SUBMISSION

AUSTRALIAN TECHNOLOGY NETWORK OF UNIVERSITIES + THE UNIVERSITY OF NEWCASTLE AUSTRALIA

University Research Commercialisation consultation paper

9 April 2021

The Australian Technology Network of Universities (ATN), in collaboration with The University of Newcastle, welcomes the opportunity to contribute to the development of the university research commercialisation scheme.

ATN is the peak body representing Australia's five most innovative and enterprising universities: Curtin University, Deakin University, RMIT University, University of South Australia (UniSA), and University of Technology Sydney (UTS). The University of Newcastle is an important research-intensive anchor institution in the regional gateways of the Hunter and Central Coast. Together, we are home to over 300,000 university students and over 23,000 full and part-time staff.

Australia's university sector plays an important role in the economic and social development of our nation. We provide foundational qualifications that set up our graduates for a lifetime contributing to the workforce and the community, we up-skill and re-skill current workers to improve their productivity, and we work closely with businesses on research, innovation and commercialisation.

The goal of improving research commercialisation is improving the lives of Australians and providing meaningful employment by creating innovative and competitive new products and services. It also improves the knowledge and productive capacity of the Australian economy, resulting in increases in output and terms of trade. This will create jobs for existing workers, students, graduates and researchers, and better lives for all Australians.

Any research commercialisation scheme will work best as part of the convergence of education and research and the integration of employment and education. As advocated in ATN's pre-Budget submission and the report *Skills for Tomorrow*, we need a comprehensive and connected package of initiatives.

In addition to direct funding, the scheme will need to be supported by training and capability building across the board – including researchers, commercialisation experts, industry partners, students and graduates. The entrepreneurial potential of the 300,000 students at ATN universities and millions of ATN alumni should also be forefront of this scheme, as well as academics and researchers.

Recommendations as part of a broad education and research strategy:

- Maintain a pipeline of research from discovery through to application and commercialisation.
- Align investment in research and education in innovations and high-value industries.
- Increase the level of university research funding to boost the output of new discoveries and innovations with commercial potential.
- Provide additional direct support for commercialisation activities that enable partnerships between universities and businesses.
- Develop collaborative learning hubs that co-locate industry, education and training sector organisations, and encourage more enterprise-based learning.

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Figure 1: Mapping university, industry and government inputs to the innovation pipeline

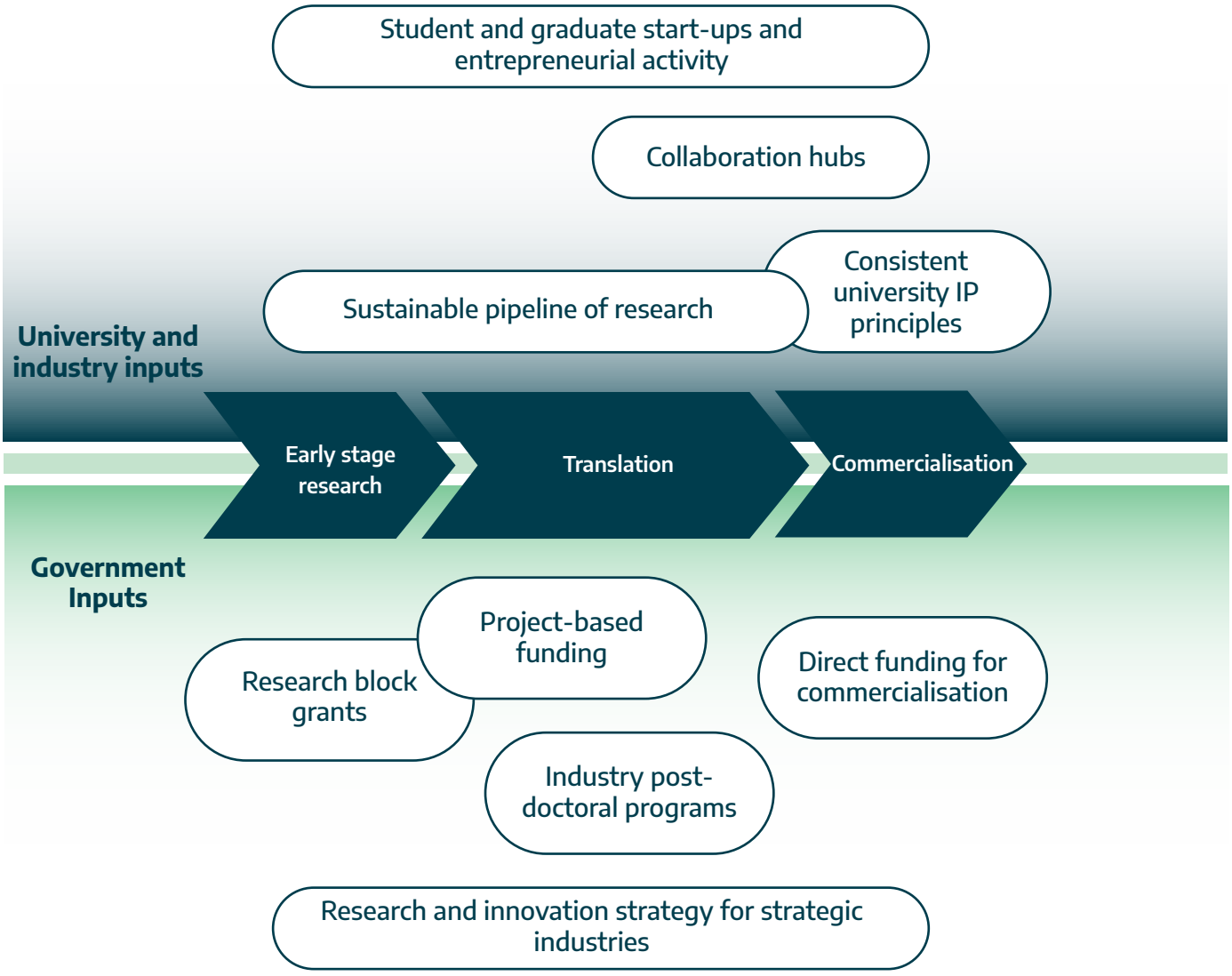
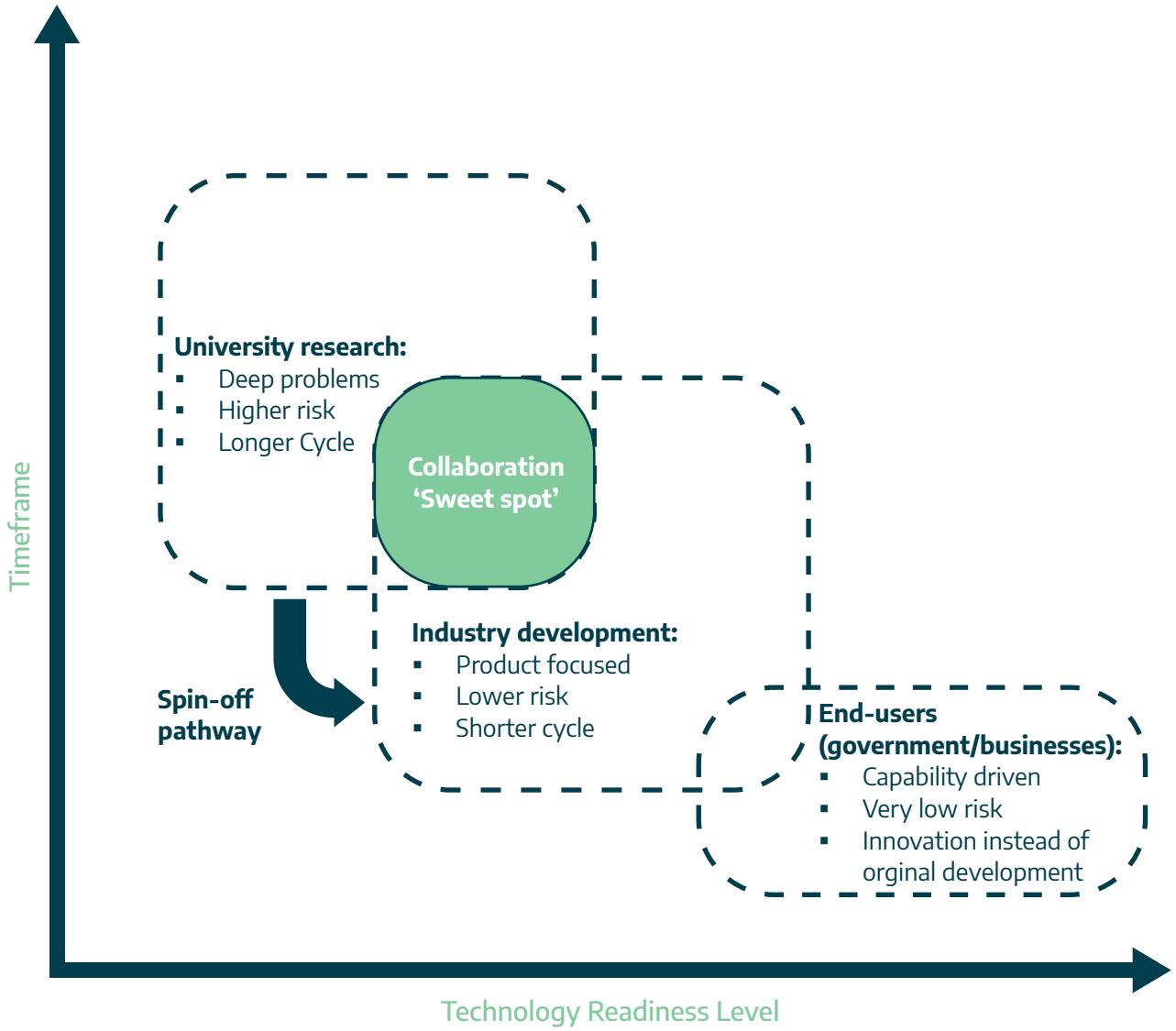


Figure 2: Mapping capabilities in the research and development system



1. Mission-driven research

ATN supports the collaborative development of long-term and ambitious goals for research and innovation around which the research activities of Australia's universities, research institutes and businesses can coalesce. Through a mission-driven research strategy, the Government can prioritise and focus public and private investment in areas that are critical to Australia's prosperity and in which we have (or can develop) globally competitive advantages.

The mission-driven research strategy must align with or supersede other initiatives across the whole of Government, including the Science and Research Priorities and the Modern Manufacturing Initiative. Investment in research must also work in concert with investments in education and skills to ensure that we have the knowledge and capability to take full advantage of the world class research that Australia is and will continue to produce.

The opportunity exists to make this a whole-of-government strategy and learn from the work that has already been done in other areas of government like defence – specifically defence science and technology. For instance, the 2016 *Defence Industry Policy Statement* outlined an initial approach and included the Next Generation Technologies Fund. The Fund includes Grand Challenges, a mission-driven program focused on highly complex defence problems that defied conventional solutions, which operates using a stage-gated system. Since then, *the Defence Science and Technology Strategy 2030* launched STaR Shots – a mission-based program designed to bring together researchers, government and industry.

In our recent pre-Budget submission, we made the following recommendation for the Government:

> ***Recognise innovations and high-value industries on a national and local level within a broader industry strategy.***

This recommendation becomes even more important if the mission-driven research strategy is adopted. This strategy should identify key strategic industries where Australia has (or can develop) a competitive edge globally and the support needed to drive these industries – including through capacity building partnerships with local universities.

It is also important that the mission-driven strategy is a long-term strategy and is backed by an evidence-based and broad consensus so that it is maintained across multiple electoral cycles. This is a clear feature of the UK's Grand Challenges and Japan's Moonshot.

This stability is necessary given the timeframes required through the whole research pipeline from early stage research through to commercialisation. While start-ups may be small and agile, the entrepreneurs themselves, the start-up support structures and the investors that all underpin their success benefit from stability and consistency of policy, funding, commercial and tax settings.

Another key feature of the UK and Japan's strategies is an appreciation of the social, as well as economic and industrial, impacts of research translation and commercialisation. The mission-driven research strategy should be invested in the wider benefits of university research to Australia and its people, as well as the economic return.

Another key recommendation in our pre-Budget submission was to maintain a pipeline of research from discovery through to application and commercialisation. A healthy research commercialisation system needs a healthy and sustainable pipeline of research at all stages, which in turns relies upon a pipeline of Australian and international research talent.

Universities should be given flexibility within the mission-driven research strategy to invest in the research, people and infrastructure that will facilitate their best contribution to the overall strategy. This will allow universities to direct investment where it is needed in a timely manner, including supporting emerging ideas and partners in a way that is not tied to grant or funding cycles.

Support for mission-driven research is a necessary, but not a sufficient, condition for a functioning research-commercialisation pipeline. There are various blockages along the way and specific enablers needed from early stage research right through to commercialisation. In addition, while well-funded research is important there also needs to be support for related non-research activities (e.g. product development). This reinforces the need for direct additional funding for commercialisation activity, above current funding for research.

2. Stage-gated scheme design

A stage-gated scheme design is an acknowledgement of the diverse and complex challenges in the research-commercialisation pathway. Different stages will involve different participants and require different solutions.

It is important to understand the value chain of funding and supports to ensure that 'valley of death' gaps are filled. These gaps are not just ones that require additional funding or investment. A sustainable system requires the recognition of the different funding, capability and engagement gaps and that there are gaps to be addressed at all stages.

Different stages of the research-commercialisation pathway also operate on different timeframes. The consultation paper acknowledges this and mentions utilising a 'fast fail' funding mechanism. It is important to also recognise that progressive and iterative improvement is also an effective development strategy.

A mix of approaches will be needed based on the operation and culture of the industry and the maturity of the university-industry partnership. For example, the timeframe for success and challenges when spinning out a start-up based on a consumer-oriented product will be different to those faced when developing a new production process with an established industry partner.

There will need to be a greater awareness of the 'Technology Readiness Level' framework amongst universities and their partners. This could include the development of an Australian version of the framework that is aligned to the stage-gated scheme design.

3. Incentives for participation

Incentives for participation need to be designed with a wide range of industries and types of business in mind. We need to build success in innovation for start-ups, small and medium enterprises (SMEs) and large businesses through considered construction of funding and support mechanisms.

Historically, state governments in Australia have supported research, development, collaboration and commercialisation activities at small and medium enterprises (SMEs) through 'voucher' programs. These vouchers have supported engagement between SMEs and research institutions like universities. To ensure an appropriate level of commitment, these vouchers require a level of co-investment by the SMEs.

These vouchers have supported a range of activity including research and development with research partners, technology transfer, and access to commercialisation support.

Western Australia – Innovation Vouchers Program

The Innovation Vouchers Program (operating since 2017) provides SMEs with a funding to access professional skills, services or knowledge, enabling them to advance their ideas or commercial activities.

Victoria – Innovation Voucher Program

The program (since finished) involved the granting of vouchers with a value of up to $25,000 for use in business research and development activities (Business R&D Vouchers), and up to $10,000 to use in improving skills (Innovation Skills Vouchers) – open to businesses with fewer than 200 employees.

On the university side, there should be an adjustment of measures of research excellence in activities such as Excellence in Research for Australia (ERA) to emphasise innovation and commercialisation. This could include reviewing the Engagement and Impact Assessment to ensure that the measures reflect our priorities for the Australian research system.

However any changes must be carefully considered as measures like invention disclosures, spinouts and patents can preference the quantum of activity over the quality of the translation or connection. Measures must also take into account the differences between fields (e.g. translation related to drug discovery is a much longer process than in many other fields).

In terms of universities, the focus should be on assessing the outputs of the scheme and commercialisation activities (e.g. patents and licences, social and environmental impacts) rather than on regulating the inputs (i.e. attempting to selectively fund research and projects). One of the difficulties of university-industry partnerships is the length and uncertainty of grant and project approval processes. The benefit of block funding for universities is that they can direct funding to promising research and partnerships when it is needed, but be accountable to the outputs generated.

4. Industry-university collaboration

Any scheme would need multiple components avoid a 'one size fits all' approach. Opportunities need to be made available for a range of scenarios including small and large businesses, metropolitan and regional businesses, and early stage and late stage research.

One of the best ways of improving the links between universities and businesses is encouraging the flow of people and exchange of ideas between the two sectors. We made a number of recommendations to improve the integration of industry and universities and drive innovation and transformation in our pre-Budget submission.

Develop collaborative learning hubs that co-locate industry, education and training sector organisations.

Encourage enterprise-based learning – such as work-integrated learning, industry-linked research positions, and employer-driven apprenticeships, cadetships and internships.

Maintain a pipeline of research from discovery through to application and commercialisation.

Collaborative learning hubs that physically co-locate industry and education and training organisations are critical to support new work-integrated models of learning and innovation. The Tonsley Innovation District in South Australia is an example where research institutions, businesses, start-ups, incubators, government and the wider community have come together in partnership. Tonsley also includes TAFE South Australia, which helps complete an integrated tertiary sector and enables skills development to occur hand-in-hand with research and industry. The facility will support the type of university-industry collaboration this scheme is seeking to foster.

One way of encouraging university-industry collaboration is through businesses employing higher degree by research (HDR) graduates and PhD students, and embracing innovation. The capacity and productivity of the Australian workforce should be increased by encouraging more businesses to do this. These HDR graduates and PhD students bring with them the ability to transform these businesses with their connection to cutting-edge research and ability to undertake research and development into new fields.

Universities would also benefit from support for the research-teaching-commercialisation nexus. Universities can take continue to develop a three-way nexus where commercialisation and industry engagement works in concert with both teaching and research. This will ensure students graduate with the ability to engage with both research and industry.

ATN has a long track record of partnering with industry and one of the results of this was developing and adopting National IP Principles. Our seven principles are the basis on which ATN universities operate when it comes to doing business with industry. Our industry partners can be confident that when dealing with ATN, the approach to IP will be consistent.

In addition to encouraging HDR graduates and PhD candidates to work with and within in industry – and taking experience of university research to industry – we should also encourage university employment pathways to bring the experience of industry to university research. To fully develop a research commercialisation ecosystem, we should look at ideas like funding industry-focused post-doctoral programs or creating new Professional Doctorates. An existing example we can learn from is the Doctoral Training Centre model in the United Kingdom.

Researchers can be excellent entrepreneurs in their own right, but all researchers would benefit from support and it is important to keep people focused on what they excel at. We need a range of supports and formalised processes to support the links between research and entrepreneurship. This could include working with established and practising entrepreneurs, partnering with R&D units in larger companies, and having a recognised career pathway for commercialisation professionals.

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