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List of attachments:

1. ATSE 2013, *Rethinking Linkages: Translating research into economic benefits for Australia*, Australian Academy of Technological Sciences and Engineering, Melbourne.
<http://www.atse.org.au/Documents/Publications/position-paper/translating-research-into-productivity.pdf>
2. ATSE 2014, *Rewarding researcher–industry engagement and collaboration: Developing an 'Impact and Engagement for Australia' (IEA) metric*, Australian Academy of Technological Sciences and Engineering, Melbourne.
<http://www.atse.org.au/atse/content/activity/innovation-content/developing-impact-engagement-australia-metric.aspx>
3. ATSE 2014, Submission to the Senate Standing Committee on Economics inquiry into the 'Tax Laws Amendment (Research and Development) Bill 2013', Australian Academy of Technological Sciences and Engineering, Melbourne.
<http://www.atse.org.au/Documents/Publications/Submissions/2014/r-and-d-tax-laws-amendment-bill.pdf>

ATSE Submission: Boosting the commercial returns from research issues paper

The Australian Academy of Technological Sciences and Engineering (ATSE) welcomes the opportunity to provide comment on the Australian Government's **BOOSTING THE COMMERCIAL RETURNS FROM RESEARCH** issues paper.

ATSE advocates for a future in which technological sciences, engineering and innovation contribute significantly to Australia's social, economic and environmental wellbeing. The Academy is empowered in its mission by some 800 Fellows drawn from industry, academia, research institutes and government, who represent the brightest and the best in technological sciences and engineering in Australia. The Academy provides robust, independent and trusted evidence-based advice on technological issues of national importance. ATSE fosters national and international collaboration and encourages technology transfer for economic, social and environmental benefit.

The effective translation of research to economic benefits will be at the core of Australia's future competitiveness and prosperity. Australia undertakes world-class scientific research through universities and other publicly funded research organisations, such as CSIRO, ANSTO, and AIMS. While improving the commercial returns from research does require significant attention, it is important that this does not come at the expense of fundamental scientific research.

Addressing barriers to collaboration

The **BOOSTING THE COMMERCIAL RETURNS FROM RESEARCH** issues paper correctly identifies many of the concerning issues that are adversely affecting Australia's ability to capitalise on our strengths in research. One of the most important of these is the poor collaboration between industry and publicly funded researchers. This may be attributed in part to current disincentives for university-based researchers to engage with businesses, as an unintended consequence of the Excellence in Research in Australia initiative (ERA).

The ERA exercise encourages university researchers to publish quality research, based on metrics such as citation rates, and rewards this behaviour by moderating allocation of approximately \$65 million per annum based on ERA outcomes. The behaviours that ERA drives in our university sector are even greater than might be anticipated from this scale of funding, demonstrating that a metrics-based approach can achieve important behavioural change. While research excellence is desirable in its own right, it is only one dimension of the research endeavour. The current system's weighting towards on research excellence is often at the expense of other important activities such as university-industry collaborations, entrepreneurial behaviour and knowledge transfer.

In August 2014, ATSE proposed an initiative – termed ‘Impact and Engagement for Australia’ (IEA)¹ – designed to encourage increased collaboration between Australia’s publicly funded researchers and business. IEA proposed using data already reported through ERA, including income received by universities from commercial and industry sources, patents and licensing, to create a metric of industry engagement.

A metric like IEA is intended as a counterbalancing measure to ERA to ensure that collaboration is appropriately recognised and rewarded alongside excellence, in line with the Government’s Industry Innovation and Competitiveness Agenda. It is likely that this will increase the return on the public investment in research in science, technology, engineering and maths (STEM) and humanities and social sciences (HASS). It is important to note that an IEA-like metric is proposed to work in parallel with ERA and does not imply a loss of value of basic, curiosity-driven research. The Group of Eight’s recently published **GROUP OF EIGHT: RESEARCH IMPACT BENEFITING SOCIETY** illustrates the fundamental importance of basic research to ongoing innovation and research commercialisation².

The concept of a metric to measure collaboration and engagement has received wide support from government, universities and other stakeholders. Importantly, the Forum of Australian Chief Scientists has endorsed the proposal, and the Queensland and South Australian Governments have expressed interest in their universities participating in a trial. ATSE is currently in discussions with the Department of Education on undertaking a project to develop detailed inputs, appropriate definitions for the assessment bands, and the methodology to be used to process the inputs into these bands. This work will demonstrate the feasibility of using these metrics to capture and reward the level of collaboration and knowledge transfer occurring in the Australian university research sector.

Commercialisation support programs

A major problem related to commercialisation support programs identified in the issues paper is that of scale. Insufficient scale reduces the overall effectiveness of a whole range of initiatives designed to support research, innovation and commercialisation.

However, the solution proposed of consolidating existing collaboration support programs to increase scale may be counterproductive. Programs must be sufficiently diverse to offer a range of appropriate niches for people seeking assistance to collaborate. Over-consolidation may end up making collaboration more difficult as options for seeking support become limited. Ideally there should be a full spectrum of programmes available from the Commonwealth and state governments that range from discrete researcher-led grants to full, multiple programme, multiple partner, user-driven research centres, such as CRCs.

¹ See attachment 1

² Go8, 2014, *Group of Eight: Research Impact Benefiting society*, Group of Eight Australia, <https://go8.edu.au/publication/go8-research-impact-benefiting-society>

To achieve sufficient scale in these programs requires that appropriate levels of funding be made available. Overall funding levels and adequacy of scale should be assessed regularly through careful analysis and consultation with participants – but without consistent, ongoing and adequate funding, programs designed to support collaboration and commercialisation of research will not reach their potential. The constantly changing landscape of these programs is a real impediment to researchers and industry.

An oft-cited example of a long-lived, well supported innovation support scheme is the Small Business Innovation Research program in the United States. SBIR has been in place for over 30 years, and delivers approximately \$2.5B per year in research contracts with the potential for commercialisation and public benefit. Each year, Federal agencies with extramural R&D budgets that exceed \$100 million are required to allocate 2.8 per cent of their R&D budget to programs that encourage domestic small businesses to engage in R&D that has the potential for commercialisation.

Evaluations of this program have found strong economic and employment outcomes, and it has been replicated in a number of other countries around the world. Importantly, the program has received consistent bipartisan support in the US. Australia should consider introducing a similar scheme, which must be supported by all political parties if it is to be successful. These and similar issues raised by the issues paper are dealt with in detail by the 2013 ATSE publication **RETHINKING LINKAGES: TRANSLATING RESEARCH INTO ECONOMIC BENEFITS FOR AUSTRALIA**.

Another key means to support research translation and commercialisation is through technology intermediaries. Technology intermediaries identify, connect and facilitate communication between parties at all stages of technological innovation, from research to product. This allows a better assessment of sharing the risks and rewards, determining where weaknesses lie and optimising the benefits of government intervention. Innovation intermediaries, preferably operating outside government but with government support, provide an effective means of creating networks and stimulating collaborations. Examples include technology brokers, incubators, accelerators and clusters. Intermediaries can help their clients to access government support, and can build links between industry and universities.

Other countries have implemented various models of technology intermediaries very successfully, including the UK's Catapult Centres and Germany's Fraunhofer Institutes. Examples of successful Australian intermediaries include the Victorian Centre for Advanced Materials Manufacturing (VCAMM) and the Small Technologies Cluster (STC). There is an opportunity to apply these models around Australia.

The issues paper also raises the issue of supporting collaboration through national research infrastructure funded under the National Collaborative Research Infrastructure Strategy (NCRIS). This is a valuable way to promote collaboration, as this kind of investment brings together researchers from academia and industry to work together on collaborative projects. NCRIS funding for shared research infrastructure that no single organisation could sustain on its own, and which can service a broad range of potential research programs, is invaluable.

Incentives

The R&D Tax Incentive is an important tool to increase business expenditure on research and development, including through collaboration with publicly funded research organisations. Any changes to this scheme should be formulated through a rigorous, evidence-based approach.

The current proposal before Parliament to limit the availability of the R&D Tax Incentive to businesses with less than \$20 billion income per year has significant potential to adversely affect its ability to encourage collaboration between industry and researchers. In addition, the proposed changes would lead to the unintended consequence of large companies potentially moving their R&D spending overseas. As most business R&D in Australia is conducted by large companies, this would have a major multiplier effect as it is the R&D personnel in large companies that form the receptors (or bridges) between industry and the academic and government-funded researchers. ATSE's position on this issue is laid out in a submission to the Senate Standing Committee on Economics inquiry into the Tax Laws Amendment (Research and Development) Bill 2013, attached for your information.

Other issues

Setting national research priorities is a worthy idea in principle, and the Chief Scientist has spoken extensively on the need for a national research strategy. However, Australia has a poor history of using research priorities effectively to improve our research translation. For industry and other end users of research, national priorities are almost irrelevant. Their criteria will always be dominated by their perceived need for the outcomes of research, and their commitment to invest time and money in commercialising and adopting these outcomes. Care should be taken when emphasising the importance of a set of national research priorities. There are a range of issues requiring attention to improve Australia's research commercialisation, and much effort may be expended on developing research priorities and the surrounding framework with little return on investment.

The Australian Council of Learned Academies' Securing Australia's Future program is currently planning a project to investigate international approaches to research translation and commercialisation. This project will address many of the issues raised in this paper and will highlight successful approaches overseas that may be adaptable for Australia. This project is planned to report in October 2015.

Concluding remarks

While many important points are raised in the **BOOSTING THE COMMERCIAL RETURNS FROM RESEARCH** issues paper, ASTE recommends that it would be most effective to prioritise a few areas on which to focus policy attention in the short term. Rapid changes to a wide range of programs and systems may risk damaging the confidence of researchers and industry. Any changes



should be undertaken in a focussed and consultative way, with provisions to assess the effects of these changes on the desired outcomes to inform further reform.

The issues raised here are of pivotal interest to ATSE, and the Academy has devoted considerable time and thought to how best to address them.