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Submission to the Department of Education, Skills and Employment

University Research Commercialisation Scheme consultation paper

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UNIVERSITY RESEARCH COMMERCIALISATION SCHEME CONSULTATION PAPER

ATSE welcomes the opportunity to provide input into the design of the University Research Commercialisation Scheme (URCS). This submission has been prepared in consultation with ATSE's Fellowship of over 900 of Australia's leaders in applied science, technology and engineering, across private, public and academic sectors.

Australia would benefit greatly from a scheme that coordinates and incentivises the translation of Australia's world leading research for commercial benefit. However, a scheme that focuses on universities alone is unlikely to be effective. Universities are only one piece of Australia's innovation puzzle, and they are not always well-equipped to judge the relative likelihood of commercial success for a particular piece of research. Many universities may not currently have the financial resources to identify the best ideas to fund or the most efficient and effective pathway to commercialise research, particularly considering the impacts of the COVID-19 pandemic on the higher education sector.

To be successful the scheme must include industry, and it must provide incentives for industry to invest in, and benefit from, Australian research.

To achieve this, government policy on research commercialisation must raise its gaze to the level of Australia's innovation system. Only at this level can systemic barriers be effectively addressed.

A coherent national scheme designed to bridge the known barriers experienced by universities, industry and government and boost the commercial benefit of research should:

- Provide a clear focus for the application of effort and resources towards the translation of research for commercial benefit in Australia, across all schemes and programs.
- Drive a long-term cultural shift towards entrepreneurial thinking and commercial acumen by supporting initiatives that embed these capabilities in Australia's tertiary education system.
- Enable the transfer of talent in research and commercialisation by providing incentives that reward both domestic and international collaboration between research and industry.
- Launch research commercialisation activities at a scale competitive with Australia's global peers by providing new financial incentives and further investment in infrastructure.
- Be guided by experts from universities and industry with experience and success at realising the commercial benefits of research, end-user collaboration and developing the next generation of research and commercial talent.

Comments on the scheme design

The URCS consultation paper asks for input on five topics related to the design of a university research commercialisation scheme. The following responds to sections:

1. Mission-driven research
2. Stage-gated scheme design
3. & 4. Incentives for participation and industry-university collaboration
5. Governance arrangements

1. Mission-driven research

A growing number of countries are implementing mission-driven innovation policies that aim to address weaknesses in national innovation systems, including holistic strategic focus and policy co-

ordination.[1] A mission-driven innovation policy can provide consistent and integrated arrangements that are strategic, consider the view of multiple stakeholders, co-ordinate policy across silos and integrate implementation. Measures can span different stages of the innovation process from research to demonstration and market deployment, mix supply-push and demand-pull instruments, and cut across various policy fields, sectors and disciplines.

As we emerge from the COVID-19 pandemic, realising the commercial benefit of research will be a key driver of economic recovery and growth. A national, mission-driven scheme would galvanise effort across research and industry in areas of strength and opportunity. We already see this in initiatives such as the Modern Manufacturing Strategy, and the Low Emissions Technology Roadmap. A national, mission-driven scheme would create a coherent, co-ordinated and strategic approach to innovation effort.

International experience shows us that successful, mission-driven approaches to innovation share design principles of:

- Strategic orientation informing and framing the specific societal challenges or problems, strengthening the legitimacy of the focused policy intervention towards clear and precise objectives
- Policy coordination of the strategies and activities of the different institutions involved in the policy
- Consistent implementation, ensuring effectiveness of the models of intervention and the public and private resources mobilised to achieve the policy objectives.[2]

2. Stage-gated scheme design

The stage-gated design is a successful model used by internationally recognised schemes such as the Small Business Research Innovation program (SBRI) in the USA. In Australia, the stage-gated design has been used effectively within Cooperative Research Centres (CRCs), national and state-based investment schemes.

It has also been successful in the Business Research and Innovation Initiative (BRII) scheme, which is based upon the SBRI and follows a two-stage process (feasibility and proof of concept).[3] It is targeted at small companies, often with no links to government, that would not qualify for a large tender process. Many applicants collaborate with universities, research institutes and CSIRO. This design is appropriate for project-focused product development, or in the funding of early-stage start-ups. These grants provide critical seed money that helps to bridge the gap between a raw idea and a tangible commercial outcome that will attract venture capital.

However, if the URCS follows a mission-based approach at the level of Australia's innovation system, the stage-gated design might limit its scale and impact.

A stage-gated design may limit funding only to projects of small capital value, leaving the potentially more lucrative, high impact, larger capital projects unfunded. High risk/impact projects such as medical devices or those in the manufacturing or resources sectors require large amounts of capital

[1] https://www.oecd-ilibrary.org/science-and-technology/the-design-and-implementation-of-mission-oriented-innovation-policies_3f6c76a4-en

[2] https://www.oecd-ilibrary.org/science-and-technology/the-design-and-implementation-of-mission-oriented-innovation-policies_3f6c76a4-en

[3] https://www.business.gov.au/grants-and-programs/business-research-and-innovation-initiative

and infrastructure, which a stage-gated scheme may be unable to provide if investment is taken up with proof of concept (stage 1) and scaling up of a project (stage 2).

Relying on venture capital or contingent loans to commercialise a project identified in stage 3 of the design proposed in the consultation paper may prove challenging in Australia. The availability of venture capital in Australia is currently much less than other comparable nations and the risk appetite is also much lower. Early-stage funding (angle, seed and accelerator) has declined in the last three years, and the amount of late-stage venture capital being raised by firms is still lagging behind Australia's global peers such as Sweden and Israel.[4]

This observed decline in available capital may not simply be due to a lack of investor money. Factors such as risk appetite and the value proposition of proposed start-ups also play a role.

Further, spin-out companies and start-ups cannot be the sole major vehicle for research translation and commercialisation. Many researchers will work with existing companies as the vehicle for commercialisation. The company will then license the intellectual property directly, particularly in manufacturing and resources industries where the capital requirements for projects of significant scale are large. It is much lower risk for a large company to commercialise a product as an addition to their portfolio than for a few commercially immature researchers to spin out a company on their own.

Whichever design is eventually selected, the scheme should be careful to avoid a linear or narrow conceptualisation of the relationship between research and commercialisation.

3. & 4. Incentives for participation & industry-university collaboration

The scheme must aim to encourage and support researchers and industry partners to focus on creating ideas, defining problems, and devising solutions. The scheme must provide an appropriate level of funding to properly resource these activities, if it is to be successful. This funding must be new money that does not detract from other government support of 'pure' and 'applied' research, and which does not impose significant additional, time-consuming administrative burdens on the scheme's participants. Incentives should also be targeted at the private sector through mechanisms like the R&D Tax Incentive, which should also offer incentives for collaboration.

The scheme should also aim to enable the development and transfer of talent between research and industry by incentivising and rewarding engagement and collaboration. ATSE has developed a collaboration toolkit that will enable collaborators to benchmark and evaluate their relationships for continuous improvement, and is finalising negotiations to take on the successful APR.Intern program, which provides paid internship opportunities for STEM researchers in non-academic settings. These kinds of initiatives provide valuable data and insights, which can be used to improve a culture of effective collaboration.

The 2019 Survey of Commercial Outcomes from Public Research (SCOPR) by Knowledge Commercialisation Australasia (KCA) shows that Publicly Funded Research Organisations (PFROs) play an active role in research commercialisation, particularly through the creation of IP. However, it shows that the majority of outputs and benefits reported are only realised by a handful of institutions.[5] As universities focus on working with industry and research commercialisation, there is an increasing overlap with the priorities of PFROs such as the CSIRO. This overlap will need to be

[4] https://crossroads.startupaus.org/analysis/capital/growth-capital

[5] https://techtransfer.org.au/wp-content/uploads/2020/09/SCOPR-REPORT-FINAL-for-web.pdf

carefully managed if the intent of a scheme is to build a collaborative environment. Ideally, the scheme should help to improve the relationship between universities and PFROs. Examples of successful collaborative relationships with universities include the Fraunhofer and Helmholtz Institutes in Germany and the US National Labs. These partnerships benefit from more frequent placement of university researchers within the National Lab and more joint appointments. Such mechanisms should be considered as an element of this scheme.

Intellectual property negotiation can often be a barrier to collaboration, and the scheme should therefore aim to address issues and barriers related to intellectual property creation. Intellectual property management at universities consumes significant resources. Many of these agreements are negotiated but few progress to a commercial reality, meaning that these resources are often wasted.

5. Governance arrangements

If the scheme follows a mission-drive approach, an existing organisation such as Industry Innovation and Science Australia (IISA) may be the most appropriate entity to facilitate the selection and implementation of national missions. The Fraunhofer-Gesellschaft in Germany offers an international example of a leading applied research organisation which has successfully enabled interdisciplinary research teams to work together with partners from industry and government in order to transform novel ideas into innovative technologies.

An expert selection panel will be needed for each cohesive research/industry grouping aligned to the identified missions (e.g. agriculture, mineral and energy resources, manufacturing). Ideally their members would combine experienced, mature, and visionary academics and industry decision-makers. They could also play an advisory role once a project has started, and help to decide when it is time to offer the project and its IP to a commercial investor.

From an implementation perspective, Australia's six Industry Growth Centres (IGCs) may have an important role to play in the selection and management of projects under a scheme. Additional IGCs could also be added. The scheme could also look at implementing an enhanced CRC program to further its objectives. A CRC has clearly focussed outcomes and involves research with the best talent and usually at the right scale.

Other considerations:

National mentoring programs and industry internships, like ATSE's Industry Mentoring Network in STEM (IMNIS) program, are important initiatives that can build bridges between research and industry at the individual and organisation level. Even before university, students should be given the opportunity to develop entrepreneurial and collaborative skills to compliment those they gain in research and independent inquiry.

A strong focus on early-career researchers (including PhDs and post-doctoral researchers) will also benefit the scheme. This cohort has grown up in the digital era, and they are well-exposed to emerging and disruptive technologies and can lead their translation into innovative new products and services for the benefit of Australia.

The IMNIS scheme could be expanded with minimal Commonwealth support to include a strong focus on early-career researchers which would lead to a sustainable and major cultural shift in Australian innovation arising from closer industry-university relations over time. Likewise, the APR.Intern program's next phase could be supported via Commonwealth rebates to encourage SME organisations' exposure to (and enhance likely employment of) advanced STEM degree-holders. These programs are an integral part of a broader suite of national programs to support innovation via collaboration between industry, universities and publicly-funded research organisations.

International talent should also not be overlooked; excellence should always be welcomed and celebrated in Australia. High-quality Australian research, particularly in the manufacturing and resources sectors, can often only be commercialised internationally where infrastructure and capitol are available at the required scale. Such international infrastructure and capital could form an important component part of national programs that provide capital to support translational research, innovation and commercialisation outcomes. Research commercialisation is an international endeavour and international collaborators, particularly large companies, play a key role in the commercialisation of Australia's research.

ATSE would welcome further engagement on the topic of university research commercialisation. If you would like to discuss any aspect of this submission, please contact Dr Harry Rolf, Senior Policy Analyst (harry.rolf@atse.org.au).