

TA-INSTITUTION

Technology Assessment in Australia's National Science Agency

by Peta Ashworth, CSIRO, Canberra, Australia

Australia currently does not have any single institution that is responsible for technology assessment (TA). Instead, there are a number of institutions which have an interest in and provide advice around technology developments. This article explores the role Australia's national science agency – the Commonwealth Scientific and Industrial Research Organization (CSIRO) – might play to effectively position itself as Australia's TA coordinating body and the benefits it might bring to Australia's innovation system more broadly.

1 Early Technology Assessment in Australia

In March 1999, a consensus conference on "Gene Technology in the Food Chain" was hosted in Canberra, Australia, by the Australian Museum. A panel of 14 lay citizens participated in the conference and made a number of recommendations to the government departments that sponsored the event. This is possibly the most well-known technology assessment (TA) activity that has been undertaken in Australia to date. Following on from the conference, a couple of months later the Australian Government announced that it would establish two new bodies: Biotechnology Australia (to coordinate policy, industry support, public engagement technology and report to the Australian Government's Biotechnology Ministerial Council) and the Interim Office of Gene Technology Regulator (to oversee the creation of a regulatory environment for gene technology).

Although the shape and investment in Biotechnology Australia and subsequent agencies changed over time, since the consensus conference, a range of public participation activities in science and technology assessment have occurred on topics such as nanotechnology, climate change,

energy technologies, biodiversity, and water. This was in keeping with moves for greater public participation and democratization of decision making to address growing public ethical, environmental and health concerns about contentious technologies that were occurring in Europe and the USA.

However, unlike Europe and the United States, Australia currently does not have any single institution that is responsible for technology assessment. Instead, there are a number of institutions which have an interest in and provide advice around technology developments such as universities, learned academies, the Chief Scientist, a number of government institutions, consultants, and commercial research laboratories. Alongside this range of expertise, there is also the Commonwealth Scientific and Industrial Research Organization (CSIRO).

2 How CSIRO Works

Often referred to as Australia's pre-eminent science and technology research organization, CSIRO has been in operation since 1926. CSIRO's annual operating budget is approximately AU\$ 1.2 billion (approx. € 865 million) with almost sixty percent of these funds coming from the Australian government¹ and the balance largely derived from industry. CSIRO employs 6,500 people across 50 sites around Australia and almost 4,000 of these work as technical or social scientists. Since its inception, CSIRO has successfully spun off more than 150 companies and maintains interests in 34 which continue to generate large annual income.

As Australia's national research agency, CSIRO's purpose is defined through the functions legislated in the Science and Industry Research Act (1949) of the Commonwealth Government which is (a) to carry out scientific research for any of the following purposes:

- (i) assisting Australian industry,
- (ii) furthering the interests of the Australian community,
- (iii) contributing to the achievement of Australian national objectives or the performance of the national and international responsibilities of the Commonwealth,

(iv) any other purpose determined by the Minister;

(b) to encourage or facilitate the application or utilization of the results of such research (CSIRO 2013). Australia's Parliament operates a bicameral system with a Senate comprised of the upper house, the Senate (76 members) and lower house, the House of Representatives (150 members). It is through this system that CSIRO formally reports directly to the Minister for Science and Research from the Senate.

To achieve the functions defined in the Act, CSIRO's mission is to *deliver innovative solutions for industry, society and the environment through great science that is used to make a profound and positive impact for the future of Australia and humanity*. CSIRO sets out to realise these goals through their National Research Flagships program which focuses on areas of national significance. Presently, there are eleven Flagships which focus on (in no order of priority) energy, climate adaptation, oceans, sustainable agriculture, preventative health, biosecurity, digital productivity, minerals, future manufacturing, water and food futures. Each Flagship has a number of research programs which address issues within their individual domains and often include the development of new technologies.

3 Technology Assessment and CSIRO

Because of its size and role in developing new technologies, one might expect that TA activities would be well entrenched in CSIRO. However, although there are some examples of TA occurring, the extent of this work is currently disjointed and many researchers do not even recognise the term. Expert TA (Griessler/Biegelbauer 2012) appears to feature most regularly as part of the development of new technologies in CSIRO but this does not necessarily occur in any systematic way. In addition, the inclusion of broader society through participation in TA activities has only recently started to occur, despite its importance in fulfilling triple-bottom line management outcomes, but there remain many researchers in the technical and engineering science domains that question the value of this. This is at odds with the more developed

methods from the European models of TA institutions where there is fundamental acceptance of the role of participation in TA (Hennen 1999).

With the increasing rate of scientific and technological change, there is an obvious need for Australian institutions to be able to systematically deal with these new developments. Particularly, as is the norm with TA institutions in other countries, to inform politicians and policy makers of the potential ethical, legal and societal issues arising from new technologies. Therefore, it appears that a more coordinated investment in TA by CSIRO represents a dual opportunity not only to increase CSIRO's science impact, but also to add value more broadly across Australia.

As Australia's most trusted scientific research institution (Swinburne University of Technology 2011), CSIRO is well placed to work towards developing and leading a more coherent strategy for TA in Australia. It has recently developed a foresight group which is applying its skills to respond to challenges being faced by a range of industries across a number of industry types (<http://www.csiro.au/Portals/Partner/Futures.aspx>). Most recently, this group has released a report on the latest Megatrends for Australia and is developing projections about the top ten technologies that may potentially disrupt our economic and social lives. Combining this information with the more participatory methods of CSIRO's social scientists would be a natural way to formalize the concept of developing an Australian TA institution, similar to those in Europe.

4 Trust, TA and a Potential Way Forward in Australia

Such a progression would also complement CSIRO's latest strategic plan (2011–2014). One of the five key objectives of this plan is that CSIRO becomes a Trusted Adviser to the nation, playing *a leading role in the trusted delivery of scientific evidence, advice and interpretation to the Australian government, public and industry*. The statement closely echoes the definition of TA provided by van Est and Brom (2012) who discuss the importance of analytic and democratic processes for informing public and political opinion. However, the challenge remains how to co-

ordinate CSIRO efforts, both internally and with other Australian research organizations. How to maximise the benefit to Australia without compromising CSIRO's independence and integrity?

Maintaining the trust and integrity within the TA process is extremely important for CSIRO as an organization, and for the perception of the technology assessment itself. European TA institutions appear to have managed any potential conflict of interest in assessing technologies being developed within the same institution, and CSIRO may learn from these models when establishing such a function in Australia. Appropriate governance and organizational structure arrangements, the autonomy of the TA function leader, and a steering group of learned experts from diverse backgrounds all appear to be important features of TA functions.

CSIRO is well placed to effectively position itself as Australia's TA coordinating body, not only through its connection to research and government institutions, but also through its connectedness with the wider Australian community. The potential to establish an Office of Science and Technology Assessment is not outside the realm of possibilities to enable greater links across Australia's whole innovation system. This would serve not only to add value to Australia but also provide an opportunity for Australia to connect to the broader international movement of TA practices, perhaps cementing the opportunity for a truly international TA organization.

Note

- 1) In the last budget round (2012-13), CSIRO's estimated research funding from the Australian Government was in the order of AU\$ 736 million (approx. € 530 million). CSIRO portfolio budget statement 2012-13. CSIRO, Canberra, Australia; <http://www.csiro.au/Portals/About-CSIRO/How-we-work/Budget--Performance/Portfolio-Budget-Statement-2012-13.aspx>.

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Contact

Peta Ashworth
Group Leader, Science into Society
CSIRO Earth Science and Resource Engineering
Queensland Centre for Advanced Technology
PO Box 883, Kenmore QLD 4069 Australia
Email: peta.ashworth@csiro.au

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