

UNIVERSITIES AUSTRALIA SUBMISSION

2021–22 PRE-BUDGET SUBMISSION

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CONTENTS

Contents	3
Executive summary	4
Recommendations	5
Opportunities for university education.....	7
Impact of Job-ready Graduates package	7
Demand-driven funding for Indigenous students.....	8
Financial assistance for micro-credentials.....	9
University research – a national asset	11
Why research is important	11
Universities central in Australia’s research landscape	12
COVID-19	13
Sovereign capability.....	14
Funding challenges.....	14
International education and research funding	15
University research – working with industry	15
Research solutions	19
Support for universities	19
Support for industry	20
International education.....	21
Hardship funding.....	22
International education strategy	22
Work integrated learning.....	23
Regulatory flexibility.....	23
Pipeline of health workforce	25
Expanding placement capacity to support workforce need	25
Managing regulatory burden	27
Countering foreign interference	28
Appendix A: Policy options to fund R&D	29

EXECUTIVE SUMMARY

In a year like no other, Australia's universities have been hit hard by the COVID-19 pandemic and subsequent recession. Universities Australia has been counting the costs and identifying support measures that will help ensure Australians of all ages continue to benefit from a world-class higher education.

The figures for 2020 are now available. Universities Australia's 39 members collectively lost at least \$1.8 billion in revenue compared to 2019. When assessed against universities' pre-pandemic budgeted revenue for 2020, this loss increases to more than \$3 billion – consistent with Universities Australia's estimates made in April last year. More than 17,300 jobs have been lost on campuses.

Revenue losses will mount year on year. Universities Australia estimates that in 2021 university revenue will decline by a further \$2 billion. Unfortunately, it is probable we will see further jobs losses.

All of Australia's universities conduct research. This is a defining feature of our world-class system. The nation's capacity to undertake R&D is under threat in the face of continued revenue decline.

Universities welcome the Government's recognition of the need for emergency assistance, delivered in last year's Budget. The Government should consider continuing this stabilisation funding for university research. Universities also look forward to further discussion on long-term, sustainable investment in university research.

In a time of economic disruption and challenge, innovation and productivity become even more crucial to maintaining Australia's competitiveness and economic wealth. Research creates the new ideas that fuel new processes, industries, products, services and jobs. This work is essential to national recovery, continuing prosperity and to our sovereign capability

There is a great deal at stake. COVID-19 has demonstrated the breadth and depth of university expertise - medical researchers, epidemiologists, public health experts, economists, social scientists and others have all contributed to Australia's effective response to the pandemic.

As Australia experienced its first recession in nearly 30 years, the Government recognised universities' key role in educating the nation, retraining and upskilling citizens for new jobs. Universities look forward to continuing to work with Government and industry to enhance the nation's skills, resilience and bottom line.

Australia's international education business is the nation's fourth biggest export industry, worth \$40 billion to the nation in 2019. \$23 billion of those earnings were injected into the wider economy through international students' spending on goods and services.

Just as importantly, international education is vital to Australia's connections with other countries in our region. Hundreds of thousands of graduates return from their time in Australia with knowledge and skills to benefit their home countries. These informal ambassadors for Australia are an unrivalled element of 'soft power' and forge enduring relationships with our neighbours.

This submission proposes 12 targeted initiatives to support and strengthen universities' contribution to Australia's future global success. These will pay dividends for the nation in both the short and longer term. Failure to invest in innovation and skills will put Australia's post COVID-19 economic recovery at risk.

RECOMMENDATIONS

Recommendation

The Australian Government should consider additional stabilisation funding for university research for at least a further calendar year.

Recommendation

The Australian Government should increase long-term investment in university research, reaffirming its central role in providing substantial long-term support for an essential pillar that underpins national prosperity, competitiveness and security.

Recommendation

The Australian Government should consider policy options that provide direct support to industry for research and development, alongside the indirect support provided through the research and development tax incentive.

Recommendation

The Australian Government should ensure the state and territory plans to bring international students back into Australia are adequately supported and enabled to proceed as quickly and smoothly as possible while ensuring public health requirements are met.

Recommendation

Careful scrutiny of the impact of JRG changes with particular attention to impacts on:

- universities' finances;
- student choice; and
- potential extension of the Transition Fund.

Recommendation

The Australian Government should extend demand-driven places to all Indigenous students (not just those from regional and remote areas).

Recommendation

The Australian Government should extend the eligibility to access the Higher Education Loan Program for Australians undertaking non-award micro-credentials delivered by Table A and Table B universities.

Recommendation

The Australian Government should provide direct funding to supplement the institutional programs supporting students whose financial situation has been impacted by the pandemic.

Recommendation

The Australian Government should exempt the time international students spend participating in industry-based learning from the work hour limit imposed by student visa conditions in recognition of the broad range of industry-based work experiences undertaken by international students.

Recommendation

The Australian Government should ensure the regulatory flexibility implemented in response to COVID-19 stay in place for as long as needed to support the international education sector's recovery.

Recommendation

The Australian Government should fund a time-limited health service placement adjustment package to support current and future health workforce supply.

Recommendation

The Australian Government should fund a university scoping study to explore models for due diligence information sharing amongst universities and between Government and universities. The project should explore options to:

- provide a service that collects and shares accurate, consistent information to inform university international due diligence processes and decisions; and
- support lifting of university capacity to undertake due diligence to counter foreign interference.

OPPORTUNITIES FOR UNIVERSITY EDUCATION

Recommendation

The Australian Government should extend demand-driven places to all Indigenous students (not just those from regional and remote areas).

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The Australian Government should extend the eligibility to access the Higher Education Loan Program for Australians undertaking non-award micro-credentials delivered by Table A and Table B universities.

Recommendation

Careful scrutiny of the impact of JRG changes with particular attention to impacts on:

- universities' finances;
- student choice; and
- potential extension of the Transition Fund.

Universities Australia welcomes the additional 12,000 Commonwealth supported places and 50,000 subsidised places for short courses announced in the October Budget. This important Government initiative supports re-skilling and re-training of thousands of Australians who have been displaced as a result of the COVID-19 pandemic. The timely provision of additional subsidised higher education places amid the COVID-19 recession provide opportunities for those who have been unemployed and those who aspire to futureproof their employment prospects to re-skill and attain further educational qualifications.

University education has clear benefits for individuals, for their ability to contribute to the economy and society, and to national productivity.

Australian Bureau of Statistics (ABS) data consistently shows that graduates perform better in the Australian labour market than non-graduates. Unemployment rates of graduates have been consistently below the national unemployment rate by more than two percentage points since 2007. In May 2020, while Australia's overall unemployment rate was 6.9 per cent, the unemployment rate for those with a Bachelor degree or higher was lower at 4.9 per cent. In the same reference period, unemployment rates for those with a diploma/advanced diploma and Certificate III/IV were higher at 6.5 per cent and 6.1 per cent respectively; while those with no post-school qualifications recorded an unemployment rate of 9.8 per cent.¹

IMPACT OF JOB-READY GRADUATES PACKAGE

Universities Australia acknowledges the Government's commitment to meeting demand for higher education places through the Job-ready Graduates (JRG) package, which passed through Parliament in October 2020. Demographic growth in the youth population, plus the effects of the first recession Australia has experienced in nearly three decades, mean that many more people –

¹ Australian Bureau of Statistics 2020, *Education and Work, Australia May 2020*, cat. no. 6227.

both school leavers and others – will want to study in coming years. To equip Australians with the skills needed to drive recovery and to thrive in the economy of the future, more university places are urgently needed.

We note, however, that total per-student funding for teaching will fall under the Job-ready Graduates package – by 5.8 per cent per place on average – when fully implemented. To give more Australians the opportunity to get a degree, universities will have to educate more students for the same amount of funding at best. Further, this obligation to do more with less will arise in a context of significant reductions in universities’ revenues for some health and STEM disciplines that the Government seeks to encourage, notwithstanding the establishment of a ‘Transition Fund’ to help universities disadvantaged by the package in the first three years of implementation.

This reduction in funding per student place for teaching puts additional pressure on the university sector already under very significant stress amid the closure of Australia’s international borders, which has significantly impacted revenue in a range of areas, and especially in international student enrolments.

Moreover, the JRG package is a large and complex series of measures that will affect different areas of higher education in various and in some cases unpredictable ways. The package includes, among other things:

- the biggest change in funding for student places in 25 years – with big increases in fees for some disciplines and substantial discounts in others;
- fundamental changes to mechanisms for Government funding of universities;
- measures to boost participation by regional students and support regional universities which are quite different from previous policy approaches; and
- new approaches to supporting industry linkage and higher education equity and access – both complex and important areas.

Universities Australia is concerned about the impact of JRG package on:

- students’ behavioural responses, particularly women and students that are potentially more price sensitive, including mature age students, students from low socioeconomic backgrounds, Indigenous students and students from regional and remote areas;
- potential misalignment between student demand and supply of places at different geographical locations; and
- the financial position of universities and the effectiveness and adequacy of the transition fund in supporting universities’ structural adjustment and whether there is a need for further transition support funding in 2024 and beyond.

Universities Australia looks forward to working with Government to monitor the implementation of the JRG package and its impact on students and universities.

DEMAND-DRIVEN FUNDING FOR INDIGENOUS STUDENTS

The JRG package includes a measure to make funding of Bachelor places (except in medicine) demand-driven for Indigenous students from regional and remote areas. This means that eligible students will be guaranteed a university place. This is a commendable measure which will help universities to continue to increase participation in higher education by Indigenous people. Indigenous enrolments more than doubled under the former demand-driven system. This progress was put at risk by the funding freeze that ended the demand-driven system at the end of 2017. As a share of domestic undergraduate enrolments, Indigenous students (1.9 per cent) are still well below the Indigenous share of the total population (3.1 per cent) in 2019.

Universities Australia recommends that demand-driven funding be extended to all Indigenous students in Bachelor degrees (other than medicine), regardless of where the student lives.

Our reasoning is simple. Most Indigenous people live in cities and towns. According to Australian Bureau of Statistics data, 75 per cent of Indigenous people live in major cities. Indigenous people in major cities are much more likely to have a degree than those from the regions, but the attainment rate for Indigenous people in urban areas aged 20-64 is only 11 per cent – only one third of the figure for the non-Indigenous population (33 per cent). While disadvantage does increase with remoteness for Indigenous people, it is clearly and obviously present in urban areas too.

Figure 1: Higher education by Indigenous status and regionality, 20 to 64 years old, 2016 Census



Source: Australian Bureau of Statistics, 2016 Census of Housing and Population, TableBuilder.

As reports on the *Closing the Gap* agenda have consistently shown, higher education for Indigenous people is a success story, and a major contributor to the advancement of Indigenous people. Enrolments and completions are trending up, and for those Indigenous people that have degrees, there is effectively no gap in employment. The 2016 Census found that both Indigenous and non-Indigenous graduates had employment rates of 83 per cent. For all Indigenous people aged 15-64, employment rates are around 47 per cent – well below the non-Indigenous rate (72 per cent). Annual Government surveys on graduate employment outcomes consistently show that Indigenous graduates' outcomes are comparable to – or better than – those of non-Indigenous graduates.

FINANCIAL ASSISTANCE FOR MICRO-CREDENTIALS

Changes in Australia's economic conditions and advances in science and technology will continue to reshape how Australians work and the role they play in Australia's labour market. The extent to which Australians, businesses and the nation can benefit from these changes depends significantly on the readiness of Australia's education and training systems to help individuals build and maintain relevant knowledge and skills over their working careers.

The general expectation is that growing numbers of adult workers will need to upskill or retrain to remain employable. However, data from the Australian Bureau of Statistics' (ABS) *Survey of Work-Related Training and Adult Learning* has shown the proportion of people aged 15–64 years

old undertaking both formal and non-formal training² has declined in recent years. In 2017, 44.8 per cent of Australians aged 15–64 years old participated in formal and/or non-formal learning, compared to 50.2 per cent in 2013 and 53.4 per cent in the 2005 survey.³

The ABS survey also found that about one in ten working age Australians (10.6 per cent) reported that they wanted to participate in more non-formal learning in 2017. Of those who did participate in non-formal learning, almost one in five (19.3 per cent) reported they wanted to do more. The main reasons for not participating in learning were:⁴

- too much work or no time (44.7 per cent);
- financial reasons (26.1 per cent);
- personal reasons (10.9 per cent); and
- course not available (5.7 per cent).

While additional subsidised short-course places for 2021 announced in the October Budget is a welcome initiative for individuals who want to retrain and reskill, some Australians are facing time constraints to complete a structured short-course within the allowable timeframe due to work commitments and childcare or family caring responsibilities.

Australia's existing financial incentives do not support workers that are facing time constraints to training or workers transitioning to new occupations. Prospective students who are time poor and not able to commit to undertake formal higher education qualifications under the Australian Qualification Framework (AQF) currently have to pay upfront for non-award micro-credentials. If they have enrolled in micro-credentials that do not relate to their current occupations, they are not able to claim the course fees as self-education expense tax deductions.

To remove these financial barriers, the Government should consider extending eligibility to access the Higher Education Loan Program to non-award micro-credentials that are not part of a recognised award under AQF offered by Australian universities. A key advantage of the income-contingent loan system is it does not discriminate based on age or employment status. Eligibility is extended to the employed, unemployed, inactive workers, and the self-employed. More importantly, it improves affordability of education and training by removing the need for upfront payment of course fees. Universities Australia notes the current consultation process by Treasury to look at extending self-education expense deductions to education expenses that are not related to individual's current employment.

² Formal training is structured or organised learning leading to a qualification that is recognised under the Australian Qualifications Framework (AQF), such as a Year 12 or equivalent, a Certificate III, a Diploma or a Bachelor Degree. Formal learning is undertaken at a recognised institution, such as a school, college or university. Non-formal learning is structured and organised learning that does not lead to a recognised qualification under AQF.

³ <https://www.abs.gov.au/statistics/people/education/work-related-training-and-adult-learning-australia/latest-release#data-download>

⁴ <https://www.abs.gov.au/articles/barriers-participation-non-formal-learning>

UNIVERSITY RESEARCH – A NATIONAL ASSET

Recommendation

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WHY RESEARCH IS IMPORTANT

Australia's prosperity will become even more dependent on gains through innovation and productivity. Universities in Australia and around the world have demonstrated their ability to rapidly deliver ground-breaking research that has allowed the effects of the pandemic to be understood and managed. These achievements stand on a foundation of long-term investments in our researchers, our students and our institutions. Universities provide the 'standing army' of research capability that can tackle the challenges and seize the opportunities. It does this by both working with industry, Government and through international collaboration.

University budgets have been severely affected by the loss of international student fee revenue and this has translated into a loss of funding for research. The \$1 billion stabilisation funding in the 2019–20 budget has enabled universities to avoid drastic losses to their research workforce. However, as the effects of the pandemic continue to be felt, more assistance is required.

It would be prudent to examine the effectiveness of the support available for research by business – the largest R&D performer in this country. Australia sits as an outlier in the level of indirect assistance in the world. Several policy options, both domestic and international, are presented for consideration in Appendix A that would leverage synergies between universities and industry through a direct funding mechanism.

Australia's economic growth prior to the pandemic has been the envy of advanced economies around the world. As the Treasurer noted in a speech in August 2019, the Australian economy has grown on average by 3.1 per cent per year, compared to an OECD average of 2.2 per cent.⁵ He identified the main driver of this growth as productivity, contributing 1.7 percentage points of that 3.1 per cent growth, the remaining 1.4 per cent being population and participation.

Importantly, the Treasurer called on business to 'back itself' and invest in R&D, which will in turn drive the productivity increases required to continue the multidecade success story.

⁵ <https://ministers.treasury.gov.au/ministers/josh-frydenberg-2018/speeches/address-business-council-australia>

Whilst the pandemic has impacted Australia's growth story, the equation still holds true. In fact, given the current limitations on the population and participation drivers – overseas migration contributed 62.5 per cent to Australia's annual population growth – the onus on productivity is greater than ever.

Australia's future requires a careful balance between global partnerships and sovereign capability in research and development. The continuing decline in national R&D expenditure means a renewed focus on support for Australian-led R&D is needed. Australia cannot rely solely on 'buying in' ideas from overseas. Whilst we can and do 'buy in' new ideas and products, and adopt and adapt international ideas and products for our own environment, relying too heavily on this pathway for innovation brings considerable risk.

UNIVERSITIES CENTRAL IN AUSTRALIA'S RESEARCH LANDSCAPE

Universities provide a 'standing army' of experts, ensuring Australia is resilient to shocks and able to seize opportunities.

Universities make a very significant contribution to Australia's national research effort. They undertake 35 per cent of all research in Australia (the eighth highest in the OECD), perform 43 per cent of all applied research (more than industry), and 90 per cent of all discovery (basic) research.

Universities provide a 'standing army' of experts, ensuring Australia is resilient to shocks and able to seize opportunities.

Never has this been clearer than in the face of the virus.

Experts in such a wide range of fields are only found inside universities. Researchers from the private sector, Government and specialised research institutes help to make up a healthy research mix, typical in advanced economies, and make valuable contributions. However, the vast majority of Australia's public good R&D is done in universities.

The scale and diversity of research capability in Australian universities significantly enhances the potential for Australia to develop sovereign capability in areas of national significance, including high value-added products and services.

Universities employ researchers who create new knowledge, technology and practices that allow improvements in economic prosperity and social and community wellbeing, and ultimately improve the quality of life for all Australians.

- University research allows discovery of knowledge.
- University research creates expertise that can be called on in times of crisis.
- University research leads to innovation that solves problems.

University research improves the life of every Australian – either through the economic contribution that Australian university research makes, or through discoveries, innovation and knowledge that Australian universities have brought into being.

Australian industry increasingly relies on these discoveries and innovations to fuel their growth, with universities performing the highest proportion of Australia's applied research.

COVID-19

The benefits of Government investment in university research have been particularly evident during the COVID-19 pandemic, and during the bushfire season that preceded the arrival of COVID-19 in Australia.

Australia has been a global leader in meeting the challenges posed by COVID-19. We have pulled together this breadth of expertise secure in the knowledge that profound changes are based on expert advice from universities and the thousands of researchers working within them.

Universities have been able to respond rapidly and effectively due to decades of investment in research excellence across all fields of research. Universities are uniquely positioned in the research system to be able to respond to any problem thanks to this breadth of expertise.

While the effects of COVID-19 have been unprecedented and unexpected, the ability of our world-leading researchers and universities to respond to it was predictable. It is the same capacity that also allowed a response to the bushfires of mid-late 2019/early 2020.

The availability of experts on the topics required to fight a pandemic did not happen by accident. It is the result of long-term investment by Government and universities across the full range of research disciplines. That investment is returned every day, but very visibly in times of such trauma.

Australia has this ‘standing army’ of highly skilled and knowledgeable experts, because we have a distinct pipeline that you can progress through from undergraduate student, to postgraduate student, to postdoctoral position, to career researcher. All through the pipeline, the development of this workforce is supported by high-quality infrastructure, global engagement and a critical mass of Australians and skilled migrants who have chosen to move here, working across fields of research. The workforce and infrastructure need to be constantly renewed, and the members of that workforce need to be constantly expanding their knowledge, interacting across Australia and globally to ensure Australia’s knowledge-base is at the frontier.

It is in Australia’s interest to maintain a broad-based capability that serves our community year in year out, and that can be pulled together into a national response when needed.

A very small selection of examples of universities helping to manage the impacts of COVID-19 and bushfire crisis include:

- A free online tool to help healthcare workers quickly recognise COVID-19 in patients and identify potentially life-threatening cases was launched by [The University of Sydney](#) spinoff DetectEd-X in March in 2020.⁶
- [University of South Australia and Flinders University](#) partnering with Adelaide packing company Detmold to test locally produced masks and respirators to help stop the spread of COVID-19.
- A tool designed to combat talent shortages in Australia’s increasingly strained supply chain sector was developed by researchers at [Deakin University](#), with a launch of a digital career map in October 2020.
- Bushfire detection modelling, conducted by [The Australian National University](#) in 2020, determined the significant economic savings of up to \$8 billion for reductions in fire detection times. In response, the establishment of the ANU-Optus Bushfire Research Centre of Excellence with a focus on rapid fire suppression was announced in October 2020.

⁶ Universities Australia 2020, *HIGHER EDUCATION*. 16 October 2020.

SOVEREIGN CAPABILITY

Australia's future will depend on our capacity to develop new and innovative ideas, products and services. We cannot rely on other countries to give us what we need.

The Department of Defence has a new Sovereign Industrial Capability Assessment Framework. The department's definition of sovereign industrial capability focuses around "access to, or control over, the essential skills, technology, intellectual property, financial resources and infrastructure within our defence industrial base as required".⁷ This definition can be used more broadly – it is in Australia's national interest to have access to, or control over, the essential skills, technology, intellectual property, financial resources and infrastructure that we need.

A component of sovereign capability is expertise in cyber security. Cyber security is increasingly an area of concern to Australia, and one where a sovereign capability is essential. Universities play an important role in developing the research expertise to combat cyber attacks, and through the flow of that expertise into undergraduate and postgraduate programs to develop Australia's cyber security workforce. The demand for cyber security specialists and cyber security knowledge is increasing. Australia's private and Government sectors will increasingly look to employ cyber security specialists, as well as expect heightened awareness of cyber security issues amongst their wider workforces. Universities are rising to the challenge of providing this expertise and this training.

FUNDING CHALLENGES

Australia's investment in R&D is falling behind international competitors. At 1.79 per cent of GDP, Australia lags behind our competitors and is now well below the OECD average of 2.37 per cent in 2017.⁸ Australia's investment has been declining for over a decade, down from 2.25 per cent of GDP in 2008, and there is no sign of stabilisation.⁹ This contrasts with a small but steady increase in the OECD average over the same period, from 2.28 per cent to 2.37 percent.¹⁰

The decline has been driven primarily by business reducing its R&D expenditure, but Government expenditure on R&D (GOVERD) has also fallen. Business expenditure on R&D as a share of GDP (BERD) declined by 31 per cent from a peak of 1.37 per cent in 2008 to 0.94 per cent in 2017-18.¹¹ Government expenditure on R&D has declined by a similar percentage.

Universities play a pivotal role in Australia's R&D effort. In 2017–18, Australia's universities undertook 34 per cent of Australia's total R&D, and more than 77 per cent of public sector research.¹² Universities perform 90 per cent of discovery or basic research in Australia, and a higher proportion of Australia's applied research than industry – 43 per cent of Australia's applied research expenditure is in universities, compared with 41 per cent in industry.

⁷ <https://www1.defence.gov.au/business-industry/capability-plans/sovereign-industrial-capability-priorities>, accessed 6 January 2021

⁸ OECD 2020, Main Science and Technology Indicators database.

⁹ *Ibid.*

¹⁰ *Ibid.*

¹¹ OECD 2020, Main Science and Technology Indicators database and Australian Bureau of Statistics 2019, *Research and Experimental Development, Businesses, Australia, 2011–12*, cat. no. 8104.0.

¹² Australian Bureau of Statistics 2019, *Gross Expenditure on R&D (GERD), Research and Experimental Development, Businesses, Australia, 2017-18*, cat no. 8104.0.

Few countries are more reliant on their university sector for their national R&D capacity than Australia.

When comparing international rates of higher education expenditure on R&D (HERD) as a percentage of gross domestic expenditure on R&D (GERD), universities performed 35 per cent per cent of all research in Australia. This is the eighth highest level in the OECD. In comparison, levels of university research as a share of national research are lower in peer nations, including Singapore (28 per cent), New Zealand (25 per cent), UK (24 per cent), France (21 per cent), Germany (18 per cent), USA (13 per cent), Japan (12 per cent) and South Korea (8 per cent). A peer nation with similarly high rates includes Canada (42 per cent).

As business and Government spending declines, universities are carrying an ever-greater share of Australia's R&D effort. In 2008 universities accounted for 24 per cent of gross expenditure on R&D (GERD). By 2017–18 this had increased to 34 per cent. However, the amount of university expenditure on R&D supported by dedicated research grants from the Australian Government has declined from 40 per cent in 2008 to 34 per cent in 2018.

INTERNATIONAL EDUCATION AND RESEARCH FUNDING

Universities have been successful in building Australia's fourth largest export industry. International education earned Australia \$40.1 billion in export income in 2019 and supported more than 250,000 jobs. The revenue earned through international education helped to support university research, which in turn has helped to support Australia's economic development and social well-being. Higher education R&D expenditure (HERD) was \$12.2 billion in 2018 (latest). Of this, \$6.8 billion or 56 per cent was from 'general university funds' i.e. funding from university internal resourcing, including international student fees.

This funding is under threat due to COVID-19 and the closure of Australia's international borders.

UNIVERSITY RESEARCH – WORKING WITH INDUSTRY

Universities around the world engage with industry, which provides a portion of R&D revenue into institutions. Australian universities sourced 4.9 per cent of their funding for R&D from industry, placing them 18th in the OECD. This compares to the US at 5.42 per cent, the UK at 4.45 per cent, Canada at 7.85 per cent and Israel at 8.63 per cent. Countries with strong manufacturing sectors generally have a higher share, with Korea at 14.25 per cent (first) and Germany at 13.5 per cent (second).¹³ It should be noted that this measure is not appropriate as a measure of industry collaboration as it effectively penalises success in other sources of funding (e.g., international student income).

As the Government noted in its assessment of the Australian innovation system in 2017, Australian firms tend to specialise in modifying innovations introduced by other Australian firms. In 2014–15, the overwhelming majority of Australian innovators across all business sizes were domestic modifiers, and this has been the case since at least 2008–09.

This strategy requires firms to seek out existing innovations, absorb them, and make the required modifications before deploying them commercially. The ability of so many Australian firms to successfully execute this relatively simple strategy is arguably a strength of Australia's innovation system.¹⁴

¹³ OECD 2021, Main Science and Technology Indicators database.

¹⁴ Australian Government 2017, *Australian Innovation System Report 2017*.

This feature of the Australian economy was highlighted in 2020 by the Prime Minister as a priority on which to further build. In his address to the Australian e-Commerce Virtual Summit, Mr Morrison identified technological adoption as a key priority of the Government:¹⁵

“...This is about using the gains we've just made this year as a springboard to become a leading digital economy by 2030.

I said that after the last election. That's where I want to see Australia go, because there's jobs there, there's incomes there, there's wages there, there's investments there, there's opportunity there.

An economy where our leading industry sectors, mining, agriculture, manufacturing, services, as well as small businesses all around the country, are at the global frontier of technological adaptation, enable them to scale up and grow...”

However, care needs to be taken not to overemphasise adoption and adaptation at the expense of invention. Invention, or new ideas, are a critical supply mechanism. Both are required. An exclusive or excessive focus on domestic modification may adversely affect Australia's international competitiveness, since domestic modification involves a lower degree of novelty than other strategies.

Australia's strengths lie in the adoption and adaptation of innovation but this should not come at the expense of breakthrough innovation.

In particular, new-to-market innovation – both new to international and domestic markets – is generally more valuable since it involves a higher degree of novelty, which in turn reflects a higher degree of competence, sophistication and knowledge. In Australia, the estimated proportion of firms undertaking new-to-market product innovation is relatively low, ranking Australia 23rd of 31 OECD countries in 2015.¹⁶

Another internationally accepted measure of economic competitiveness and industry resilience is the level of sophistication and diversification of its industries. This is commonly proxied by what is termed the Economic Complexity Index.

Australian industry has reduced its R&D investment consistently over the last 10 years from a peak of 1.37 per cent of GDP in 2008 to 0.94 per cent in 2017 (latest figures).

Since 1995, Australia has fallen in ranking in the economic complexity index from 55th (out of 133) place, to 87th place in 2018, just below Uganda and above Burkina Faso.¹⁷

Universities are key enablers of the economy to invent, adopt and adapt.

The scale and diversity of research capability in Australian universities significantly enhances the potential for the country to develop sovereign capability in areas of high value-added products and services. Universities, contrary to some commentary, have deep and productive collaborations with industry that contributes to economic outcomes.

University-industry collaboration has generally been measured as being low in Australia relative to international counterparts. However, the usual measure

¹⁵ Speech by the Prime Minister to the Australian E-Commerce Virtual Summit. 21 October 2020. Link to speech [here](#).

¹⁶ OECD 2015, *OECD Innovation Indicators*, OECD Publishing, Paris

¹⁷ [The Atlas of Economic Complexity](#). Accessed 6 Jan 2021.

employed is the amount of industry funding that universities attract as a share of their total R&D performance.

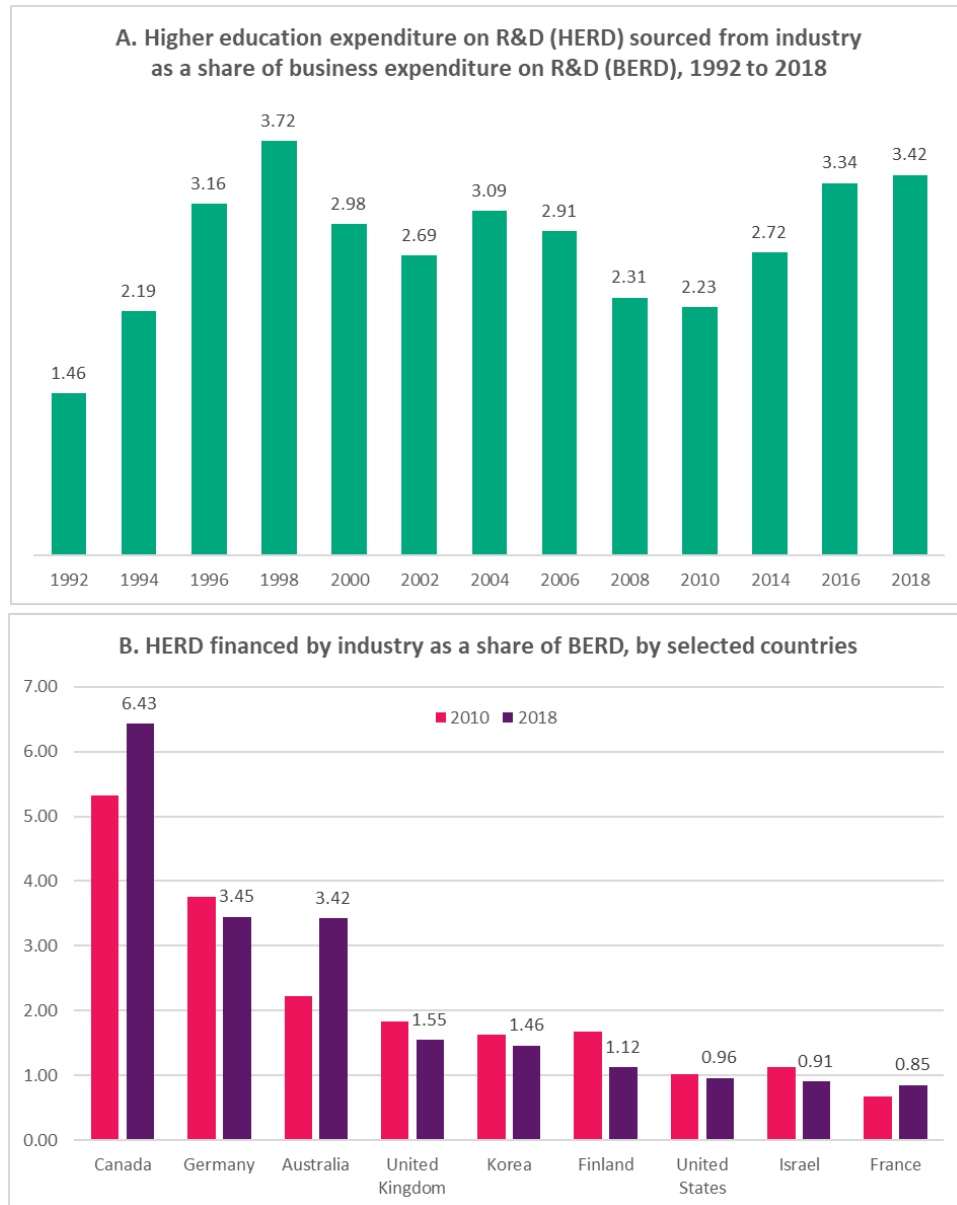
Perversely, this metric in effect has penalised Australia's university sector for being successful at attracting R&D funding from other sources, most notably international student earnings.

A better measure is the amount of industry funding that universities attract as a share of R&D performed by the business sector. This measure provides an indication of the extent to which business allocates funds for R&D performed by universities. It is an indication of demand for university research.

Australian universities rank highly in the OECD in attracting industry funding.

Figures 2A and 2B below shows industry demand for university research in Australia over time and how Australia compared to other comparable countries. When Australia is compared on this metric, it is one of the top performers in the OECD on university-industry collaboration. This is a significant finding and runs counter to the standard narrative. It also complements the finding, noted above, that universities perform the majority of applied research in Australia.

Figures 2A and 2B: Industry demand for university research (per cent)



Source: Universities Australia's analysis based on ABS cat. No. 8111.0 and 8104.0, various years and OECD, *Main Science and Technology Indicators database*, accessed on 21 January 2021 and ABS cat no. 8111.0, 2016.

Formal collaborations between Australian businesses and universities generate \$12.8 billion a year in revenue directly for the firms who partner with universities. By the time this flows through to the economy, these collaborations are contributing \$26.5 billion a year to Australia's income, and have created an estimated extra 38,500 full-time jobs across the country. Modelling by Deloitte Access Economics estimated the total economic return on investment at \$5 in GDP for every dollar invested in higher education research.¹⁸

¹⁸ Deloitte Access Economics, *The importance of universities to Australia's prosperity*, March 2020

Furthermore, community-wide (social) returns on investment for publicly funded R&D are likely to exceed 20 per cent, based on modelling the impact of R&D on private sector productivity. It should be noted that this is likely to be understated.¹⁹

RESEARCH SOLUTIONS

Industry funding of university research complements, but cannot replace, Government funding.

Key Australian research developments and sovereign capability address the challenges of the future. Breakthroughs in treating severe asthma and curbing tuberculosis²⁰ through to the evidence and expert driven response to a global pandemic are all the result of a robust research pipeline. It is the result of essential investment at each stage of the research journey, from invention to adoption, adaptation, and eventual impact. Whilst the economic and societal gains of research translation have led to an increased Government focus on commercialisation and collaboration initiatives, Australia must also possess high quality research that it is able to translate.

For a thriving ecosystem of research translation, balance across all aspects of the research pipeline – from basic research through to commercialisation – is necessary to address the opportunities and challenges Australian research seeks to resolve. This pipeline does not come with pre-determined timelines. For example, ongoing key developments in neurodegenerative disease research, and subsequent translation and commercialisation activities conducted by the Florey Institute of Neuroscience and Mental Health at The University of Melbourne, began with a NHMRC Postgraduate Scholarship in 1989.²¹ Similarly, with a project commencement-to-commercialisation period spanning 1998 to 2014, irrigation technology research advanced and implemented by researchers from University of Southern Queensland, has now resulted in significant efficiencies, water saving and economic gain for the Australian cotton industry.²²

As well as fostering the research necessary for translation and impact, universities, with Government support, provide the expertise to effectively adapt and adopt research, and to respond to Australia's most pressing challenges. With all nine of Australia's current federal, state and territory Chief Medical and Health Officers being alumni of Australian universities, this expertise is not developed overnight, but instead through persistent investment in the development of Australia's national capabilities and workforce.

SUPPORT FOR UNIVERSITIES

The sector appreciates the Government recognising the price the country would pay for a sudden reduction in university research expenditure. This was recognised through a \$1 billion injection of stabilisation funding in the October 2020 budget. This funding is welcome. However, as the figures demonstrate, a one-off injection of funds does not solve the major, ongoing issues affecting Australia's investment in research and development.

¹⁹ Frontier Economics 2014, *Rates of return to investment in science and innovation*, Frontier Economics, London, p. 5-6

²⁰ See 'Aridol and Bronchitol' (2018), 'Severe Asthma: Mepolizumab' (2019), 'Tuberculosis control in the South-East Asian region' (2020) and 'History of tuberculosis control in Australia' (2020), Impact Case Studies, NHMRC. nhmrc.gov.au/about-us/resources/impact-case-studies.

²¹ See 'Neurodegenerative disease and metals' (2019), Impact Case Studies, NHMRC. nhmrc.gov.au/about-us/resources/impact-case-studies.

²² University of Southern Queensland, 'Optimising surface irrigation leads to increased productivity in the Australian cotton industry', Engagement and Impact 2018, Australian Research Council.

Universities Australia is therefore advocating for further such injections of funding into universities through the Research Support Program to support the research workforce and research infrastructure that supports Australia's future economic and social development.

SUPPORT FOR INDUSTRY

In the business R&D space, the balance between indirect (the R&D tax incentive) and direct measures sits at an extreme. With 86 per cent of Australia's current innovation-focused investment filtered into the R&D Tax Incentive mechanism, Australia sits apart from peer nations in its singular focus on tax incentives as a mode of stimulating R&D. Australia has the highest level of indirect support for R&D in the OECD compared to other partner economies (comprising 50 nations).²³

Direct funding of R&D provides flexibility in policy objectives, ensures that investment is well targeted and guarantees additionality. In contrast, indirect policy measures – such as R&D tax incentive – suffer from persistent questions on whether the R&D activity would have been undertaken irrespective of the incentive. Whilst it is often claimed that direct funding is more expensive to administer than an indirect, tax-based incentive, the benefits outweigh this cost. Also, the administrative costs of indirect incentives are considerable.

In the *2016 Review of the R&D Tax Incentive*, the program administration cost was estimated to be \$437 million in 2014–15, of which \$199 million (or 46 per cent) was fees to consultants.²⁴ The burden of the cost does not fall evenly on business. Compliance costs were estimated to account for 23 per cent of benefits for small businesses, compared to eight per cent for large. Of the compliance cost, small businesses spent 41 per cent on consulting fees, compared to 54 per cent for large business.

Direct funding of R&D offers a mechanism for better aligned incentives for universities-industry collaboration, from small to medium enterprises to large business. Universities Australia notes the current efforts to support innovation as part of the Modern Manufacturing Strategy and supports further efforts at a diversified approach to direct R&D support mechanism.

We highlight some current efforts to fund R&D – both domestic and international – that could be investigated for introduction or expansion in Australia in **Appendix A**.

²³ Direct government funding and government tax support for business R&D, 2018 and 2006, OECD R&D Tax Incentive Database, <http://oe.cd/rntax>, December 2020.

²⁴ Ferris, B., Finkel, A. and Fraser, J. 2016, *Review of the R&D Tax Incentive*, p.25.

INTERNATIONAL EDUCATION

Recommendation

The Australian Government should ensure the state and territory plans to bring international students back into Australia are adequately supported and enabled to proceed once public health requirements have been met.

Recommendation

The Australian Government should provide direct funding to supplement university hardship funds supporting students whose financial situation has been damaged by the pandemic.

Recommendation

The Australian Government should exempt the time international students spend participating in industry-based learning from the limit on working hours imposed by student visa conditions in recognition of the broad range of industry-based work experiences undertaken by international students.

Recommendation

The Australian Government should ensure the regulatory flexibility implemented in response to COVID-19, stay in place for as long as needed to support the international education sector's recovery.

Australia's international education system is an Australian success story. It is the product of more than 60 years of dedicated work by universities to build Australia's international education system from the ground up. The centre of gravity of the world's middle-class has shifted to Asia, with rapidly growing numbers of people seeking quality higher education. Given, Australia's unique geographical location, we are very well positioned to deliver that world-class education.

International education has delivered huge benefits to Australia and is our nation's fourth largest export sector after iron ore, coal and natural gas. Of the \$40.1 billion that international students contribute to the Australian economy annually, \$17.3 billion goes to the universities and other education providers in fees, and the remaining \$22.8 billion is injected into local economies – supporting more than 250,000 jobs across the nation.

The benefits of international education are not just economic. International education enriches our campuses and delivers a worldwide network of informal ambassadors for Australia. It enables us to build enduring relationships both within our region and further abroad, acting as an important conduit of 'soft power'.

The hundreds of thousands of international students that have chosen to seek an education in Australia during the past decades leave our shores with a quality education and an understanding and experience of Australia that will shape the rest of their lives.

The constraints on international education due to border closures will have severe consequences for Australia's university research and development capability. University R&D amounted to \$12.2 billion in 2018, 56 per cent of which was funded by universities themselves – funding drawn largely from international student fee revenue. The projected decline in international education will constrict university budgets and hamper their ability to conduct research on behalf of the nation. Estimates project around one quarter of university R&D is at risk.

The sector fully acknowledges that public health considerations are of paramount importance and commends the Commonwealth Government for following the advice of the health professionals as they manage the pandemic. Australia's success in controlling the spread of COVID-19 is the envy of the world. But the uncertainty surrounding when international borders will reopen to international students is affecting the sector's confidence. Universities are unable to plan or to provide any sort of certainty to existing and prospective students who are offshore.

In the absence of a nationally coordinated and consistent approach to bringing international students back into Australia, the Government should ensure the state and territory plans are adequately supported and enabled to proceed as quickly and smoothly as possible while ensuring public health requirements are met.

HARDSHIP FUNDING

Universities Australia and its members are deeply concerned for the safety and welfare of international students. International students make a profound contribution to Australia's economic and cultural fabric, and we should make every effort to ensure they are safe and well during their stay.

Many of these students lost casual jobs. They were and remain ineligible for any form of income support provided to Australian citizens.

During the past 12 months, Australian universities have set up hardship funds to support international students in need, at a time when the universities are under financial pressure. Between March and June 2020 alone, Australian universities provided \$110 million to more than 75,000 international students in need. But now funds are close to exhausted and the number of students who require assistance remains high. While state and territory governments provided some financial and other support for international students, and the Commonwealth Government provided additional funding to charities to support temporary visa holders, a more direct and targeted source of support for international students is important.

Despite the pandemic and the subsequent travel bans, Australia remains one of the top choices for prospective students. The rapid transition to online teaching has meant that a significant proportion of Australia's international students have continued their studies online from home. Competitor nations have been mindful of preserving their competitive advantage in international education. Government wage subsidy and income support programs implemented in response to the pandemic in the UK, New Zealand and Canada have been extended to international students, providing protection and support to those students who meet the necessary eligibility criteria.

INTERNATIONAL EDUCATION STRATEGY

Given the significantly altered landscape and current context of uncertainty, the decision taken by the Council for International Education to conduct a complete renewal of the National Strategy for International Education is welcome.

Universities Australia welcomes the strategy's focus on student experience. Complex cultural, social and structural factors influence international and overseas students' safety, mental health and wellbeing, both inside and outside of educational settings. The strategy must be accompanied by adequate, long-term funding for culturally safe, tailored programs and support services that address the breadth and complexity of issues affecting international students' wellbeing.

WORK INTEGRATED LEARNING

International students must comply with their visa conditions while in Australia, one of which is a 40-hour per fortnight limit upon the number of hours they can work during term time. Under the current arrangements, work-based placements or other work integrated learning (WIL) activities, such as an internship, that are a required part of a student's course do not count towards the 40-hour per fortnight work limit, provided that the WIL element was explicitly listed in the course requirements within the Commonwealth Register of Institutions and Courses for Overseas Students (CRICOS).

However, if a student undertakes a WIL activity on an elective basis, the time engaged in this activity does count towards the student's 40-hour limit. These WIL experiences are highly valued by international students seeking to gain professional skills and experience. Uptake of non-compulsory WIL activities has steadily increased over recent years, and is encouraged by both the Government and universities.

The expert members of the Council for International Education have acknowledged the importance of ensuring our institutions provide skills-based education and training that produces job-ready graduates.²⁵ WIL activities form a valuable part of many international students' university experience and future employability. Given the now-widespread nature of WIL activities for many international students, the fact that the time spent engaged in these activities counts towards their 40-hour limit is proving to be a considerable impediment to their participation.

The conditions placed on the student visa should consider the broad range of industry-based work experiences undertaken by international students. The 40-hour per fortnight limit upon working during term time should be relaxed to acknowledge the importance of international students' participation in WIL activities and not place them at a disadvantage or restrict their learning opportunities.

REGULATORY FLEXIBILITY

Universities Australia welcomes the student visa flexibility measures introduced by the Government in response to difficulties international students faced because of the COVID-19 pandemic. These measures will likely need to be continued for the foreseeable future to ensure international students are not disadvantaged and Australia retains its attraction as a study destination. While we acknowledge that these measures were introduced as temporary response to the challenges posed by the pandemic, we urge that the Government retains this level of flexibility for as long as necessary and does not seek to revert to the standard visa settings prematurely.

The sector also welcomes the measures introduced to allow for greater flexibility regarding recognition of online delivery. These will need to remain in place for as long as Australia's border restrictions prevent international students from travelling to Australia to study in-country.

²⁵ <https://internationaleducation.gov.au/international-network/australia/InternationalStrategy/Council%20for%20International%20Education/Documents/Expert%20Member%20-%20Communique%20-%205%20August%202020%20FINAL.pdf>

Given the ongoing nature of the virus, and the continuing impact on universities, these measures should stay in place for as long as needed to support the international education sector's recovery.

PIPELINE OF HEALTH WORKFORCE

Recommendation

The Australian Government should fund a time-limited, health service placement adjustment package to support current and future health workforce supply.

Ensuring a sufficient and capable workforce is a key part of an effective health system and Australian universities play a critical role in its formation and growth. Universities educate virtually all new entry, pre-registration health professionals in Australia across all disciplines.

Health workforce is already an area of predicted jobs growth, particularly in the areas of aged, disability and primary/community care. Workforce need is also likely to expand further as we traverse the pandemic and deal with the additional challenges posed by post COVID-19 syndrome, the return to routine/catch-up care and vaccination roll-out.

COVID-19 itself has significantly disrupted Australia's health workforce supply and the workforce pipeline is now at risk. Constraints on clinical placements, crucial to graduation, have been severe. Placements generally occur in health services but are a shared responsibility between education and health providers. Quality and type of placements have a known influence on students' future work domain choice. Yet the majority still occur in public hospital settings, despite the known workforce need in other, more community-based domains.

Placement challenges are not new, but they have been exacerbated by COVID-19. Despite joint efforts from education and health stakeholders, we now face two immediate placement issues which threaten Australia's health workforce supply:

- A substantial clinical placement backlog arising from COVID-19. If unaddressed, existing health professional students will be unable to complete their studies and the health workforce will shrink. Ensuring our domestic workforce supply is especially critical while border closures prevent importation of overseas health personnel.
- The urgent need to expand placements into service areas of identified, growing, yet unmet health workforce need in aged, disability and primary care.

EXPANDING PLACEMENT CAPACITY TO SUPPORT WORKFORCE NEED

Various effective health service placement models exist that show the efficacy of partnership approaches between universities and health services in building learner development cultures. These models integrate students into community-based services in sustainable ways that overcome perceived barriers to student placements. As a result:

- clients and providers experience the benefits of student delivered care, including improved staff recruitment and retention;
- students benefit from rich clinical learning environments in non-traditional settings; and
- the community and health sector benefits from workforce gains in areas of need.

These models rely on strong, collaborative, relationships between the university and service provider. However, building these relationships requires dedicated time from both parties and resourcing to achieve.

Universities Australia proposes a time-limited health service placement adjustment package to help address the immediate placement backlog issue while also building the foundations for sustainable and expanded future placement capacity. The expanded capacity would not only support the required growth in health workforce, but also help distribute the workforce to service settings of need.

The package could fund universities to work in partnership with health, aged care, disability and community services to:

- identify and/or develop effective, innovative models that quickly expand placement capacity;
- successfully implement these models nationally, with the initial aim of addressing the immediate placement backlog to maintain current health workforce supply. The secondary aim is to expand placements into identified areas of unmet health workforce need; and
- map, share, evaluate and adjust effective placement models to build sustainable longer-term approaches to placement capacity in areas of need, particularly in aged, disability and primary care services.

MANAGING REGULATORY BURDEN

Recommendation

The Australian Government should fund a university scoping study to explore models for due diligence information sharing amongst universities and between Government and universities. The project should explore options to:

- provide a service that collects and shares accurate, consistent information to inform university international due diligence processes and decisions; and
- support lifting of university capacity to undertake due diligence to counter foreign interference.

Australian universities are autonomous institutions with a range of reporting and compliance obligations under both Commonwealth and state or territory legislation. Universities take their compliance responsibilities seriously and invest in staff, systems and processes to ensure their legislative obligations are met.

Universities Australia is grateful for the various regulatory and fee reliefs provided by the Australian Government in response to the COVID-19 pandemic.

However, in recent years the number of regulatory compliance activities required and expected of universities has increased. This includes the introduction of the Excellence in Research for Australia (ERA) and Engagement and Impact (EI) exercises, and the introduction of the *Guidelines to counter foreign interference in the Australian university sector* in November 2019. While the guidelines are not a compliance document, there are nevertheless expectations about how universities respond to the advice contained in the document.

The recent changes to the *Higher Education Support Act (2003)* to implement the Job-ready Graduates package will establish two new funds – the National Priorities and Industry Linkage Fund (NPILF) and the Indigenous, Regional and Low SES Attainment Fund (IRLSAF). While the design and allocation of these funds are yet to be finalised, we expect universities will be required to provide more data and information to the Department of Education, Skills and Employment, on top of other reporting requirements already in place. The regulatory impact of the *Higher Education Support Act (Freedom of Speech) Bill 2020* remains to be seen.

Other Commonwealth departments and agencies are also currently proposing legislation and/or changes in oversight or regulatory practices that will have significant regulatory and costs implication on the university sector. Legislation includes:

- *Defence Trade Controls Act 2012* – in the process of being reviewed;
- *Foreign Influence and Transparency Scheme Act 2018*;
- *Australia's Foreign Relations (State and Territory Arrangements) Act 2020*;
- Security Legislation Amendment (Critical Infrastructure) Bill 2020 – yet to pass the Parliament; and
- Commonwealth Integrity Commission Bill 2020 – yet to be introduced.

Combined, these potentially create overlapping regulatory and oversight regimes in the university sector that risks diverting increasing amounts of scarce resource from the core operation of universities – teaching and research.

COUNTERING FOREIGN INTERFERENCE

Universities and Government are working together through the University Foreign Interference Taskforce (UFIT) to strengthen the capacity of universities to counter foreign interference in their activities. Universities Australia continues to urge Government to utilise UFIT to increase the coordination of Government policy in this area as it impacts universities.

Due diligence is an important aspect of countering foreign interference. Universities and Government can bring complementary information and expertise together to increase knowledge and underpin decision-making.

Universities have access to publicly available information and commercial services, but are not vetting agencies and should not seek to function as such. Instead, Universities Australia suggests exploring the option of a Government funded service that allows Government and universities to share information, with an ability to tap into knowledge held by each partner in the UFIT partnership.

There are considerable benefits to Government in such a service. The Department of Defence, the Department of Foreign Affairs and Trade, the Department of Home Affairs, the Department of Education, Skills and Employment, TEQSA and the Attorney-General's Department currently, separately, have taken responsibility for aspects of countering foreign interference and regulation of international collaborations. A trusted service that provides a clearing house for due diligence information would provide considerable efficiencies and benefits to Government as well as the university sector.

Knowledge-sharing in a trusted environment is a core requirement in the foreign interference space. A central mechanism for the sharing of information would benefit both Government and universities. It could have two key roles:

- provide a service that collects and shares accurate, consistent information to inform university international due diligence processes and decisions; and
- support lifting of university capacity to undertake due diligence to counter foreign interference.

APPENDIX A: POLICY OPTIONS TO FUND R&D

In this section, Universities Australia highlights some current efforts, both domestic and international that could be investigated for introduction or expansion in Australia.

Innovation or technology vouchers to encourage university SME collaboration

Innovation vouchers are an initiative that encourages collaboration between small and medium-sized enterprises (SMEs) and universities, thereby providing the SME with a greater opportunity to commercialise its products or services through access to skills and infrastructure it would not otherwise be able to afford. They address a well-known gap in the university-industry engagement space.

An example is the NSW TechVouchers scheme which awards up to \$15,000 to SMEs (matched by the SME). The SME is connected with an expert in the relevant fields of research, as well as receiving access to high tech instruments and facilities that would otherwise be prohibitive.

A Commonwealth vouchers scheme would provide a national basis for stimulating SME-university collaboration and driving productivity at a national scale.

International examples include:

- Ontario (Canada) Government's **Voucher for Innovation and Productivity** awards up to \$150,000 (matched by industry partner) to support R&D collaborations between companies and publicly funded universities, colleges and research hospitals
- **The Austrian Innovation Voucher** is designed to help SMEs start ongoing R&D activities, paying for the services (to a maximum value of €12.500) to enlist the services of research institutions.

Industry-specific R&D vouchers

Industry-specific R&D voucher schemes provide a mechanism for targeted, practical support for SMEs that can be contextualised to local needs. It allows university R&D capabilities to couple to existing and future Government industry strategies and policy elements, such as the industry growth centres initiative.

An international example of an industry-specific R&D voucher scheme can be found in Scotland.²⁶ The £11.5 million InGAME R&D collaboration aims to deliver innovative research and R&D support for the Dundee games industry.²⁷

Launched in 2019, the scheme allows games companies, businesses and non-profit organisations to pitch for blocks of academic expertise, resources and support worth up to a maximum of £5,000 per project.

The model allows voucher holders to quickly develop and test new ideas without the risk of financial and time limitations. Developers can prove concepts and assess the feasibility of creative and commercial opportunities.

²⁶ <http://www.sfc.ac.uk/news/2020/news-80775.aspx>

²⁷ The £11.5 million total includes the matching of funding (50/50) through the provision of co-funding (cash) or resources, equipment or intellectual contribution (in kind).

InGAME is jointly funded by an investment of £5.25 million from the Arts and Humanities Research Council and an additional investment of £500,000 from the Scottish Funding Council.

Government facilitated SME–university technology transfer

An example of this initiative is the Small Business Technology Transfer (STTR) Program in the USA. The STTR supports the commercialisation of technologies through providing a share of federal R&D funding to SMEs that have a formal collaboration with public and non-profit research institutes, including universities.²⁸

Each year, US federal agencies with external R&D budgets that exceed \$1 billion are required to reserve 0.45 per cent of the extramural research budget for STTR awards to small businesses. These agencies designate R&D topics and accept proposals.

The program focuses explicitly on the transfer of technology from the research institutes to the SMEs. Whilst the grant applicant has to be the SME, the research institute must perform at least 30 per cent of the R&D. Furthermore, the principal investigator can be from either the SME or the research institute.

This is a key difference between the STTR and its companion program, the Small Business Innovation Research Program (SBIR), on which the Australian Business Research and Innovation Initiative (BRII) program was based.

An equivalent Australian program would allow SMEs to overcome the risk and upfront expenses associated with R&D, and would allow universities to convert the investments made in basic and applied research into products and services to grow the economy through the SME. Thus, the program leverages the strengths of both entities.

Mission-driven grants or ‘challenge prizes’

Mission-driven grants and prizes – based largely on the premise that financial subsidies do not motivate business and research entities to the extent that reward does – are often designed with the aim of promoting both cross-sector collaboration and further innovation, alongside possessing the potential to increase national capabilities and speed-to-market in identified areas of national strategic advantage.

Challenge prize programs are being increasingly employed in the UK, EU, Canada and the United States, largely aimed at escalating innovative activities toward a strategic area of focus.

An example of this can be seen in the UK’s recent Open Up 2020 prize, launched in response to the Competition and Markets Authority’s commitment to sparking more competition and innovation amongst the nation’s largest banks, or in the EU’s Horizon Prizes, targeted towards breakthroughs in some of societies’ most pressing research and technology fields.

The differing structures of these programs (both examples grant and prize hybrids), also allow for a range of potential options, from simply awarding those who meet the set-criteria and ‘win’ the award, supporting the innovation process through grants at certain checkpoints, or a combination of the two. Different configurations of evaluative criteria can also have significant bearing on the ways in which the prize or grant fosters collaboration and progress towards the desired goal.

²⁸ <https://www.sbir.gov/about/about-sttr>

Other challenge prize examples include *Canada's challenge programs*, which provide \$150 million over five years, across 14 strategic research centres with academic and industrial partners.

Industry PhD training programs – a mechanism for transferring R&D into the economy

One of the most powerful ways of knowledge transfer between universities and industry is through the exchange and permanent transfer of researchers. Australia could develop a program at scale.

International models exist of long term, successful industry, doctoral training programs. A notable example is the French, CIFRE program (Industrial Agreement for Training through Research). Under the program, a three-year contract between the company, the research provider and the PhD student is entered into. The Government provides grants of €14,000 (2018 value) per annum to the company. The PhD candidate receives a minimum gross annual salary of €23,485. The company may also be eligible for a research tax credit.

In 2018, 1450 CIFRE grants were provided. The program boasts an employment rate of 90 per cent following the completion of the program. The companies are 42 per cent SMEs, 41 per cent large firms, and 17 per cent other.

Other examples include **Austria's Industrial PhD Research partnerships**. This program funds three-year industrial PhD projects to improve qualifications of research and innovation staff in companies and non-university research institutions. For the duration of the PhD project, the PhD student is employed by a company or non-university research institution located in Austria, for at least 50 per cent of a full-time position.