Australian National University

University Research Commercialisation Consultation

Response from The Australian National University

Office of the Deputy Vice Chancellor (Research & Innovation)
+61 2 6125 2900
eo.dvcr@anu.edu.au

The Australian National University
Canberra ACT 2601 Australia
www.anu.edu.au

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Summary of Recommendations

- ANU supports the development of a Government scheme that will improve the translation and commercialisation of University research outputs.
- We recommend that Australia consider modelling the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs that have been driving innovative research in the USA for decades.
- We recommend establishing a Translational Research Fund (non-medical) that encompasses a range of programs that assist transition along the risk pipeline from basic research to initial proof-of-concept led by Universities with industry partners.
- We recommend further developing and supporting assistance programs that focus on talent development for future industry workforce requirements.
- We recommend that governance arrangements mirror those of the current Growth Centre initiative with the board structures created for the Growth Centres migrated into management and governance structures.

Mission-driven research

The Australian National University (ANU), as a research-led education institution, plays a crucial role in developing and supporting the Australian innovation system. Successfully translating publicly funded fundamental research into direct economic and social impact is key to building our international standing and attracting the best staff and students. Providing educated graduates to meet commercial, social and environmental needs of the nation; and directly engaging with business, industry and government to address problems that restrict productivity and growth are areas that demonstrate relevance for the University.

Mission-driven research is an appropriate approach to address national priorities as set by the Federal government. However, mission-driven research should be focused on issues of national importance, including a long-term approach to new industry development, as opposed solely supporting immediate commercial or market-led outcomes. Delivered appropriately, mission-driven research can deliver societal impacts by lowering the bar for University-industry collaboration and drive innovation by de-risking these collaborations for all participants.

ANU supports the development of a Government scheme that will improve the translation and commercialisation of University research outputs. Research Intensive Universities use a variety of mechanisms to assist translation of research. At ANU, we have established a number of different initiatives including Translational Fellowships and Innovation Institutes focussed on areas of National interests (eg, AgriTechnology, Space, Precision Medicine).

Example: Centre for AgriTechnology (CEAT)

CEAT was built with grant funding from the ACT Government and ANU and seeks to utilise ANU's interdisciplinary capabilities to address complex issues facing the sector and is achieving this by
(a) growing an ecosystem where agri-tech solutions are co-created, tested, translated (some to commercialisation) and adopted;
(b) building partnerships with industry, researchers and government;
(c) forming Innovation Project Teams (made up of students and/or staff) to develop solutions to complex agri-tech sector challenges;
(d) increasing the capacity of ANU for industry engagement through investments that encourage more ANU researchers to work on projects of relevance to industry;

(e) forming relationships with networks and institutes to share knowledge and identify innovations;
(f) engaging in policy debates on the drivers and consequences of transformational change in agriculture

As University funding becomes tighter the flexibility for universities to invest in these types of initiatives will come under significant pressure. The existence of a major Commonwealth push to support commercialisation and translation is therefore increasingly important.

To achieve sustained growth through innovation requires a decadal strategy. The UK's Lambert Review into University Business Collaboration set the foundation for the enhanced role of Universities in driving an innovative economy. The 2015 National Science Innovation Agenda attempted to establish a framework for Australia and its aspirations remain valid. The criteria for missions should cover a range of social, cultural and environmental priorities beyond lifting productivity and economic growth. Mechanisms to stimulate collaboration between the research community and industry must recognise that economic benefit can be derived through routes other than commercialisation, and that social impact and translation also has a key role in driving innovation and productivity.

Stage-gated Scheme design

We agree there are merits to stage gated approach to a commercialisation development program led by industry that drives industry collaboration with research institutions. **We recommend that Australia consider modelling the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs that have been driving innovative research in the USA since 1982.** The SBIR and STTR programs encourage small businesses to engage in R&D with the potential for commercialisation. A key aspect of the STTR program is collaboration between small businesses and research institutions. The STTR program requires small business to collaborate with a research institution in Phase I and Phase II to bridge the gap between performance of basic science and commercialisation. Together, these programs enable small businesses to explore innovative research and proof-of-concept development.

Key characteristics of a successful scheme in Australia model key aspects of the SBIR/STTR programs that are not integral to current Australian commercialisation grant and support programs. These characteristic include:

1. Competitive application process with review committees with specific domain expertise including representatives from University commercialisation offices, government agencies and industry
2. Eliminate or minimise the requirement for matching funding in the initial feasibility stages
3. Minimise the requirement for trading history and matched funding for start ups spun out of Australian universities that are focused on commercialising University intellectual property
4. Projects should not be required to have a significant market impact within 5 years of project completion. Such time constraints on market impact limit long-term development and returns on significant, new innovations. However, successful projects should target and demonstrate of commercialisation outcomes including achievement of significant investment or industry partnerships that underpin market development to move from early to later phases of funding.

Incentives for participation

We need to regard the path from University expertise to commercial and societal impact as a risk path. Universities undertake high risk, exploratory research which needs to be fully funded by government.

Financial investors want to invest in lower risk, managed opportunities. The translation from University research to commercial return therefore needs to be managed along the risk path.

There is a well-recognised 'valley of death' which needs to be crossed if Australian industry is to adopt new technologies. There are nine broadly agreed levels of Technology Readiness (TRL) and levels 1 – 4 will require government intervention to mitigate risks and move knowledge and IP to a point where companies and capital markets are willing to invest.

Given the Australian industrial base we need to recognise that market pull from Australian businesses will not be sufficient and we need to stimulate new company formation and support technology push and new market creation.

A comprehensive set of coordinated government programs therefore are needed to stimulate the risk path pipeline. Steps have been taken in the health and medical science research sector which is fragmented across NHMRC, MRFF and to a lesser degree ARC funding. This then feeds into the MRFF BTB program, MRCF and the BTF for commercialisation. Non-medical research is funded through ARC, CRC, Development Corporations, ARENA with no dedicated government supported down-stream programs; this omission in this translational step in the pipeline has resulted in a reduction in Australia's capacity to translate research to industry.

For the last 40 years governments around the world have introduced similar programs to stimulate an innovation driven economy that leverages off the investment in the university research sector. Evidence demonstrates that the keys to success are the scale and consistency of such support over a decade or longer. We need to change a culture at a national level, and this requires consistency of policy. This has been one of the biggest issues in Australia to date in particular with many commercialisation support schemes. Delivering real outcomes takes time and a framework that is consistent and enduring such that all stakeholders can de-risk decisions about contribution and participation. Programs will be reviewed and updated depending on current environment but the framework needs to be robust and consistent

Further to a stage-gated scheme to driving commercialisation of Australian intellectual property, we also recommend establishing a Translational Research Fund (non-medical) that encompasses a range of programs that assist transition along the risk pipeline from basic research to initial proof-of-concept led by Universities with industry partners. These programs (outlined below) fall into two key categories:

1. Knowledge Access Partnerships
2. IP Exploitation and Commercialisation

Knowledge Access Partnerships:

- ***Linkage Program***: The ARC ***Linkage Program*** has provided the base line mechanism for University researchers to engage with business and industry. The program needs to be increased in total fund size and individual grants. It is important to retain the University partner as the applicant supported by industry partner. The program should maintain a rolling application process with an assessment time cycle of approximately 3 months. Matching industry funding should be at least 25% of the project funds which can be in-kind with NO expectation of University providing matching funds. A program of this nature is essential at the early stage high risk end of the risk pipeline.

- ARC Centres of Excellence are focused very much about the excellence of research undertaken from an academic point of view. To achieve this powerful collaborations are built across research institutions. Whilst this should not be diluted, having a component of CoE funding linked to application and translation will orientate some of the research into exploitable IP, feeding into other programs. This would be particularly the case in the last three years of funding.

- ***Knowledge Transfer Partnerships***: There are a number of "knowledge transfer" programs around the world. The Knowledge Transfer Partnerships (KTP) in the UK https://ktn-uk.co.uk/programmes/knowledge-transfer-partnerships and the French Cifre are two examples of very successful programs that have been running for over 30 years. Key to these programs is the employment of graduates as Associates who spend substantial time in the partner company working closely with the University assisting the knowledge transfer, developing translational skills and often staying with the company to consolidate improvements. The graduates' sole priority is the introduction of a new innovation/technology to the company. These programmes often bring graduates into these businesses for the first time and recognise that innovation is not simply about technology but about human capital with a high percentage of companies retaining the graduate on completion. These can be implemented as whole of government programmes supported by diverse government departments and agencies but all on similar terms making accessibility easy for industry. These schemes have had success in the context large scale pharmaceutical companies, smaller biotechnology firms and iron foundries.

- ***CRC(P):*** In Australia the more recent CRC P program aims to replicate the aims of such programs. The applicant is the industry partner and there is a requirement for matching funds. Total funds available can be up to $3M per project. Present criteria require 2 industry partners alongside a research institution. This is a major disincentive and given the Australian industrial base this should be relaxed to allow one to one relationship. A program of this nature provides logical next step in building collaborations following on from Linkage activities with the company now taking on more financial risk, but the risk overall will have reduced.

- ***R&D Tax Concession:*** All programs and R&D funding should be eligible for R&D tax concession and/or rebate. This program has proven to be highly beneficial in building start-ups. However, in line with the Ferris/Finkel/Fraser review on the R&D Tax Incentive, the use of a higher preferential rate for projects put in place with University research groups would further incentivise collaboration.

- ***CRC:*** CRC's have been a key part of the Australian Innovation system for over 30 years. Some have been very good and others not so. At present they tend to have become cumbersome with many partners often leading to fragmentation of research effort rather than consolidation. They tend to be focused on a major challenge driven by an industry or societal need and hence are a mechanism for bringing experts together to address a national need as opposed to developing new IP to create industries of the future. This distinction is subtle, but we think key in where the CRC program should be focused going forward. The funding for the CRC scheme could potentially be repurposed for a "KTP" like model (referenced above) as it kindles graduate skills, improves companies absorptive capacity and improves industry understanding in the research lab.

IP Exploitation and Commercialisation

- ***National Proof of Concept fund***: There is a real need for a ***National Proof of Concept fund***. This would support one year projects of $50k-$100k that are milestone driven and allow IP generated and disclosed with the normal technology transfer process to be taken to the next stage. This in turn feeds into Venture funding opportunities but also CRC(P) and ARC Linkage. At the ANU we have the Discovery Translation Fund (DTF) funded at $500k per annum. However, we could easily fund $1M worth of projects. Government should provide funds to institutions to award as quick cycle times are needed to take the IP forward in the

commercialisation path. These projects are high risk but significantly accelerate the commercialisation process.

- ***Translational Funding Program***: At present there is no ***Translational Funding Program*** for applied research and development along the lines of the NHMRC Development Grant program for non-medical technologies. Such a scheme would follow on from ARC Discovery grants where the outcome is not measured by academic performance alone, but predominately by how well the IP position has been enhanced and the commercialisation path forward taken. Such a program would award $1m to $3M for a 1 to 3 year project with 25% of funds targeted at the commercial business development. The difference between this program and a CRC(P) is that the applicant is a university.

- ***Innovation companies***: At present the accepted route for commercialisation of university research generated IP is through licensing or start-up companies. The start-up process is slow in building a company to critical mass for large scale investment. Another approach to accelerate commercialisation of university IP is through ***Innovation companies***. The aim would be to form a company around a leading researcher or group that has a significant IP position supported by a proven business leader. The aim is then to access to private financial capital alongside that of government investment (and possibly university) to build a commercialisation that can be scaled up to be globally competitive. Through this approach a fraction of the large amount of private capital in super and other funds in Australia can be unlocked to accelerate the industries of the future. We have examples of this at ANU with WearOptimo Pty Ltd led by Mark Kendall and Silicon Quantum Computing Pty. Ltd led by Michelle Simmons.

- ***Commercialisation Company***: Whereas the above examples focus on specific world leading IP, another model to accelerate commercial outcomes from University IP is a Commercialisation Company that sits alongside a research institution. One such model for this is the SRI alongside Stanford University. Such a model would again have investment from the government, private capital and the research institution into the company with its aim to accelerate the commercialisation process for a range of technologies. This is a variation also on Biocurate in Melbourne and QEDDI in Brisbane focused on drug discovery.

- ***Early Stage Seed Fund:*** Whilst the university sector has been reasonably successful in attracting dedicated funding for start-up activity such as with IP Group Australia, Main Sequence Ventures, UniSeed, Significant Capital Ventures etc, the seed fund stage - $500k-$1.5M is still a significant challenge. For medical opportunities there is the Medical Research Commercialisation Fund (MRCF), but for non-medical opportunities there is no equivalent government support fund. Such a fund would be managed as investment and sit alongside other funders.

Industry-university collaboration

Innovative research and IP development is key to driving future industry development and growth. However, access to a well-trained cohort of potential employees ready for industry employment is an immediate and ongoing risk to Australian industry that could be mitigated by better and deeper industry engagement with Universities.

We recommend further developing and supporting assistance programs that focus on talent development for future industry workforce requirements. Such programs include the following:

- ***Translational PhD Scholarships:*** Graduates with the depth of a PhD but the ability to commercialise and translate research are the key resource in driving a research led economy. Specific collaborative applied PhD scholarships used to be awarded (APA(I)) but are no longer identified as such. A specific translational/commercialisation PhD scholarship program should be introduced possibly undertaken over a four to five year period combining a traditional PhD with an enterprise activity. This will sit alongside the Knowledge Access Partnerships programs above and include training programs below.

- ***Internships:*** Specific Internships program for PhD students and early career researchers (ECRs) to be continued, but better integrated into other project funding programs such as CRC (P)s and ARC Linkage.

- ***Translational Fellowships*****:** Whilst PhD graduates will be a key driving resource for high technology companies, ECRs, with a greater degree of maturity and experience often provide the driving force for commercialisation with a greater chance of success. A Translational Fellowships program for Post Docs/ECR should be introduced and aligned to the other talent development programs, possibly as a follow on to DECRAs and Future Fellowships. The ANU has introduced such a fellowship program internally to promote the careers of talented individuals along this alternate career path. The ANU has also demonstrated the alignment between fundamental science and application working in partnership with Westpac.

- ***PhD/ECR Training Scheme:*** Innovation and commercialisation is essentially a contact sport in which the education process is often one of experiential learning. However, there is great advantage in a formal Entrepreneurial Training program for PhD/ECRs. A previous government funded Commercialisation Training Scheme (CTS) showed great potential before being defunded. Using a mixture of on-line courses, workshops and delegations to best practice globally will equip graduates. At the ANU we have Innovation ACT student commercialisation program, CBRIN run researcher entrepreneur courses and access to the (now defunct) ON program. These alongside PhD student/ECR delegations to international innovation hot spots has a profound impact on individuals and where they take their careers.

- ***Entrepreneurial Laureate:*** In the same way that a Translational Fellowship program is needed for ECR's, an Entrepreneurial Professor program akin to the ARC Laureate Fellowship would provide leading exemplars of a broader academic career. Not only would recipients lead significant translational programs with high impact deliverables, they would provide role models for ECR's whose interest lies in translational research.

- ***University-Business Business Development & supporting infrastructure***: The culture and drivers of universities is distinctly different to that of business and industry. To bridge that cultural gap requires Business Development Managers who understand how to frame the transition, build nature relationships and make things happen in a timely fashion. A BD internships/apprenticeship scheme that allows PhD graduates to follow a translation facilitation career path would fill a significant talent gap at all research intensive universities. An example is the higher education innovation fund set-up by the UK government. The UK government recognised that it wanted more out of universities while maintaining basic science funding. The scheme was metric and size driven and resulted in an allocation to a medium sized university of around 2MUKP per annum. The University had to commit the funds to business development, translation activities and had to report annually on the use of

the fund. This led to resourcing and scaling and a whole series of baton shaping experiments and ultimate delivery.

- ***Doctoral Training Centres***: Doctoral Training Centre provide a cohort approach to building critical mass of research in a targeted area with key partners. The current ARC IITC program provides a good basis for expansion with greater funding. Evolving an Australian version of the UK Catapult centres that overlaps with a future CRC program may provide a rationalisation of Doctoral partnership programs.

Governance Arrangements

Consistent and strong governance is key to maintaining a long-term commitment to supporting University-industry engagement in support of commercialisation and new industry development. ***We recommend that governance arrangements mirror those of the current Growth Centre initiative with the board structures created for the Growth Centres migrated into management and governance structures***. MTP now has several MRFF schemes under management each with a clear selection process with a panel selected from the most experienced in the sector. This is an efficient model and resembles the UK catapult structure. Situating Chief scientists/innovators in each government department working with the Federal Chief Scientist will aid in increasing the awareness and requirement for research and development within government departments government departments