

Boosting Commercial Returns from Research

Submission by Australian Institute for Bioengineering and Nanotechnology (AIBN)

Introduction

AIBN is Australia's premier multidisciplinary institute focused on the development of technologies and products arising from the exploitation of nanotechnologies and biotechnologies. The institute is located in a purpose-built, state-of-the-art facility at the University of Queensland. It is a translational research institute, with a strong focus on engagement and collaboration with industry. In addition to collaborative research and development projects with industry, the institute runs an active Industrial Affiliates Program (IAP), which provides project-independent opportunities for AIBN researchers to engage with representatives from industry. AIBN's core objectives include:

- Excellence in research related to biological and nano technologies applied to health, industrial and environmental issues
- Results leading to advances in knowledge, products and processes
- Collaborative links to leading research groups and companies
- Working with industry to address real issues in the market

AIBN's objectives align completely with the Government's objective of boosting the commercial returns from research and AIBN welcomes the opportunity to comment on the government's proposed initiatives in support of this important objective.

Executive Summary

Strong connections between industry and academia are a critical component for a healthy innovation system. According to the 2014 Insead Global Innovation Index (GII) [\[LINK\]](#), Australia ranks 48th out of 143 countries in the world in its innovation linkages. There is a desperate need to improve this situation and it is appropriate that the proposed initiatives outlined in the discussion document "Boosting the Commercial Returns from Research" are heavily directed towards increasing the level of engagement between researchers and industry.

AIBN takes a positive view on many of the proposed initiatives in the Government's discussion document:

- AIBN agrees that industry experience and end-user engagement should be recognised in the rules for competitive grants and arrangements for research block grants. However, more fundamental changes to the scope of research grants are required to address the gulf between research and industry; grant schemes need to be expanded in scope to provide support for industry-relevant development and proof-of-concept activities. AIBN believes that the R&D incentive should not be used to force collaboration between industry and researchers but could be enhanced to encourage collaboration.
- AIBN supports a strengthening of infrastructure programs such as NCRIS so as to enhance engagement between industry and researchers. It recommends that financial support (such as voucher schemes) could facilitate access to research infrastructure by smaller companies.
- AIBN does not support direct Government involvement in IP management. Instead, AIBN suggests that the Government should provide incentives for universities, research institutes and public research bodies to improve existing IP management and technology transfer processes. Promotion of entrepreneurship and removal of bureaucratic barriers is critical for enhanced engagement between researchers and industry.
- AIBN supports initiatives to increase industry relevant research training and enhance the flow of people between industry and academia. AIBN suggests that incentives for the creation of innovation precincts are a mechanism that could be implemented in support of this initiative. AIBN also recommends that re-activation and expansion of the researchers-in-business scheme should be considered.
- AIBN agrees that improved metrics for researchers that take into account engagement, knowledge transfer and economic / societal benefit are required in addition to traditional scientific and academic metrics. AIBN strongly supports the ATSE proposal for implementation of an Impact and Engagement for Australia (IEA) metric as a readily achievable complement to the ERA metric.
- AIBN supports the Government's proposal for a Medical Research Future Fund (MRFF). However, it believes that such a fund should be heavily directed towards 'downstream', product-focused and translational research.

Detailed responses

This submission provides commentary on each of the initiatives described in the policy document:

Creating stronger incentives for research-industry collaboration

The Government will identify opportunities to adjust funding mechanisms to provide greater incentives for collaboration between researchers and industry. To achieve this outcome the Government is seeking input from the research and end-user community on opportunities to:

modify 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;

leverage greater collaboration between publicly funded research agencies and industry;

consolidate existing programmes that focus on collaboration with industry to increase their scale and effectiveness; and

consider whether the R&D Tax Incentive sufficiently encourages collaboration between industry and researchers.

AIBN comments:

Industry and academia work on fundamentally different timelines. As a gross generalization, industry needs a particular problem to be solved 'today', while academia would like a multiyear research grant to study the problem. This gulf needs to be bridged if there is to be greater collaboration between researchers and industry.

AIBN agrees with the idea of modifying the rules around competitive research grants to give appropriate recognition for industry-relevant experience, and modifying block grant arrangements to encourage engagement with industry and end-users. However, these changes do not really address the underlying gap between researchers and industry / end-users.

The reality is that the current funding schemes largely do not allow for research to be developed to a level where it is ready for industry. This is true even for grants like ARC Linkage, which require active participation (i.e. cash) from an industry partner. ARC Linkage projects, in order to be funded, need to be directed at fundamental scientific issues of peripheral interest to the commercial partner, with careful avoidance of near term commercial utility. As a result, the researcher and industry partner can end up with a project that is contrived to meet the program rules, without necessarily meeting the needs and interests of either party. Thus, a scheme that

is designed to encourage interaction between researchers and end-users can actually help perpetuate the gap between them. NH&MRC Development Grants do not operate under the same constraints; however the amount of funding for these grants is small compared to Project and Program Grants, which fund much earlier stage research.

An obvious way of using the current funding schemes to enhance engagement between researchers and industry would be to support development and proof-of-concept activities, either by redirecting some of the existing funds or, preferably, expanding the overall pool of funds for these activities. Again, as a gross generalization, researchers follow the money while industry follows the products. Providing funds for projects directed towards product concept / proof-of-concept would create common territory for researcher and industry interests. Further, it would drive real communication between the two parties, with significant cross-leveraging of knowledge, skills and experience.

Another mechanism for helping the existing grant programs become more relevant to industry would be to expand the peer review process for grant applications to include reviewers with *bona fide* industry experience. Academic reviewers cannot (and cannot be expected to) consider the real development and commercialisation potential (and challenges) of research projects. Inclusion of industry-savvy individuals in grant review panels would encourage applicants to take industry-relevance and the requirement for end-user engagement seriously.

In respect to potentially modifying the R&D tax incentive scheme to enhance collaboration between industry and researchers, it is important to recognise that this is a world-leading scheme that is critical to the local innovation system. For the scheme to be effective, long-term stability is essential. Even the perception of potential changes to the rebate can act as a deterrent to investment. The R&D tax scheme provides *partial* compensation to companies for doing the R&D to which they believe is the right R&D for the company. If researchers are working in areas directly relevant (in focus and timing) to the company, then the company will choose to engage. If not, the R&D tax incentive should not be used to artificially force collaboration, since this would push companies to undertake R&D that is not necessarily the 'right' R&D for the business. However, some form of bonus incentive that provides a positive inducement for increased private / public collaboration could be considered, *as long as it is an enhancement to, not at the expense of, the current R&D tax incentive scheme.*

Supporting research infrastructure

The Government will take steps to ensure that research infrastructure facilitates increased collaboration between researchers and industry. To achieve this outcome the Government is seeking to:

- *strengthen the existing focus of the NCRIS on outreach to researchers and industry;*

- *undertake a reassessment of existing research infrastructure provision and requirements, in line with the recommendations of the National Commission of Audit; and*
- *develop a roadmap for long-term research infrastructure investment, in consultation with the research sector and industry.*

AIBN comments:

Ongoing support to infrastructure programs by the Australian Government is essential to a healthy innovation system. Research, development and commercialisation of science-based products requires access to state-of-the-art facilities and equipment. High technology equipment can cost tens to hundreds of millions of dollars, well beyond the reach of single institutions or companies (particularly small companies). Without schemes such as NCRIS to provide centralised access to high cost instrumentation and capabilities, the Australian research community (both public and private) would be forced to access these facilities overseas. This would provide a further inducement for Australian researchers and research-intensive companies to consider relocating overseas (in addition to access to capital and other considerations). The inclusion of \$150million for NCRIS in the 2014/15 federal budget was a positive step, however this is a program that requires long-term, bipartisan support.

There are two key challenges impacting on industry's ability to engage with researchers in the context of research infrastructure: firstly, knowing how and where to access the infrastructure; secondly, particularly for small companies, paying for access. The first issue could be dealt with via databases or registries that are readily accessible to industry. The second requires a financial solution. Research infrastructure within universities and research institutes is viewed as just that, research infrastructure. It is accessible at academic rates to academic researchers. However, access to industry is at commercial rates. For a small company in particular, this can create a substantial, if not complete, block to accessing research infrastructure. One potential way of addressing the problem would be to institute a voucher program (similar to the technology access voucher schemes of the Victorian Government) to cover modest access to publicly funded research infrastructure. Initial engagement between industry and researchers in the context of infrastructure access would enhance the prospects of engagement in a broader context at a later stage.

Providing better access to research

The Government will put in place arrangements to provide industry and other end-users with better access to research. To achieve this outcome the Government is seeking to:

- *strengthen IP guidelines for researchers;*
- *examine the potential to link research funding to the dissemination of IP;*

- *establish an online point of access to commercially-relevant research for business; and*
- *develop a whole-of-government policy to open up access for business and the community to publicly funded research.*

These proposals will be supported by the release of an IP toolkit which will provide guidance to simplify discussions relating to IP between researchers and industry.

AIBN comments:

Entrepreneurship rather than bureaucracy is one of the keys to encouraging engagement between researchers and industry and to driving commercial outcomes from research. It's hard to see how interposing government in the process is going to enhance rather than hinder engagement. Universities, particularly through their commercialisation companies and technology transfer offices (TTOs), already provide IP support to their researchers and also serve as an identified contact point for business to access academic research.

However, one of the bottlenecks for private / public research collaboration can often be the TTOs in the public sector research provider. The Government should use its funding power to ensure that publicly funded research organisations are actively encouraging open access and collaboration between their researchers and their counterparts in the private sector. Public sector organisations should have to provide audited data, either in the HERDC or Research Commercialisation returns, to demonstrate active collaboration between their researchers and their private sector counterparts.

In addition, the Government could provide incentives for universities, research institutes and public research bodies to remove barriers to engagement and to encourage entrepreneurship. Unfortunately, these institutions tend to be conservative, bureaucratic and risk-averse, all of which are anathemas to entrepreneurial behaviour. Institutions with 'best practice' IP policies, technology transfer processes, engagement activities, etc. should receive benefits to further encourage these practices. Recognising and rewarding outcome-orientation and industry engagement via Government funding mechanisms (such as block grants) is more likely to have a positive impact on the dissemination of IP than initiatives such as an IP toolkit or an on-line access point for commercially-relevant research.

Increasing industry relevant research training

The Government will take steps to ensure that the research workforce is equipped to work with industry and bring their ideas to market. To achieve this outcome the Government is looking to provide greater opportunities for industry relevant research training, provision of industry and business relevant skills, and recognition of PhD candidates with existing industry experience. These issues will be a focus of a review of research training arrangements which will be informed by consultation with the research sector and industry.

AIBN comments:

Career pathways for researchers in industry are poorly developed in Australia, so industry training is both limited in supply (from industry) but also in demand (from researchers). One reason for this is the relative shortage of companies in research-intensive industries. A vibrant innovation system would be characterized as having a core of established, research-based companies that employ (and train) new graduates, surrounded by start-up companies and service providers that provide ongoing and diversified career opportunities. Such innovation precincts are characteristic of successful innovation ecosystems (e.g. Boston and San Francisco for life sciences, Silicon Valley for IT).

Internationally, innovation precincts have been effective vehicles for fostering interaction between researchers and industry, particularly by providing a rich and vibrant environment for startup companies. Innovation precincts put technology suppliers (i.e. the researchers) in close proximity to the customers and end users of the technology. Australia is largely devoid of such precincts.

Government (both Federal and State) could play an active role in redressing this situation. For example, governments could require company “incubators” to be incorporated into any new hospitals, research institutes or technology facilities that receive public funding. They could also provide financial incentives for universities and research institutes to create incubator space. The Federal Government could offer taxation or other incentives for established companies to offer incubator space and access to facilities and equipment to start-up companies. The recent initiative by the NH&MRC for the recognition of Advanced Health Research and Translation Centres [\[LINK\]](#) is a step in the right direction. Likewise, the Government’s Industry Growth Centre initiative could help create innovation centres. However, local innovation precincts are required as well as national growth centres. There should be an obligation on research-intensive institutions to play an active role in creating, supporting and encouraging local innovation precincts and/or technology incubators.

Another aspect of the problem in Australia (unlike the US and elsewhere) is that there are limited opportunities for back and forward flow between industry and academia. Any significant time out of academia is seen by Australian researchers as being detrimental to their academic career, particularly with respect to their publication track record and its resultant negative effect on grant success. Changes to the systems for reward, recognition and promotion of academic researchers are needed to encourage academics to at least consider spending time in industry. As proposed in the Government’s policy document, recognition of industry-relevant experience in the assessment of applications for competitive grants would go some way to redressing the problem.

Programs such as a revamped and expanded version of researcher-in-business are required to provide financial inducements for two-way flow between industry and academia. This is

particularly important for early and mid-stage researchers who are unlikely to receive encouragement to explore career options in industry from their academic supervisors in the absence of supporting Government programs. The Government should consider re-activating the researchers-in-business program and expanding it to allow eligibility for start-up companies to participate and personnel exchange from business to research. It is not clear whether an improved version of researchers-in-business falls within the scope of the yet-to-commence Industry Skills Fund.

Finally, there are also other mechanisms for providing industry exposure to researchers that will enhance the prospects for the commercialisation of research. Scientific Advisory Board (SAB) membership, active participation in industry organisations, consulting to companies, and the like, are all important ways in which researchers gain insights into end-user issues. They also create opportunities for two-way dialogue between researchers and industry, potentially leading to the flow of information, ideas, technology, (and people). The Government could consider ways to encourage this kind of engagement. SAB membership, etc. could be recognised and taken into consideration for senior academic promotions; likewise it could be considered as part of a researcher's "track record" in grant applications. Companies could be provided with incentives to create SABs that include Australian-based researchers, again possibly through a revamped researchers-in-business program.

Measurement of outcomes

The Government will work with the research sector and industry to improve assessment of the research system, including improved metrics on engagement and knowledge transfer with industry, as well as research outcomes and impact.

AIBN comments:

If the Government wants to encourage researchers to engage with industry, it is essential that the recognition, reward and promotion systems for academic researchers are revised and expanded. If industry engagement is seen by researchers as a key factor for grant success and career advancement, then it will drive that type of behaviour.

Currently, grant success and promotion is linked almost exclusively to scientific outcomes. The primary metric of scientific publications, while readily quantifiable, is a poor indicator of societal and economic benefit. Indeed, by being forced to focus on publications, academic researchers are discouraged from undertaking activities that will lead to societal and economic benefit, to the extent that time and effort devoted to the latter is at the expense of the former.

There is a real need for engagement, development and commercialisation outcomes to research projects to be valued as highly as (if not more highly than) academic outcomes. The ERA assessment needs to be expanded (or complemented by another assessment index) to recognise outcomes that have societal or economic benefit. The recent proposal from ATSE

[\[LINK\]](#) to create an Impact and Engagement for Australia (IEA) metric to complement the ERA would be a significant and straightforward step in the right direction. AIBN strongly endorses the ATSE proposal.

Capitalising on the Medical Research Future Fund

The Government will ensure that the new Medical Research Future Fund supports collaboration between researchers and industry and drives the uptake of Australian medical research.

AIBN comments:

AIBN supports the idea of a Medical Research Future Fund (MRFF) that will ultimately double the Government's investment in medical research. However, such a fund should not represent "more of the same" in terms of granting schemes. If the creation of an MRFF is going to help boost the commercial return from research, then it is essential for a substantial proportion of the fund to be devoted to 'downstream' research, i.e. proof-of-concept, product-focused development and early stage commercialisation. *Investing more heavily in early stage research without addressing the deficiencies in the translation process will actually reduce the rate of commercial return from research (i.e. the level of commercial outputs will not increase at least in proportion to the increased level of inputs).*

One matter that cannot be overemphasised is that, in order to boost the commercial returns from research, there has to be a stable innovation ecosystem. Research, development and commercialisation activities are long-term endeavours and must be underpinned by stable, long-term government policies. Australia's innovation system has suffered (and continues to suffer) from a lack of stability due to the highly partisan nature of Australian politics.

In conclusion, AIBN agrees with the Government's objective to boost the commercial returns on research and is largely supportive of the initiatives proposed in the Government's discussion paper. However, some of the initiatives need to be reconsidered in order to ensure that they appropriately address the underlying issues and don't impede rather than support the objectives. It is essential that initiatives have bipartisan support and are implemented in the context of a long-term vision to create a stable innovation ecosystem.

We would welcome the opportunity to discuss this submission in person with representatives from the Department of Education and Department of Industry.

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