* DEST, April 2006, p. 55.

[69] See eprints.qut.edu.au/. In 2008, QUT amended clause 3.1.5 of its IP policy to ensure open access to scholarly works published by QUT academics – see www.mopp.qut.edu.au/D/D_03_01.jsp#D_03_01.05.mdoc . It states:

QUT assigns the right to publish scholarly works to the creator(s) of that work. The assignment is subject to a perpetual, irrevocable, worldwide, royalty-free, non-exclusive licence in favour of QUT to allow QUT to use that work for teaching, research and commercialisation purposes and to reproduce and communicate that work online for non-commercial purposes via QUT's open access digital repository.

If required, QUT will sign documents to more fully record the staff member's ownership of the right of publication of the copyright in a scholarly work and QUT's non-exclusive licence to that work.

The version of the scholarly work that QUT can make available via the digital repository may be the published version or the final post-peer review manuscript version. QUT will agree to third party publisher-requested embargoes of 12 months or less (from date of publication by the third party publisher) on the publication of the manuscript via the digital repository.

Open access requirements have also been adopted by the University of Tasmania (see eprints.utas.edu.au/) and Charles Sturt University (see bilby.unilinc.edu.au:8881/R?func=search&local_base=GEN01-CSU01) and are being considered at Macquarie University (see www.earlham.edu/~peters/fos/2008/07/macquarie-vc-preparing-to-propose-oa.html).

[70] Australian Research Council, *Discovery Projects Funding Rules for funding commencing in 2008* www.arc.gov.au/pdf/DP08_FundingRules.pdf National Health and Medical Research Council, *Project Grants Funding Policy for grants commencing in 2008* www.nhmrc.gov.au/publications/_files/profundingpol.pdf See also the ARC's response to the Productivity Council's draft research report on Public Support for Science and Innovation (2006), recommending that consideration be given to the funding of institutional open access repositories: Australian Research Council, *Response to the Productivity Commission Draft Research Report – Public Support for Science and Innovation* (2006) www.arc.gov.au/pdf/response_PCdraftresearchreport_06.pdf.

[71] Australian Research Council, *Discovery Projects Funding Rules for funding commencing in 2008,* [1.4.5.1] www.arc.gov.au/pdf/DP08_FundingRules.pdf; National Health and Medical Research Council, *Project Grants Funding Policy for grants commencing in 2008,* [16.2]. www.nhmrc.gov.au/publications/_files/profundingpol.pdf.

Support for the introduction of requirements for open access to papers and data from publicly funded research projects is found in the Productivity Commission's report *Public Funding for Science and Innovation* (2007)[72] and in speeches by the Minister for Innovation, Industry, Science and Research, Senator Kim Carr:

> [R]esearch and research data should be widely disseminated and readily discoverable. The results of publicly funded research should be publicly available … [Funds should be] used to get us moving towards an open access regime for publicly funded research. A lot of work needs to be done on sorting through the legal and infrastructure issues, including the implications for public-private collaborations. However, it will be worth the effort. More accessible information equals more robust debate equals a stronger national innovation system.[73]

Other important initiatives established to enable access to public sector information include:

- the National Data Network (NDN)[74]

- the eMarine Information Infrastructure (eMII) facility established by the Integrated Marine Observing System (IMOS) project, funded under the National Collaborative Research Infrastructure Strategy (NCRIS)[75]

- the provision of free and unrestricted data by the Australian Bureau of Statistics (ABS)[76]

- IP Australia's AusPat database which provides free online access to Australian patents and patent applications filed since 1979.[77]

There have been several reports on access to information and digital content, including *Commerce in Content: Building Australia's International Future in Interactive Multimedia Markets* (1994),[78] *Unlocking the Potential: Digital Content Industry Action Agenda* (2005)[79] and *From Data to Wisdom: Pathways to Successful Data Management for Australian Science* (2006).[80]

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[72] Productivity Commission, *Public Support for Research and Innovation*, Research Report (2007) 240, 243 www.pc.gov.au/study/science/finalreport/index.html at 3 April 2007.

[73] The Hon Kim Carr, Minister for Innovation, Industry, Science and Research, 7 February 2008, available at minister.industry.gov.au/SenatortheHonKimCarr/Pages/THEREISMORETHANONEWAYTOINNOV ATERESEARCHFORDISCOVERY,UNDERSTANDING,ANDAPPLICATION.aspx. Note that this speech was also reported in the Australian's Higher Education Supplement on 23 January 2008.

[74] www.nationaldatanetwork.org/ndn/ndnhome.nsf/Home/Home.

[75] See www.imos.org.au/ Note that IMOS has established the eMarine Information Infrastructure (eMII) facility to manage marine data and information generated by IMOS. See imos.org.au/emii.html.

[76] In November 2005, ABS abandoned the restrictive licensing practices it had previously applied in licensing its datasets, which had involved charging fees for access to data and the restriction or prohibition of commercial downstream use by the licensee and/or others. Since then ABS has eliminated virtually all charges for data and restrictions on downstream use of their data (that is, both access and re-use), whether commercial or otherwise.

[77] See www.ipaustralia.gov.au/auspat/

[78] Cutler & Company,1994, produced for the Department of Industry Science and Technology, CSIRO, and the Broadband Services Expert Group, see www.nla.gov.au/misc/cutler/cutlercp.html

[79] Strategic Industry Leaders Group report to the Australian Government, November 2005, see www.dbcde.gov.au/__data/assets/pdf_file/0006/37356/06030055_REPORT.pdf

[80] Prime Minister's Science, Engineering and Innovation Council, Working Group on Data for Science, *From Data to Wisdom: Pathways to Successful Data Management for Australian Science,* (2006)

Along with the rise in support for access to information has come a growing recognition of the importance of developing systems and processes for proper data management. If the benefits of enhanced access are to be realised, it is essential for there to be active and professional management of the processes by which research data and information are generated, organised, evaluated and disseminated.[81] The importance of professional management of research data and information has consistently been identified as central to data and information infrastructures.[82] The International Council for Science (ICSU) in its report *Scientific Data and Information: A report of the CSPR Assessment Panel* (2004) stated that data management expertise has become a core skill for researchers, who should receive data management training as part of their education. The NCRIS Strategic Roadmap identified 'data storage management, access, discovery and curation' as one of the five key inter-related components of collaborative e-research platforms. To enable access to and re-use of information it is necessary not only to adopt appropriate technical standards, practices and architecture, but also to develop legal frameworks that facilitate access and re-use, whether on an inter-organisational basis or across national borders.[83] The benefits that may potentially be gained through advances in information and communications technologies will not be achieved solely through engineering but will result from a combination of social, legal and technical factors. The NCRIS Strategic Roadmap (2006) acknowledged that the management of research outputs requires the coordination of many elements, including the appropriate hardware and software, supporting workflows, policy and regulatory frameworks, administrative arrangements and resources. Importantly, it makes the point that while much of the work on data access to date has focused on the use of technical mechanisms to overcome barriers to access, it is also necessary to ensure that the legal context is understood and that intellectual property interests (notably copyright) are effectively managed.[84] As Professor Paul David has commented in relation to e-science collaboration, 'if it is to be achieved, [it] will more likely be the resultant of a nexus of interrelated social, legal *and* technical transformations. The socio-institutional elements of a new infrastructure supporting research collaborations … are every bit as complicated as the hardware and computer software, and, indeed, may prove much harder to devise and implement'.[85]

When the increasing demands in Australia for improved access to information are considered in the context of international developments, it becomes apparent that there is a need for an Australian National Information Policy (or Strategy) which facilitates and promotes the dynamic, networked exchange of ideas and information.[86] Development of such a policy or strategy would require a systematic study of our economic institutions with a view to

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www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/Presentation_Data_for_Sci ence.htm.

[81] See Margaret Henty, 'Developing the Capability and Skills to Support e-Research'*, Ariadne*, 55, April 2008, available at www.ariadne.ac.uk/issue55/henty/.

[82] See Innovation Review submission 165 (Australian Academy of Science).

[83] See OECD *Principles and Guidelines for Access to Research Data from Public Funding* at 14, at www.oecd.org/dataoecd/9/61/38500813.pdf.

[84] Australian Government, Department of Education, Science and Training (DEST), *National Collaborative Research Infrastructure Strategy (NCRIS),* see www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/ncris/.

[85] Paul A David, *Towards a cyberinfrastructure for enhanced scientific collaboration: providing 'soft' foundations may be the hardest part*, Oxford Internet Institute Research Report No. 4 (2004 revised May 2005), see www.oii.ox.ac.uk/research/publications.cfm.

[86] See generally, N. Gruen 'A National Information Policy?' (17 Apr 2008) *The Australian Financial Review.*

understanding how information is collected, handled and disseminated, so that existing impediments to efficient information flows can be eliminated and the flow of information can be improved for social and economic benefit.

A National Information Policy (or Strategy) must be founded on current economic theory and research about the social and economic benefits of information flows (including the respective roles of government and the private sector)[87] and a detailed understanding of the practices and experiences in other key jurisdictions (notably the United States, the United Kingdom and the European Union). In establishing the policy and guiding principles, it will be necessary to have regard to the policy and principles that have been developed in other jurisdictions and at the international level, particularly the OECD's Seoul Declaration on the Future of the Internet Economy[88] and associated materials, including the *Principles and Guidelines for Access to Research Data from Public Funding*[89] and the *Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information.*[90]

SUBMISSIONS TO THE REVIEW OF THE NATIONAL INNOVATION SYSTEM

Support for development and implementation of a national policy (or strategy) for access to information was expressed at forums held during the public consultation round in March and April 2008, as well as in several written submissions.[91] The National Library of Australia's submission to the Innovation Review supported a 'national information infrastructure' which encompasses the academic, industry and government sectors, urging the endorsement 'a national digital information agenda that includes strategies to address the creation of a national digital information framework'.[92]

The CRC for Spatial Information called for a National Information Infrastructure:[93]

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[87] On this issue see submission no. 305, Australian Spatial Information Business Association (ASIBA).

[88] OECD, *Seoul Declaration for the Future of the Internet Economy*, 18 June 2008, available at www.oecd.org/dataoecd/49/28/40839436.pdf.

[89] OECD, *Recommendation of the Council concerning Access to Research Data from Public Funding* C(2006)184. webdomino1.oecd.org/horizontal/oecdacts.nsf/Display/3A5FB1397B5ADFB7C12572980053C9D3?OpenDocument.

[90] The proceedings of a WPIE Workshop on public sector information, *The Socioeconomic Effects of Public Sector Information on Digital Networks: Toward a Better Understanding of Different Access and Reuse Policies*, held in Paris on 4–5 February 2008 are available at www.oecd.org/document/48/0,3343,en_2649_33757_40046832_1_1_1_1,00.html . For background, see Graham Vickery and Sacha Wunsch-Vincent, *Digital Broadband Content: Public Sector Information and Content*, OECD Directorate for Science, Technology and Industry, DSTI/ICCP/IE(2005)2/FINAL, Committee for Information, Computer and Communications Policy, Working Party on the Information Economy 30-Mar-2006, available at www.oecd.org/dataoecd/10/22/36481524.pdf and *Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking* (2007) Organisation for Economic Co-operation and Development, available at www.oecd.org/dataoecd/57/14/38393115.pdf.

[91] See Submissions no. 33 (B Cornell), 78 (Dr D Rooney), 172 (Dr R Clarke), 211 (Prof. J Zobel), 303 (CRC for Spatial Information), 305 (Australian Spatial Information Business Association – ASIBA), 306 (Council of Australian University Librarians – CAUL), 307 (Australian Spatial Consortium), 428 (Prof. B Fitzgerald), 450 (CSIRO Staff Association), 493 (CAMBIA), 504 (Prof. G Greenleaf), 548 (Australian Bureau of Statistics).

[92] Submission no. 423, National Library of Australia at pp. 6–7.

[93] Submission no. 303, Cooperative Research Centre for Spatial Information (CRC-SI) at pp. 19–20.

Australia's government agencies, through ANZLIC – The Spatial Information Council and the Australian Spatial Information Business Association (ASIBA) have identified as a fundamental need in Australia the development of a nation-wide online information infrastructure (or coordinated and linked suite of portals) for sharing datasets within government and by the private sector.

There are emerging and compelling arguments to show that provisioning information more efficiently to the end user will be a critical driver of innovation. Government agencies at all three levels in Australia control vast data stores, most of which are difficult or impossible for users to access. This initiative seeks to unlock the value for the enormous number of potential users.

An emerging proposition for the use of data over the Internet and the Web is that the more interactions that end users can undertake, and the more complex these interactions become, the more valuable the outcome. Moreover, if the outcome can be achieved in near real time, even greater value is added. This initiative will drive much greater utility for end users of information online. It will tackle the processes of linking disparate data stores (including spatial data), custodial and legal arrangements, licensing, governance arrangements, tensions between open access and proprietorial requirements, and the development of new standards, protocols and default-use conditions. It will be underpinned by a Creative Commons approach that will look to create a new on-line culture of data sharing.

The Australian Spatial Industry Business Association (ASIBA) called for the establishment of a national spatial information policy.[94] The Australian Spatial Consortium, the umbrella body formed by all the major spatial information bodies in Australia, advocates the establishment of a 'national information portal', together with a supporting structure and resourcing, to improve discoverability, access and the flow of information.[95] The Australian Spatial Consortium also suggested that a creative commons approach be adopted in providing access to information:[96]

The members recognise that users often improve the information they get and two way flows, together with a single data model approach (collect once and make available for all), is the most effective means for managing information. The national information portal, and all of the support mechanisms it requires, may require new management structures to permit the better management of information. A structure that accommodates the federated model of information management currently operating across jurisdictions in Australia will be needed. Such an approach would accelerate transformation of spatial information value chains, harmonising the creation of value by our government institutions and private sector corporations, and increasing the competitive advantage of Australian industries in national and international markets.[97]

The CSIRO Staff Association proposed that the principles underpinning the role and participation of the public sector in innovation should value 'open communication and dissemination of the outcomes of publicly funded research'[98] and expressed the view that 'open

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[94] Submission no. 305, ASIBA at p. 5. See also 'Spatial, the final frontier', *Australian Financial Review*, 16 May 2008 at p. 63.

[95] Submission no. 307, Australian Spatial Consortium, p. 1.

[96] Submission no. 307, Australian Spatial Consortium, pp. 1–2.

[97] Submission no. 307, Australian Spatial Consortium, p. 2.

[98] Submission no. 450, CSIRO Staff Association, p. 10.

access will increasingly become a crucial issue for public sector research institutions'.[99] The submission stated:[100]

> The Staff Association supports the principle underpinning open access to publications and data from publicly funded research. We suggest that there are efficiencies that could be gained by more effectively sharing data within government-funded agencies and departments. One obvious example is access to geospatial data between agencies such as CSIRO, the Bureau of Meteorology and Federal and State Government departments.
>
> Open access does not necessarily have to lead to reduced opportunities for development of intellectual property and commercialisation in CSIRO or the NIS as a whole. Conversely, open access to publicly funded research, when managed appropriately, should lead to enhanced awareness and creativity opportunities. CSIRO will always have research in its portfolio that is commercial-in-confidence and/or where intellectual property is tied to the funding partner. However, for projects or programmes that are purely publicly funded, CSIRO should be encouraged to disseminate the outcomes of its research more readily.
>
> Furthermore, once these outcomes have gone through internal accountabilities such as peer review, they should be freely accessible to the wider community, particularly online. Publication in open access journals and easier availability of publications on the CSIRO website would facilitate greater interaction and awareness about the developments in science with the general public.

QUT's submission raised the need to consider 'the social cost of locking up IP generated by publicly funded research and restricted access to data held within government agencies', expressing support for 'a national system and protocol for the storage of, and access to, research data, especially where the data is obtained under the auspices of public funding'.[101] CAMBIA urged the adoption of an open access publishing policy for publicly funded science (similar to that adopted by the US National Institutes of Health in 2008), to apply to works resulting from research funded wholly or partially by public monies.[102] It also made the point that while the 'information commons' is clearly important, the innovation system requires information to be converted into a knowledge base which is capable of being used:[103]

> If we are to see effective innovation system reform, it will be through the realization that the delivery of science-enabled innovations into the social and economic market place will be the metric by which we will be judged, not just by collaborative science and information, per se, nor the monetizing of the components, the tools and the findings that lead to an effective innovation.[104]

Professor Brian Fitzgerald[105] proposed a national information policy which would encompass a 'national knowledge sharing strategy within and between government/s, researchers, citizenry

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[99] Submission no. 450, CSIRO Staff Association, p. 20.

[100] Submission no. 450, CSIRO Staff Association, p. 19.

[101] Submission no. 424, QUT (Professor P Coaldrake), at p. 4.

[102] Submission no. 493, CAMBIA at p. 9.

[103] Submission no. 493, CAMBIA at p. 6; see also submission no. 548, Australian Bureau of Statistics at p. 3.

[104] Submission no. 493, CAMBIA at p. 9.

[105] Submission no. 428, Prof. B Fitzgerald at p. 3.

and business'.[106] He identified what he calls the 'pure exchange of ideas' as central to the innovation system, requiring the 'freedom to innovate'[107] or 'information flows and information markets'.[108] He explained:

> Australia needs to become a true laboratory of experimentation fuelled by the greatest possible freedom to exchange ideas (through formal and informal professional and social networks). In today's networked society and economy we have learned that we cannot predetermine knowledge construction and that serendipity (discovery by chance), contributions by everyday citizens (from the periphery) and seamless access to the network and to the knowledge are vitally important. The networked environment has shown us more than ever that no one person has a monopoly on knowledge and that collaborative endeavour (some of our Web 2.0 colleagues might call this 'crowdsourcing') is a fundamental part of discovery…[109]

> Australia's ability to lead the world in developing institutional (government, education and industry) and informal ways (citizenry and social networks) of managing, facilitating and providing access to and usability (flow and re-use) of information, knowledge, data and culture must be seen as one of the greatest drivers of innovation and competitive advantage in the global market economy.

Professor Fitzgerald pointed to an emerging broad international consensus – as evidenced by the recent OECD declarations and recommendations – that 'the default rule' is that 'publicly funded knowledge, data, content and culture should be available for open access':

> Open access should be the default rule. A national policy (that involves the States perhaps through COAG) and a set of principles that support this need to be articulated (ideally by the end of 2008) so that public administrators have clear direction on this issue.

The Australian Bureau of Statistics' submission made the point that there are 'rich sources of valuable information potential available from the operational and administrative activities' of government departments, as well as the private and voluntary sectors. Advances in communications technology mean that it may 'be feasible to unlock these potential sources of rich and timely data and make it available to innovators across Australia. However, the ABS cautioned that use of statistical data must subject to adequate protection (physical and legal) for personal privacy.[110]

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[106] Submission no. 428, Prof. B Fitzgerald and p. 8.

[107] See R Jefferson, *Freedom to Innovate as a Human Right*
blogs.cambia.org/raj/index.php/2007/04/05/freedom-to-innovate.

[108] N. Gruen 'A National Information Policy?' (17 Apr 2008), *The Australian Financial Review.*

[109] See generally: G. Vickery and S. Wunsch-Vincent, *Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking* (2007) Organisation for Economic Co-operation and Development www.oecd.org/dataoecd/57/14/38393115.pdf ; E. Mayo and T Steinberg, *The Power of Information* (2007) (and UK Government response),
www.cabinetoffice.gov.uk/reports/power_of_information.aspx;

[110] Submission no. 548, Australian Bureau of Statistics.

Several submissions called for the development of an Australian creative archive to provide access to publicly funded creative and cultural materials.[111] Professor Brian Fitzgerald and Jessica Coates observed that although public agencies (including the ABC, SBS, Film Australia, the National Film and Sound Archive and the National Library of Australia) own large amounts of creative content, the combined effect of copyright issues and 'static archiving practices' means that users have been limited to dealing with these materials on a passive, 'view only' basis:[112]

> Remixing and distribution are integral to the digital environment's creative capacity, yet these practices are almost impossible under current archive licensing regimes. As a result, the potential for this content, and its contribution to Australia's cultural and economic growth, is drastically limited.[113]

Proposals were advanced for establishment of a digital creative archive from which cultural archival content could be made available for access and re-use under flexible licensing terms, similar to the BBC's Creative Archive project. Professor Graham Greenleaf illustrated by reference to the National Library of Australia's Picture Australia service:[114]

> The National Library of Australia's Picture Australia aims to be the definitive pictorial service for and about Australians and Australia, providing one search over collections in 45 major Australian public institutions. Pictures, (photos, sketches, cartoons etc) are often only available for private research and study, but some are available for other uses. Picture Australia's 'Click and Flick' is an initiative to open Picture Australia to contributions from the Australian public, through uploads to Flickr using Creative Commons licences. Picture Australia now includes over 1.1 million images from the collections of 45 organisations and, now, individuals via Flickr. Its federated combination of public domain images, Crown copyright images made available for free access, and images contributed by the public under voluntary public rights licences (Creative Commons) is indicative of what creative collaboration among public institutions can do.[115]

The Australian Broadcasting Corporation's submission pointed to its own Pool project (pool.org.au) as an example of the kind of initiative which can build 'a critical mass of innovative content of general community interest' and enable the ABC to contribute to Australia's 'information commons'. Pool is a media-sharing web project being developed by ABC's Radio National, together with UTS, researchers at RMIT and the University of Wollongong and a community of contributors. It enables users of the site to download and remix content, including ABC Archive material.

> It is a collaborative workspace for creative content communities and a test-bed, fostering 'open source' interactions between ABC and digitally-connected social networks. Through collaboration, peer critique, and media sharing within the legal framework of Creative Commons licensing, Pool will serve as an online mentoring system. Pool's curatorial framework will provoke collaboration between ABC

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[111] Submissions no. 435 (Prof. B Fitzgerald and J Coates), 504(R) (Prof. G Greenleaf), 597 (Australian Broadcasting Corporation).

[112] Submission no. 435, J Coates and Prof. B Fitzgerald, p. 10.

[113] Submission no. 435, J Coates and Prof. B Fitzgerald, p. 10.

[114] www.pictureaustralia.gov.au.

[115] Submission no. 504(R), Prof. G Greenleaf, p. 9.

producers and communities to build new forms of collaborative creation in public media. [116]

RECOMMENDATIONS

The following recommendations are proposed for consideration by the review panel:

(1) Establish a National Information Policy/Strategy

Advances in information and communication technologies have brought about an information revolution, leading to fundamental changes in the way information (especially digital data) is collected or generated, shared and distributed. The internet and digital technologies are re-shaping research, innovation and creativity. Economic research has highlighted the importance for innovation of information flows and the availability of information for access and re-use. Information is crucial to the efficiency of markets and enhanced information flows promote creativity, innovation and productivity. In order to maximise these benefits it is essential to formulate a National Information Policy/Strategy which facilitates and promotes the dynamic, networked exchange of ideas and information, and removes the current impediments to the efficient flows of information. A National Information Policy/Strategy must be founded on current economic theory and research about the social and economic benefits of information flows, as well as an understanding of the practices and experiences in other key jurisdictions, including the policy and principles formulated by bodies such as the OECD.

(2) Promote access to and re-use of government or public sector information (PSI) (content and data) for the purpose of sponsoring social, cultural and economic innovation.

Making public sector content and information (PSI) available for access and re-use can lead to significant economic and social benefits, such as fostering the development of new products and services (e.g. weather forecasting and environmental management), seeding new forms of cultural activity and addressing key societal challenges (e.g. indigenous disadvantage, child health, climate change, environmental sustainability). Greater access to, and re-use of, government information will result in better informed and focused public sector decision and policy making, enhance the role of parliaments, and invigorate participatory democracy throughout Australia. The default position to be adopted is that the vast majority of public sector information (PSI) that is eligible for public release (that is, not subject to restrictions based, for example, on personal privacy or national security considerations) should be available on an open access basis, at marginal or no cost. To facilitate this outcome, open content licences including Creative Commons licences need to be used and the application of copyright law in relation to materials held by the public sector may need to be reviewed.

(3) Promote access to and re-use of publicly funded research data and scholarly publications and cultural materials.

It should be mandated that the results of research funded by the public sector – whether in the form of data, materials or journal articles – are to be made openly accessible to the fullest possible extent possible (taking into account legal constraints, including the need to protect personal privacy). A sustained effort is required to develop and nurture a discoverable, well managed, legally compliant and interoperable 'data commons', the full potential of which may

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[116] Submission no. 597, Australian Broadcasting Corporation, p. 6.

be realised through various endeavours including groundbreaking research, evidence-based policy making and social, democratic and creative activity.

(4) Promote access to and re-use of publicly funded creative and cultural material and indigenous cultural heritage materials through a 'creative archive'.

The store of Australian cultural and creative materials – particularly where they have been produced or acquired through public funding sources – should be accessible and re-usable across the community. Access to the wealth of material collected in Australia's public cultural institutions – that 'define our past achievements and our future hopes'[117] – through digital databases[118] which make creative and cultural materials available for access and re-use will foster creativity and enable Australians to better understand and identify with their cultural heritage. An Australian creative archive would protect and preserve Australian creative content, and act as a practical tool to inform, educate, support and stimulate Australia's creative future. Importantly, collections of indigenous cultural heritage materials could be included so they are more readily available for access and innovative use (in a culturally appropriate manner) by indigenous peoples, academics, governments and policymakers.[119]

(5) Develop the capabilities and skills required to implement the National Information Policy/Strategy

If the benefits of enhanced access to information are to be realised, it will be necessary for the processes and systems for generating, organising, evaluating and disseminating research data and information to be actively and professionally managed. There is a need to develop the new skills and professions required to enable the National Information Policy/Strategy to be implemented. Managing access to and re-use of information requires the coordination of a numerous policy, administrative, technical and legal elements. The skills and capabilities required are cross-disciplinary, including computer-based (hardware and software) technical skills, data storage management, data discovery and analysis, curation, project management, communication, collaboration and an understanding of how to develop legal frameworks for managing copyright and intellectual property interests to facilitate access and re-use.

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[117] Senator Kim Carr, First Speech, 5 May 1993, see
www.aph.gov.au/Senate/senators/homepages/first_speech/sfs-AW5.htm.

[118] See *Australia 2020 Summit: Initial Summit Report,* 'Towards a Creative Australia: the future of the arts, film and design', pp. 29–30.

[119] Submission no. 638, AIATSIS, p. 9.