

Science as a Public Enterprise: opening up scientific information – a response to a call for evidence from the Royal Society of London

Summary

- There can be conflicts between opening up scientific information as a contribution to global knowledge, and restricting access to information to provide commercial advantage, and thereby economic benefits for countries.
- Initiatives in New Zealand for sharing data include: the New Zealand Government Open Access and Licensing framework, the New Zealand Declaration on Open & Transparent Government, New Zealand Social Science Data Service (NZSSDS), the Kiwi Research Information Service, and the Ocean Survey 20/20 Portal and 'data.govt.nz'.
- Open access copyright licenses used by governments and institutions should be standardised to streamline permissions and facilitate efficient sharing and reuse.
- Challenges in making data useable for sharing include the fear of pre-emptive publishing and the time and cost of preparing the data for reuse. The benefits of more widespread sharing of data, area however, many and various.

Introduction

The Royal Society of New Zealand is pleased to respond to the call for evidence on the use of scientific information as it affects scientists and society.

Scientific research has become increasingly complex and multi-disciplinary. Advances in technological skills, analytical power and availability of improved communication pathways have also provided new challenges. In this context, having diverse means of communicating with the wider public have become important, particularly given the swiftness and complexities of contemporary scientific research and the substantial challenges confronting modern societies.

Nevertheless, there are also increasing choices to be made. The tensions between the public and private use of publicly-funded research continue and are especially harsh in New Zealand where most industry-good research is publicly funded. There are areas of publically funded research, such as in the dairy industries, where New Zealand has a competitive advantage. In these areas it is likely to be against the national interest to publish everything, as New Zealand industry is supported by the margin its secret intellectual property creates for the sector. If taxpayer funding is used, a 'public' obligation of targeting the wealth creation towards the domestic economy is likely to apply. On the other hand, basic research, funded publically, needs peer review and benefits from publication. We also enjoy free access to the 99.8% of global research funded by taxpayers elsewhere in the world and science benefits from the sharing and interchange of knowledge.

There are, therefore, significant issues to consider around the beneficiaries of research funded by taxpayers in a small economy. What strategy should we follow and what are our obligations to colleagues elsewhere?

The information that follows provides specific comments on the some of the questions raised:

3. What activities are currently under way that could improve the sharing and communication of scientific information?

There are a number of existing initiatives that aim to improve sharing and communication of existing scientific information:

- the New Zealand Social Science Data Service (NZSSDS) is a data archiving and data sharing facility, operating since 2008 (www.nzssds.org.nz). It aims to gain improved access to current and past data series/collections to the tertiary sector's research community; to improve the speed and capacity for data cleaning, compilation and dissemination of new surveys to students, researchers and policy makers; and to provide access to relevant data from comparable international studies.
- The Kiwi Research Information Service (<http://nzresearch.org.nz>) run by the National Library of New Zealand. The service gathers information about documents stored in research repositories from around New Zealand, and assembles them in one database. The original documents are all held at the originating institutions, and the website only stores information like the title, authors, URL, and subject. Once the metadata is harvested, the service pushes the metadata out into the wider research community through RSS feeds, OAI-PMH¹ re-export, SRU² searches, and other novel channels.
- The Ocean Survey 20/20 programme, coordinated by Land Information New Zealand, has the goal of presenting data on marine resources to researchers, agencies and individuals. One portal provides access to data and metadata on biodiversity, marine resources, extractive activity, and a wide range of other scientific data which is sourced from government departments, regional councils, marine park management organisations, crown research institutes, and local partners. This information is presented under a Creative Commons licence.
- Valuable research assets such as the Land Information New Zealand Dataservice and the Charities Commission's open API can be discovered through 'data.govt.nz' – a directory of publicly-available, non-personal New Zealand government held datasets.
- In addition there are considerable resources elsewhere in the world to assist with the setting up of data sharing capability, such as the UK data Archive (<http://www.data-archive.ac.uk>) and Australian Social science data archive <http://www.assda.edu.au>.

However, even the most useful and applicable data and information which is made available online cannot realise its full potential if it is not licensed appropriately for re-use by the wider public where possible. Like the proliferation of digital formats, one of the greatest barriers to an efficient commons of scientific data and research is the proliferation of open access copyright licenses used by governments and institutions. The New Zealand Government has aligned itself with open access licensing standards advocated in Australia³ by developing the New Zealand Government Open Access and Licensing (NZGOAL) framework. The framework was approved in July 2010 and recommends "using Creative Commons New Zealand law licences and recommends the use of 'no-known rights' statements for non-copyright material."⁴

The UK government has developed its own custom re-use copyright licence (www.nationalarchives.gov.uk/doc/open-government-licence) which is intended to be interoperable with the Creative Commons Attribution 3.0 licence.

¹ Open Archives Initiative - Protocol for Metadata Harvesting (OAI-PMH)

² Search/Retrieve URL Service (SRU)

³ Australian Governments Open Access and Licensing Framework, 2011

⁴ [New Zealand Government Open Access and Licensing framework](#), 2010

4. How do/should new media, including the blogosphere, change how scientists conduct and communicate their research?

New Zealand benefits from the activities of a government-supported Science Media Centre who publicise research and connect researchers with both new & old media. One of their initiatives is Sciblogs.co.nz, a network of nearly forty blogs run by active researchers. Recent advances at Sciblogs include science podcasts. This network provides a hub for researcher-led public discussion of socially-relevant science issues in New Zealand and has featured extensive debates on vaccination, climate change, and innovation. Beyond merely hosting and informing these debates, this network of communicators provides openness, transparency and responsiveness to public debate and presents a human face to research.

Visualisations, infographics and applications facilitated by the [‘Mix and Mash’](#) initiative, [the Guardian](#), and [MySociety](#) help the public understand data and information more clearly and should be encouraged.

5. What additional challenges are there in making data usable by scientists in the same field, scientists in other fields, ‘citizen scientists’ and the general public?

In addition to the commercial sensitivities (particularly for more applied work), one of the primary challenges to the early release of research data is that many researchers do not want it made available to other scientists in case they publish from it before the primary researcher has had an opportunity to do so. This could be overcome in some cases by giving a specified timeframe of exclusive access to the data before it goes into the public domain. A second challenge arises because of the costs associated with properly documenting and preparing data for archiving and possible re-use by others. Researchers argue that they do not have the time or money to undertake this task. However, it could be said that proper research practice would dictate that research data is properly documented and stored as a matter of course.

6. What might be the benefits of more widespread sharing of data:

Research data are a valuable resource, usually requiring considerable time and money to be produced, and which can have a significant value beyond usage for the original research undertaken. Sharing research data:

- encourages scientific enquiry and debate
- secondary analysis increases the cost-effectiveness of research through creating more value from existing data
- promotes innovation and potential new data uses
- increase the visibility of scholarly work
- enhance a researchers’ reputation
- establish links to the next generation of researchers
- increase citations
- leads to new collaborations between data users and data creators
- maximises transparency and accountability
- enables scrutiny of research findings
- encourages the improvement and validation of research methods
- reduces the cost of duplicating data collection
- increases the impact and visibility of research
- promotes the research that created the data and its outcomes
- can provide a direct credit to the researcher as a research output in its own right
- provides important resources for education and training

- o removing inequalities in access to key resources for postgraduate education
- o increasing real life teaching opportunities – projects, activities and examinations.

The social, cultural and economic benefits of making publicly funded scientific datasets available for reuse are evident in crowd sourced mobile and web applications that combine or 'mashup' information in new ways. ['100 Companies'](#) was recently rewarded by New Zealand's Ministry for Science and Innovation as part of the 'Mix and Mash 2011' competition. It enables people to better consider the current economic situation by using interactive technologies to visualise industry and natural resources data.

8. What should be expected and/or required of scientists (in companies, universities or elsewhere), research funders, regulators, scientific publishers, research institutions, international organisations and other bodies?

Public funders of research in many countries are increasingly following guidance from the Organisation for Economic Co-operation and Development (OECD) that publicly funded research data should as far as possible be openly available to the scientific community. Many overseas funders have adopted research data sharing policies and mandate or encourage researchers to share data and outputs. Data sharing policies tend to allow researchers exclusive data use for a reasonable time period to publish the results of the data.

In the UK, funding bodies such as the Economic and Social Research Council (ESRC), the Natural Environment Research Council (NERC) and the British Academy mandate researchers to offer all research data generated during research grants to designated data centres – the UK Data Archive and NERC data centres. The Biotechnology and Biological Sciences Research Council (BBSRC), the Medical Research Council (MRC) and the Wellcome Trust have similar data policies in place which encourage researchers to share their research data in a timely manner, with as few restrictions as possible.

New Zealand has put in place the Declaration on Open and Transparent Government to apply such policies appropriately, at least for Government-created data. Given the importance of the publicly-funded Crown Research Institutes in the New Zealand research system, implementing these policies sets priorities and expectations for most domestic research.

“The government holds data on behalf of the New Zealand public. We release it to enable the private and community sectors to use it to grow the economy, strengthen our social and cultural fabric, and sustain our environment. We release it to encourage business and community involvement in government decision-making.”⁵

Additional Information

This response was produced by the Royal Society of New Zealand from a range of submissions from its members, and signed off by the Chair of the Academy. Any enquiries about this submission or others should be addressed to the Royal Society's External Relations Manager, Dr Marc Rands (Email: marc.rands@royalsociety.org.nz). Responses are published on the [RSNZ website](#) .

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⁵ [Declaration on Open and Transparent Government](#) , August 2011