

University of Melbourne response to the *Boosting the commercial returns from research* discussion paper

Introduction

The University of Melbourne is delighted to offer a submission to the consultation on the *Boosting the Commercial Returns from Research* discussion paper. This submission makes a number of recommendations which support a system where Australia can leverage strong returns from research through immediate opportunities to commercialise discovery and technologies, as well as ensuring Australia continues to invest for the long-term in basic research, which provides the pipeline for future opportunity. Both taking the opportunities that research offers now and investing for the future are central to the nation's economic, social and environmental progress.

The research system and the role for government

For Australia to make the most out of the national research effort and realize the maximum commercial returns for both public and private sector investment, it is crucial there be dynamic partnerships between industry, public research organisations and government.

To foster the strongest possible partnerships, the research system must ensure synergy between basic and applied research to support four interlinked aims: making discoveries and creating new knowledge, developing new applications for existing research, training the research workforce of the future, and creating impact through commercialising research outcomes.

The Commonwealth Government has an important and distinctive role in the research system that helps to maximise this synergy. Any policy change should recognise three broad areas where government is best placed to intervene and deploy public resources. These three areas are:

1. directly investing in research, infrastructure and people, especially in the absence of private investment or where it is strongly in the national interest;
2. actively facilitating partnerships and collaboration;
3. creating strong legislative, funding and regulatory frameworks to support research, commercialisation, protection of intellectual property and application of new knowledge and new ideas.

While fundamental research ultimately drives commercial and translational outcomes, there is usually little incentive for significant private investment in it the short term. For this reason government necessarily has a strong role in supporting fundamental research. Similarly, government's role in supporting commercialisation and knowledge transfer of research is best targeted where market failure or other impediments exist to private investment.

Framing the discussion of commercialisation and commercial returns

How discussion around commercialisation and commercial returns is framed is important if optimal policy settings are to be established. Framing the discussion primarily on the ideas and IP that comes from research, as the paper does, misses the critical role of people and skills in coming together to transfer an idea to the marketplace. Instead of largely conceiving of the challenge as “better translation of research into commercial outcomes”, it is important to widen scope to “enable our most talented researchers to participate in the commercial development of knowledge/technology”. This shifts sole focus away from technology and IP, and onto skills and people as well.

A narrow focus on technology and IP implies a linear progression from research to development to commercialisation. In practice the pathway is rarely linear and often involves extensive feedback loops. Ensuring that policy is framed in such a way as to enable people, through skills enhancement or through fostering team/network development, to contribute productively at multiple stages of the development process, is more powerful than suggesting fixed stages through which ideas and knowledge must progress to outcomes.

Much of the discussion about boosting commercial returns from research fails to adequately distinguish between the two parts of Research and Development – they are so often linked in the acronym ‘R&D’ that it is easy to conflate the two. Hence, it is tempting to assume that by tweaking the incentives in the ‘research’ base, it is possible to deliver much stronger ‘development’ outcomes.

Such an oversimplification fails to properly acknowledge that the most important driver of a successful ‘development engine’ is excellence in the research base.

Australian researchers operate in a globally competitive environment where peer review is a key standard by which quality is measured. To fully participate in that global market for research and knowledge, Australia cannot disregard the importance of striving for excellence, supported by a robust peer review system.

To effectively harness opportunities to commercialise, the research system must build in incentives for both researchers and businesses alike. The discussion paper notes that a central way to provide incentives is through research funding mechanisms because these affect the behaviour of the whole system, from individual researchers and SMEs to large universities and global corporations.

To achieve the right balance between incentives, this submission argues that programs should be reformed, support should be maintained for basic as well as applied research, and that a process be developed to examine how measures of commercialisation success could complement measures of research excellence. This will deliver a system that foster active partnerships between industry, public research organisations and government.

Any new effort to change policy settings to boost commercial returns from research should:

- a) Be designed recognising that research often supports commercial outcomes rather than directly leading to them.
- b) Be attuned to the inherent complexity of developing measures of research impact and commercialisation success, while recognising the risks in the use of underdeveloped metrics, inappropriately applied.
- c) Not impede or remove elements of the research system that are necessary for delivering world leading research. That is, not throw out the good with the bad.

The following sections address some of specific proposals in the discussion paper.

Incentives for research-industry collaboration

The Government proposes to identify opportunities to adjust funding mechanisms to provide greater incentives for collaboration between researchers and industry. Key proposals are:

- modifying the rules for competitive research grants to appropriately recognise industry-relevant experience;
- develop research block grant arrangements that retain a focus on quality and excellence while supporting greater industry and end-user engagement; and
- leverage greater collaboration between publicly funded research agencies and industry, as well as consolidating existing programs that focus on collaboration with industry to increase their scale and effectiveness.

Recommendation 1: Initiate a robust process to develop research commercialisation and impact metrics, to complement existing measures of research excellence.

Excellence must sit at the centre of the research system if Australia is to maintain global competitiveness and provide a strong foundation for commercialisation. Acknowledging this, the effort to measure research excellence should be complemented where appropriate by metrics that capture the translation of research through commercial opportunities and impact.

To develop an appropriate metric, the Government should initiate a robust process with significant consultation to propose appropriate measures that capture commercialisation outcomes and research impact. Critical through this process will be clearly defining what activity the metric intends to capture and to what end. Careful design is need to avoid unintended consequences were such a metric is used to drive any funding.

A recent proposal by ATSE to create a measurement of impact using HERDC data is an example of why it is critical that any new measure be properly nuanced for maximum effect and to avoid unintended consequences. While the simplicity of the ATSE proposal is attractive on one level, its use of limited aggregate income metrics means it may fail to capture the full range of commercialisation and engagement activities. Simple metrics may not adequately look to other important indicators and outputs such as co-authorships between academia and industry, the value of licensing agreements and licensed patents, as well as the value of consultancy, contract and commercial funding.

Recommendation 2: *The Government should reform the Research Infrastructure Block Grants (RIBG), the Sustainable Research Excellence (SRE) and the Joint Research Excellence (JRE) programs so that they are allocated to best support their intended focus.*

Although the full cost of publicly funded research is not met by Government, the research block grants are the primary mechanism by which the essential indirect costs of research are met. They are not a genuinely flexible pool of funds that can be redirected without consequence. Research block grants are critical to supporting the research effort, playing a vital role in assisting research organisations to meet indirect costs, even when industry partners are involved.

For this reason, success in Government granting programs should remain the principal driver of the RIBG and SRE programs. It is likely that any new measures of commercialisation success and end user engagement would most appropriately be incorporated into JRE funding and would complement rather than replace the existing measures of research excellence. However, as the previous recommendation has made clear, it is critical that a robust process be undertaken to assess the utility and application of any new metric.

Future review of the block grants should ensure each program has appropriate focus: the SRE program should focus on excellence, and the RIBG on supporting the indirect costs of research and the JRE on engagement.

Any modification of the block grants must be undertaken with a view to how the entire research system fits together, as well as the incentives that exist for all types of research organisations, including universities, governments, non-government and commercial enterprises. Tweaking one part of the system, such as the block grants, without a view to the whole system risks compromising research excellence, and will have wide ranging consequences for Australia's research effort, including translational and applied research.

Recommendation 3: Foster greater industry engagement with competitive grant programs and harness industry-relevant experience for research by supporting programs such as ARC Linkage and NHMRC collaborative programs.

Alongside supporting ARC Linkage and NHMRC programs for greater linkages with industry, existing rules must be maintained for all other grant schemes that are focused on building a foundation for research excellence.

The Commonwealth Government should not modify the existing rules for ARC Discovery or NHMRC project grants which recognise the research excellence that underpins successful industry engagement.

Any future modification to competitive grant programs must recognise that competitive funding *does not* cover the full cost of research and that indirect costs are usually borne by the research institutions, even in the case where industry is a research partner.

Recommendation 4: The Government should develop a program to provide incentives and support for commercialisation for both industry and research organisations.

Incentive to improve the capacity of universities to engage with industry, such as modest funding to support ‘mid-pipeline’ translation of research into viable commercial outcomes, is an important future policy reform. This would be particularly focused on *proof of concept* studies. The quantum of funding required would be low compared to the proportion of total research funding, and can be administered transparently and with full accountability through EIP. The experience overseas, such as the UK’s Catapult program, shows the importance of well-targeted programs to foster commercialisation and industry collaboration.

THE CATAPULT PROGRAM IN THE UK

The Catapult Program began provides a useful example of how leading research systems internationally are tackling the challenge of commercialisation. The program began in 2010, when UK Prime Minister David Cameron announced that as part of its strategy to stimulate innovation and growth, the Government would invest over £200m over four years in a network of ‘technology and innovation centres’. These were created and overseen by the UK’s innovation agency, the Technology Strategy Board. Catapults are challenge-led, helping businesses to innovate by developing new solutions and products to meet current and future market needs.

A ‘third stream’ of funding, separate from that which supports the research base, can create appropriate incentives for universities to commercialise research. This third stream, which has been implemented with significant impact in the UK for over a decade now, would allow for local needs and opportunities to shape the way that individual universities choose to invest, but would nonetheless apply careful metrics to assess the impact achieved by universities. Whilst initial allocations would need to be made in a relatively formulaic manner, over time the allocation of funds would increasingly be determined by their outcomes, such that the institutions that invested most wisely would secure an increased proportion of future funding.

HARNESSING VENTURE CAPITAL: FIBROTECH

A good example of why support for early and mid-stage development can pay large dividends for the Australian economy is the Australian biopharmaceutical company Fibrotech.

Fibrotech is developing a new class of drugs to prevent a massive health burden associated with fibrosis (tissue scarring). The Company develops novel anti-fibrotic drug candidates for the treatment of the fibrosis prevalent in such chronic conditions as chronic kidney disease, chronic heart failure, pulmonary fibrosis and arthritis.

It was initially funded by Uniseed, a venture fund operating at the Universities of Melbourne, Queensland and New South Wales, with investment capital provided by the three universities and AustralianSuper.

In May 2014, Fibrotech announced that it has reached an agreement with Shire Plc, the global specialty biopharmaceutical company, under which Shire has agreed to purchase Fibrotech for an upfront payment of \$75 million. This is a good example of how venture capital can be employed to generate strong businesses harnessing Australian research. However, venture capital opportunities in Australia are rare in and result in missed opportunities for research commercialisation.

Recommendation 5: To complement existing opportunities, the Government should develop additional incentives to encourage academic secondments to industry and industry-based postdoctoral opportunities.

This will achieve greater knowledge and technology transfer between the nation's universities and industry, recognising that there are at times strong incentives in academic cultures *against* engaging with industry. This mechanism must fund the full salary and support costs for academics for the full duration of the secondment, even if this means less secondments overall. The Government should develop a program of industry postdocs, learning from the experience in other countries such as Germany and the US.

INTERNATIONAL EXAMPLES OF INDUSTRY POSTDOCS

In Germany, industry based and supported funding makes up two thirds of all research and development support. Businesses often work closely with the global network of Fraunhofer Institutes and the German Federation of Industrial Research Associations (AiF). As part of this integration with the research system, many companies offer 'industry' postdocs. The German Government supports early career researchers moving into industry and provides useful tools to help match postdoc opportunities with early career researchers, such as through government websites. (An English language description of postdoc opportunities can be found at the government website research-in-germany.de).

Supporting research infrastructure

The Government proposes to build mechanisms so that infrastructure facilitates increased collaboration between researchers and industry by:

- strengthening the existing focus of the NCRIS on outreach to researchers and industry;
- undertaking a reassessment of existing research infrastructure provision and requirements, in line with the recommendations of the National Commission of Audit; and
- developing a roadmap for long-term research infrastructure investment, in consultation with the research sector and industry.

Recommendation 6: Provide certainty for infrastructure investment and develop the roadmap.

The Government should provide funding certainty for current research infrastructure over the forward estimates to best leverage previous investment. As well an ongoing program aimed at fully funding substantial pieces of infrastructure that are essential to breakthrough discoveries should be developed.

VICTORIAN LIFE SCIENCES COMPUTING INITIATIVE

A good example of why it is important to invest in research infrastructure that is accessible and open to a variety of research partners is the Victorian Life Sciences Computing Initiative (VLSCI). This supercomputer facility gives researchers access to a powerful tool to help them solve some of the biggest challenges facing the State's health system and impacting on our quality of life. Life scientists and computer scientists are forming exciting collaborations to improve diagnostics, find new drug targets, refine treatments and further our understanding of the major diseases affecting our community: cancer, epilepsy, genetic disorders, infectious diseases and eye disease, among others. The collaboration with IBM further enhances Victoria's reputation as a global centre for excellence in life sciences research capabilities.

Increasing industry relevant research training

The Commonwealth Government proposes greater opportunities be made available for industry relevant research training, provision of industry and business relevant skills, and recognition of PhD candidates with existing industry experience.

Recommendation 7: Reform the Research Training Scheme and Australian Postgraduate Awards (RTS and APA) to focus on excellence while providing industry relevant experience.

The Government should provide universities with flexibility to use Australian Postgraduate Awards to support the development of further transferable skills during research training (PhD/Masters). These skills might include project management, IP management and business skills. Government should provide financial incentives for universities and industry to partner in training focusing on key industry problems and opportunities.

This should occur where a suitably mature environment for research exists in industry, and where the universities have a commitment to research training involving industry. As with industry postdocs discussed previously, government can provide useful support and incentives to facilitate internship opportunities. These would be tailored to different disciplines.

To ensure the most is made of initiatives that provide industry relevant experience, both universities and industry co-invest in any new industry focused training program. In reforming the doctoral programs there are useful lessons to learn from the US and Germany. Government can usefully work with universities and industry to develop new mechanisms, such as websites, that are able to match PhD candidates or recent doctoral graduates with opportunities to work with, and in, industry.

Government should also work with universities to develop current or further programs that support direct research translation by assisting PhD candidates to translate their research via spin-off or start-up companies. The competitive Innovation Corps Program, run by the National Science Foundation in the US, is an example of a successful program. It up-skills PhD candidates and partners them with experienced entrepreneurs, leveraging existing funding programs while assisting with follow-on programs. Such an approach helps to build an entrepreneurial culture and ecosystems within universities.

THE MELBOURNE ACCELERATOR PROGRAM

The Melbourne Accelerator Program (MAP) was established in 2012 to assist start-ups and provide an environment of creativity, courage and innovation for entrepreneurs. Accelerator activities revolve around the dedicated support provided to Entrepreneurial Fellows. This includes funding, unparalleled networking opportunities and formal mentoring. In the last two years MAP has evolved beyond an accelerator into the most comprehensive entrepreneurship program in Australia with a range of activities to support entrepreneurs of all abilities.

The Program has already produced some significant success with several of the new ventures able to raise several million in venture capital. Including the successful crowd funding of SwatchMate, a device that instantly captures colour and displays it wirelessly on a paired smartphone or computer, and Venuemob, which has raised \$1m in funding and grown their team from 3 to 19 with staff in Melbourne and Sydney.

Summary of recommendations

1. Initiate a robust process to develop research commercialisation and impact metrics, to complement existing measures of research excellence.
2. Reform and refocus the Research Infrastructure Block Grants (RIBG), Sustainable Research Excellence (SRE) and the Joint Research Excellence (JRE) programs so that they are allocated to best support their intended focus.
3. Foster greater industry engagement with competitive grant programs and harness industry-relevant experience for research by supporting programs such as ARC Linkage and NHMRC collaborative programs.
4. Develop a program to provide incentives and support for commercialisation for both industry and research organisations.
5. To complement existing opportunities, develop additional incentives to encourage academic secondments to industry and industry-based postdoctoral opportunities.
6. Provide certainty for infrastructure investment and develop the roadmap.
7. Reform the Research Training Scheme and Australian Postgraduate Awards (RTS and APA) to focus on excellence while providing industry relevant experience.