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## Australian Academy of Science Submission to Department of Education, Skills and Employment consultation on a University Research Commercialisation Scheme

The Australian Academy of Science (the Academy) welcomes the opportunity to contribute to the consultation on a *University Research Commercialisation Scheme* (URCS). The Academy's National Committees of Science may individually offer discipline focussed perspectives.

The Academy suggests that:

- An additional funding stream support the application, translation, and commercialisation of research outcomes
- Clear and transparent criteria be used to select challenges and missions involving strategic advantage, research strengths, public and economic drivers, capacity to generate new knowledge, global relevance, and skills development
- The scheme allows Australian universities and researchers to participate in international collaborative projects aligned to selected missions and utilise international research infrastructure
- Relevant learned academies should be engaged to assist with strategic planning for the scientific and technological input to the missions due to their expertise in decadal planning and horizon scanning for scientific disciplines.
- International examples of best practice, such as the [Small Business Innovation Research](#) (SBIR), should be drawn upon to model the new scheme.

### Funding Research and Development (R&D)

Research generates knowledge, the use of which benefits society and opens new opportunities for industrial and social advancement. Ensuring that the public receives benefits from investment in research has been a critical priority of successive Australian governments. These benefits include additional employment, products, services, and industries. Australia has struggled to translate world-class research into tangible benefits at a suitable scale. There has been an extensive range of inquiries, reports, and policy statements - **one hundred and fifty over the past twenty-five years**.<sup>1</sup> In that time, no policy initiative has been sufficient to shift the dial on industry collaboration with universities.

#### Australia's role in science and research

Australia is a small but significant player in the global science and research system, contributing to the global stock of knowledge, and is part of the global research community from which we learn and to which we add value. It also conducts research on Australian issues that no other nation could be expected to conduct. An additional funding mechanism (above existing base research funding) such as the proposed University Research Commercialisation Scheme (URCS) offers Australia an opportunity to better focus research and mobilise science around national priorities.

## Industry must be encouraged to “buy-in”

As distinct from the United States, the critical and often missing ingredient in Australian attempts to ‘commercialise’ research is buy-in from both industry and research. In 1995 American corporate leaders wrote an open letter to President Clinton arguing that “History has shown that it is federally sponsored research that provides the truly “patient” capital needed to carry out basic research and create an environment for the inspired risk-taking that is essential to technological discovery.”<sup>2</sup>

It takes decades of curiosity-driven research for cochlear implants to be developed, and decades of research in physics and electronics for the devices to be small enough to be readily wearable. Similarly, it took decades of ‘basic’ research to know enough about mRNA to even think of using it to make a vaccine.

Patient-capital is a means by which we keep connected with the rest of the world. It develops new knowledge, and by being an active contributor, it is how we keep talent in Australia. It is how we manage to adapt and apply knowledge and ideas to new products and services.

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“People sometimes think that I and others worked on penicillin because we were interested in suffering humanity. I don’t think it ever crossed our minds about suffering humanity. This was an interesting scientific exercise, and because it was some use in medicine is very gratifying, but this was not the reason we started working on it.” – Howard Florey (1967)<sup>12</sup>

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To fix this ‘gap’, the best place to target incentives is with business, and to require a link to academic researchers. In other words, do what has been elsewhere successfully by comparison with Australia.

## Policy and program coherence

Australia has many schemes to support research and some to support industry engagement sitting across multiple Departments, agencies and sectors. There are, for example:

- [Science and Research Priorities](#)
- [National Manufacturing Priorities](#)
- [CSIRO Missions](#)
- A plan for [National Agricultural Innovation Priorities](#)
- [Medical Research Future Fund missions](#)

In addition, there are schemes such as the Australian Research Council, the National Health and Medical Research Council, Co-operative Research Centres (including Projects), Rural Research and Development Corporation grants and Research and Development Tax Incentives. The obvious lack is a cohesive, national and patient approach, such as a Department with authority over all science, industry and university research.

## Role of researchers

Australia should not suggest, or expect, that academic researchers should suddenly be transformed into entrepreneurs. Australian Universities should be supported to continue making world-class discoveries. Australian business should be incentivised to take advantage of that basic research that creates the same

environment for the inspired risk-taking that is essential to technological discovery, as found in the United States.

### Scheme design should be radical and smart

The way the scheme is designed must be both radical and smart. Radical in the sense of supporting new, at scale, commercialisation activities. Smart in ensuring that a new URCS does not lead to misallocation of other funding mechanisms that currently ensure excellence in basic or fundamental research. Applications to programs should be efficient and accessible, and avoid placing unnecessary administrative burden on applicants.

The scheme's design must promote investment along the entire innovation value chain - from basic research to end-users, including interaction with business – especially small and medium enterprises.

**Funders and policymakers should avoid counterproductive policy interventions, such as reallocating existing funds from basic research to applied or translational research.**

An additional funding mechanism (above existing base research funding) offers Australia an opportunity to focus research and mobilise science around national priorities. That is, the science we need to do to safeguard our people, security and environment, and the science we do because of our national capacity to translate and scale the solutions.

## Mission-driven research

The Academy agrees that the URCS should be organised around a series of missions or grand challenges. Missions allow for long-term investment to solve the grand challenges of our time. The mission format serves to galvanise a country's research and development effort and allows for holistic strategic orientation and policy coordination.<sup>3</sup>

Resolving these issues will require the Department to consider the typology of the missions envisaged. The OECD has identified four types of mission-oriented innovation policies: overarching strategic frameworks; challenge-based schemes; thematic mission-oriented programs and ecosystem-based mission programmes. Deciding the scope of the URCS, its role in the overall strategic direction of the national government and supporting policy co-ordination and implementation actions will be vital.<sup>3</sup> These issues will be further discussed in our comments on governance below.

### Missions involve making choices

To avoid the pitfalls of previous research priorities, the missions should be selected, designed, and regularly reviewed collaboratively with the research sector. Missions must be bold and decisive and avoid being vague and too generic. Public funding available through a URCS must be allocated with a laser-like focus on these missions and sustained for an adequate period of time to enable impact. Other considerations will be the interaction with other missions across government and opportunities to accentuate research impact through linkages with international consortia or collaboration mechanisms.

The Academy suggests that the following criteria should be used to select missions:

- Australia has a strategic<sup>4,5</sup> advantage in tackling a particular mission
- Australia has existing strengths in the research fields relevant to the mission
- The mission has important public and economic drivers for its solution
- Work on addressing the mission will result in new knowledge with an extended use-by date
- Australia's contribution to the mission will be globally appreciated

- Addressing the mission will provide young researchers with skills for a lifetime career.

## Incentives for participation

Research commercialisation has been subject to an extensive range of inquiries, reports, and policy statements - one hundred and fifty over the past twenty-five.<sup>1,4,5</sup> The nearly three decades of Australian innovation and research financing policy has failed to shift the dial on the commercialisation, translation, and impact of research at scale. Universities have responded to perverse incentives that, through the failure to address the indirect costs of research and the need to attract discretionary income, have valued publications, citations, and the pursuit of rankings over other considerations.<sup>6,7</sup>

### Focus on collaboration with SMEs

Small and medium enterprises dominate Australia's economic structure. Globally these types of firms invest less in R&D, but Australian firms lag even further. Australian industry sectors like manufacturing, mining and ICT invest less than their global peers. However, Australian professional, scientific services, finance, agriculture, and utilities are more intensive users of R&D. Australia's economy also has a smaller manufacturing industry, and larger mining, retail, and finance sectors.<sup>8</sup>

These issues suggest that the scheme should focus on improving the level of engagement with SMEs. Globally the best example of such a program is the [Small Business Innovation Research](#) (SBIR) program noted in the consultation paper. While Australia has had a [Business Research and Innovation Initiative](#) since 2016 and a [Small Business Innovation Research for Defence](#) program, these are small, bespoke and lack critical mass. Notably, a URCS should be tasked with de-risking investment across all the three stages outlined in the consultation paper: proof of concept, scale-up and commercialisation.

The pathway to engage with SMEs must involve knowledge brokering, connecting organisations, industries, and researchers, and harmonising partnership enablers such as IP arrangements and early-stage investment options. Successful models such as [Interface](#) in Scotland can provide a model for an independent organisation that specialises in brokering relationships between businesses and academics.

## Industry-university collaboration

With over half the research workforce in universities being Higher Degree by Research (HDR) students, they must be considered a necessary force in driving industry-research collaboration. Implementing and continuing to support programs that engage HDR students in industry collaboration, such as the successful APR Intern program, can help create a necessary shift in Australia's research culture.

The Academy supports the establishment of an industry fellowships scheme, similar to that offered by The Royal Society.<sup>9</sup> The UK model provides a pathway for academic scientists who wish to work on a collaborative project with industry and for scientists in industry who wish to work on a collaborative project with an academic organisation. This offers more expansive collaboration with an industry partner than existing programs.

## Governance arrangements

The governance arrangements for a new mission-based program are likely to be the most critical part of the scheme's implementation. An independent expert report on Governing Missions in the European Union examined how to implement and govern a mission-oriented process.<sup>10</sup> The report focused on three key questions that are broadly relevant to mission governance in Australia:

- How to engage citizens in the design, creation, implementation, and assessment of missions?
- What are the public sector capabilities and instruments needed to foster the ecosystem?
- How can mission-oriented finance and funding leverage and crowd-in other forms of finance?

The importance of involving the scientific community and the community more broadly in creating and implementing missions has been demonstrated in the establishment of the Medical Research Future Fund and the selection of the Australian Medical Research and Innovation Priorities.

Reorienting research and development towards societal problems brings new governance requirements with a great diversity of potential cross-cutting and multidisciplinary missions. Creating a typology can assist in categorising and assessing the impact of these missions.<sup>11</sup>

## References

1. Howard Partners. *Australia 2030: Prosperity through innovation*. (2017).
2. A Moment of Truth for America | MIT News | Massachusetts Institute of Technology. <https://news.mit.edu/1995/moment-truth-0510>.
3. Larrue, P. The design and implementation of mission-oriented innovation policies: A new systemic policy approach to address societal challenges. *OECD Sci. Technol. Ind. Policy Pap.* (2021).
4. The Australian Academy of Science. Submission—2030 Strategic Plan for Science | Australian Academy of Science. <https://www.science.org.au/supporting-science/science-policy/submissions-government/submission-2030-strategic-plan-science> (2017).
5. The Australian Academy of Science. Submission—House of Representatives Inquiry into Funding Australia’s Research | Australian Academy of Science. <https://www.science.org.au/supporting-science/science-policy/submissions-government/submission-house-representatives-inquiry> (2018).
6. Devinney, T., Dowling, G., Devinney, T. & Dowling, G. What Are the Strategies of Australia’s Universities? Arenas, Vehicles, Differentiators, Staging and Economic Logic. in *The Strategies of Australia’s Universities* 143–167 (Springer Singapore, 2020). doi:10.1007/978-981-15-3397-6\_9.
7. Compagnucci, L. & Spigarelli, F. The Third Mission of the university: A systematic literature review on potentials and constraints. *Technol. Forecast. Soc. Change* **161**, 120284 (2020).
8. AlphaBeta. *Australian Business Investment in Innovation: levels, trends, and drivers*. (2020).
9. Industry Fellowships | Royal Society.
10. Mazzucato, M. *Governing Missions in the European Union - Independent Expert Report Research and Innovation*. (2019) doi:10.2777/014023.
11. Wittmann, F. ; Hufnagl, M. ; Lindner, R. ; Roth, F. ; & Edler, J. *A Service of zbw Leibniz- Informationszentrum Wirtschaft Leibniz Information Centre for Economics Developing a typology for mission-oriented innovation policies*. [www.econstor.eu](http://www.econstor.eu).
12. de Berg, H. Transcript of Taped Interview with Lord Howard Florey. 15 (1967).