

# SUBMISSION TO THE STANDING COMMITTEE ON EMPLOYMENT, EDUCATION AND TRAINING INQUIRY INTO RESEARCH FUNDING

30 June 2018

Universities Australia welcomes the opportunity to make a submission to the House of Representatives' Standing Committee on Employment, Education and Training's inquiry into research funding. Universities Australia is the peak body for Australia's 39 comprehensive universities, which educate more than a million students and undertake research to add to the stock of advanced knowledge.

## EXECUTIVE SUMMARY

Australia's research and development capability is principally distributed across the business, higher education and government sectors, with an innovation pipeline from pure basic research through to commercialisation and deployment. Despite its fundamental importance to Australia's economic and social wellbeing, our level of investment in R&D lags international peers. The higher education sector remains the backbone of Australia's research effort, exercising stewardship over our research capability, but a greater R&D effort across the whole economy is necessary to ensure prosperity.

Australian university research is highly regarded around the world, demonstrating the commitment of Australia's universities and researchers to excellence and innovation. Their work changes lives for the better – pioneering Australian discoveries can be seen directly in products like the cervical cancer vaccine and the bionic ear, or indirectly as contributions to advances across many fields. Although discoveries in the sciences and technical fields often gain the most attention, it is important to understand that these discoveries are complemented by advances in the humanities, arts and social sciences, which help us understand (and capitalise on) the complexity of human society.

Australia's research funding system is complex, with many interconnected actors and policies. The Commonwealth financially supports approximately one-third of Australia's \$31 billion science, research and innovation effort, through more than 160 separate programs. There have been a multitude of reviews and inquiries over the past two decades into Australian research and innovation funding, leading to numerous changes. Currently, the Australian research funding system is undergoing significant change, with the outcomes of five separate reviews being implemented. Very careful consideration should be given to whether further changes at this time would be in the interests of, or breed confidence in, Australia's overall research and innovation system.

Rather than focussing on specific elements of the current system, Universities Australia outlines a set of principles that should be at the heart of research funding mechanisms. These relate to:

- the importance of long-term planning and patient investment;
- the centrality of investigator-driven research to future innovation;

- the need for funding mechanisms to promote excellence and integrity;
- the role of flexible funding mechanisms in the stewardship of research capability;
- funding mechanisms and processes that support transparency, accountability and efficiency, and
- embracing the increasingly global nature of the research enterprise.

Universities Australia strongly believes that Australia is best served by a confident, outward-looking research community that can utilise its global expertise for the benefit of Australian society. Our research capabilities are national assets, which universities safeguard and nurture on behalf of the nation. By embracing these principles, the value of these assets is protected and increased for current and future generations.

#### **Recommendation 1:**

The Australian Government, in partnership with the states and territories, the private sector and the higher education sector, should develop a strategy and commit resources with the goal of significantly increasing the intensity of research and development in the Australian economy.

#### **Recommendation 2:**

Universities Australia recommends that the Government work towards full re-capitalisation of the Education Investment Fund, and recommencement of disbursements from investment earnings of the Fund.

#### **Recommendation 3:**

Universities Australia recommends that proposals for further major changes to the research funding system not be considered until the effects of the current suite of changes are apparent.

#### **Recommendation 4:**

Expert peer review should remain and be reaffirmed as the core determinant of excellence for funding the most outstanding and deserving ideas.

#### **Recommendation 5:**

The Australian Government should restore the demand driven undergraduate enrolment system to ensure the widest possible participation in the postgraduate research cohort.

#### **Recommendation 6:**

New policy initiatives likely to result in increased reporting or compliance requirements for the higher education sector should be accompanied by a Regulatory Impact Statement that quantifies the cost of the change.

#### **Recommendation 7:**

The Australian Government should expand support for international linkages for Australian researchers through the Australian research funding system.

## INTRODUCTION

Australia's research and innovation system is composed of actors from the business, higher education, government and private not-for-profit sectors. Researchers across the system contribute to the full innovation pipeline, from basic curiosity-driven research through to end-use deployment of novel goods, services, knowledge, policy and practice.

In 2015-16, \$31.2 billion was spent on research and development across the Australian economy. The business and higher education sectors accounted for the vast majority (84%) of this expenditure.<sup>1</sup> Across the economy, the Australian Government funded or supported approximately one-third of this effort (\$10.2 billion), predominantly through the Research and Development Tax Incentive scheme for business R&D, and competitive and block-based funding for higher education research.

The Australian research and innovation system is complex and has evolved over time to meet changing community priorities and expectations. Universities Australia notes that the research and innovation sector has been extensively reviewed, both by the Government and the Parliament, with numerous reports and policy statements being delivered in the last decade. In particular, the last major review of research policy and funding conducted by Dr Ian Watt in 2015 is still being implemented, meaning that the research and innovation system is still adapting to new policy settings. Universities Australia strongly cautions against frequent changes to research policy and funding arrangements, which robs the system of the ability to plan and the confidence required to respond to policy settings.

### The importance of research and development

Research, development and innovation is critical to the prosperity of the Australian economy. Innovation is a key driver of productivity growth, and hence vital to the economic and social wellbeing of the community. Public and private sector R&D are both important to the national welfare. As explained by the Australian Council of Learned Academies;

*“Private sector knowledge is a source of positive benefits (spill-overs) to productivity. This implies that innovative activity has broad benefits that diffuse throughout the economy.*

*Public sector R&D expenditure by Australian Government research agencies, the Australian Research Council and the universities have strong spill-over benefits and are important sources of gains in productivity.”<sup>2</sup>*

Research that fosters innovation is important not only on the national scale, but also to individuals within the economy. As Bill Ferris, Chair of Innovation and Science Australia notes:

*“Innovation drives productivity, which drives GDP growth which drives living standards. And fast-growing companies that innovate, export and scale are responsible for virtually all new net jobs in the economy.*

*History shows us that in the long term the places that practice innovation – new and better ways of making things and delivering services at home and abroad – are the ones that keep creating sustainable jobs and prosperity.”<sup>3</sup>*

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<sup>1</sup> Australian Bureau of Statistics 2017, *Research and Experimental Development, Businesses, Australia, 2015-16*, cat no. 8104.0, accessed 4 June 2018.

<sup>2</sup> Bell, J, Frater, B, Butterfield, L, Cunningham, S, Dodgson, M, Fox, K, Spurling, T and Webster, E 2014, *The role of science, technology and research in lifting Australian productivity*, Australian Council of Learned Academies, Melbourne, p.134.

<sup>3</sup> Ferris, B 2018, 'Australia 2030: the role of universities in our economic and social future', *Higher Edition*, Universities Australia, accessed 4 June 2018

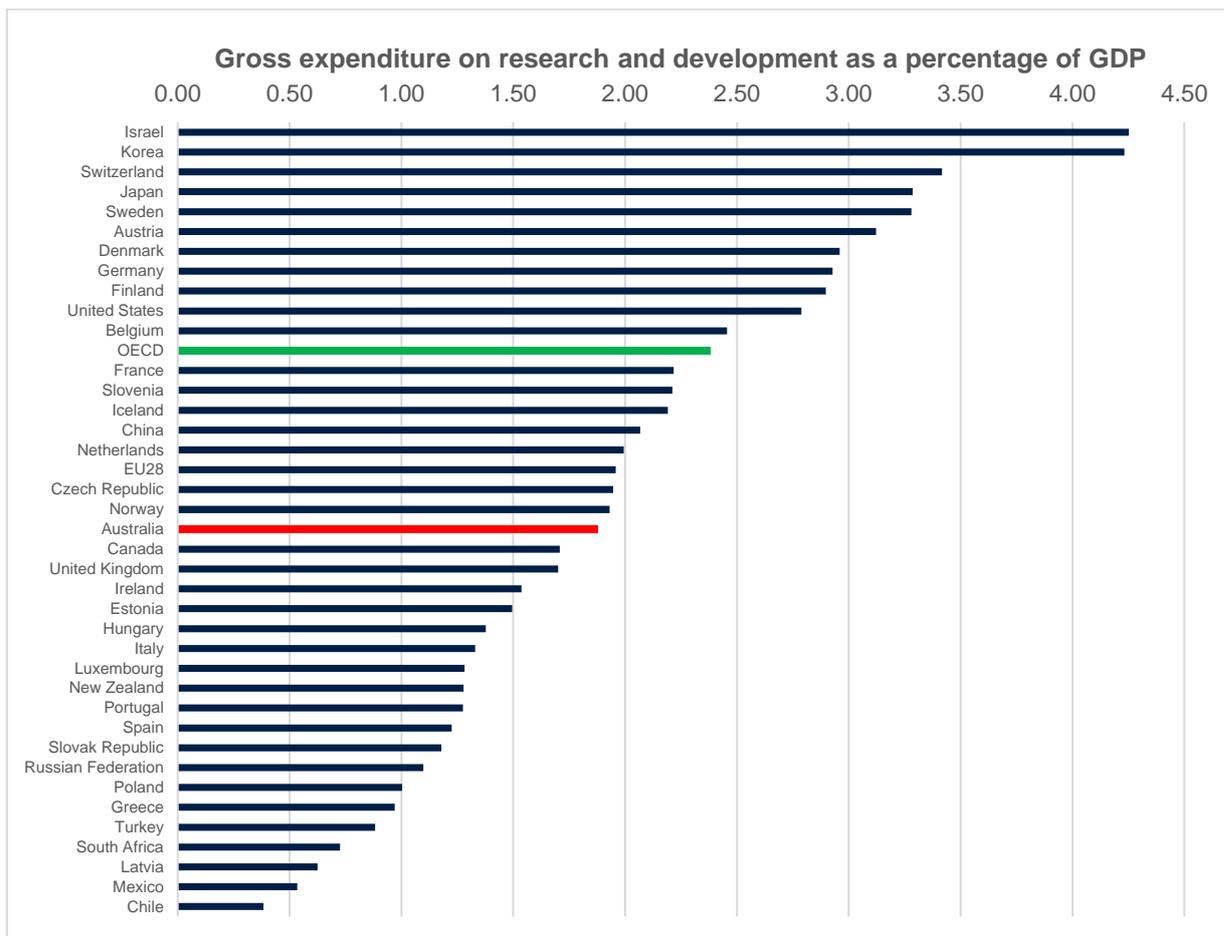


Figure 1: R&D intensity of OECD and selected other economies. Sources: OECD 2017;ABS 2017

The world’s leading economies recognise the importance of R&D and invest accordingly. The intensity of Australia’s R&D effort, at 1.88 per cent of gross domestic product, lags behind our competitors and is well below the OECD average of 2.38 per cent (see figure 1).<sup>4</sup>

In Australia, the stock of knowledge gained from Australian university research was estimated to contribute around 10 per cent of GDP in 2014, or \$160 billion per annum – this does not include the additional contribution of overseas research.<sup>5</sup> In 2016, the Office of the Chief Scientist and the Australian Academy of Science estimated that advanced research in the physical, mathematical and biological sciences alone (including Australian and international research) underpinned more than a quarter of the Australian economy – or \$330 billion in annual economic activity.<sup>6</sup>

Research and development is the basis of innovation; basic, curiosity-driven research supplies the stock of new ideas that give rise to new technologies or services. Without applied research and development, discoveries stay at the laboratory bench and do not realise their full potential. Without dedicated researchers, there are no new cures for diseases, nor new kinds of nutritious and accessible food. Without collaboration across disciplines, there is no successful integration of new ideas into community-ready products and services.

<sup>4</sup> ABS 2017 op cit., Organisation for Economic Cooperation and Development 2017, *Science, technology and industry scoreboard*, Paris, p.99

<sup>5</sup> Deloitte Access Economics 2015, *The importance of universities to Australia’s prosperity*, p.84

<sup>6</sup> Australian Academy of Science 2016, *The importance of the advanced physical, mathematical and biological sciences to the Australian economy*, p.2

The returns to society from public investment in research are significant and real, although it can be challenging to attribute the specific returns from an individual discovery through the economy. Nonetheless, there is a body of evidence that shows that public investment in R&D is a wise and productive use of funds. In a report commissioned by the UK Department of Business, Innovation and Science, Frontier Economics noted that 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.<sup>7</sup> Closer to home, the ratio of benefits to costs associated with the Australian Government's investment in the Cooperative Research Centre program was found to be around **3:1**,<sup>8</sup> and the Productivity Commission has concluded that '*on the basis of multiple strands of evidence, the benefits of public spending [on science, research and innovation] are likely to exceed the costs.*'<sup>9</sup>

Research and development is not simply a competing demand in budgetary consideration – it is one of the most productive mechanisms that we have as a society to invest in the future prosperity and wellbeing of both ourselves and future generations.

### **Recommendation 1:**

The Australian Government, in partnership with the states and territories, the private sector and the higher education sector, should develop a strategy and commit resources with the goal of significantly increasing the intensity of research and development in the Australian economy.

### **Australia is a global leader in research quality and productivity**

Australian research and development is not only world-class but is world-leading in many instances. In the 2015 Excellence in Research for Australia assessment, around 90 per cent of Australia's research was assessed to be at or above world standard. A third of Australia's research was assessed to be 'well above' world standard.<sup>10</sup> Australia's researchers are well-regarded internationally, and the quality of Australia's research is a significant contributor to the university sector's international success. The esteem in which Australian universities are held by the international community, as measured by world rankings, is due in no small measure to the success of Australia's research and innovation system.

Australia's university research system is also highly productive and efficient. According to the Scimago Journal and Country Rank, in 2017 Australia was responsible for 2.7 per cent of the world's scientific output, while being home to only 0.34 per cent of the world's population.<sup>11</sup> Productivity does not come at the expense of quality - OECD figures also rate Australia's research highly, with Australian output significantly over-represented in measures of the world's most highly-cited research.<sup>12</sup> Yet these achievements are hard-won in the face of declining investment. A Universitas 21 report demonstrated the efficiency of Australia's universities, which were rated to have the third-highest output of research and its impact, and student throughput, whilst only being ranked 14th for resourcing.<sup>13</sup>

<sup>7</sup> Frontier Economics 2014, *Rates of return to investment in science and innovation*, Frontier Economics, London, pp. 5-6

<sup>8</sup> Allen Consulting Group 2012, *The economic, social and environmental impacts of the Cooperative Research Centres Program*, Canberra, p.xiii

<sup>9</sup> Productivity Commission 2007, *Public support for science and innovation*, Australian Government, Canberra, p.xvi

<sup>10</sup> Australian Research Council 2015, *State of Australian University Research Volume 1 ERA National Report*, Australian Government, Canberra, p.12

<sup>11</sup> Derived from Scopus, *Scimago Journal and Country Rank*, data set for 2017, accessed 4 June 2018.

<sup>12</sup> Organisation for Economic Cooperation and Development 2017, *Science, technology and industry scoreboard*, OECD, Paris, p.122

<sup>13</sup> Universitas 21 2018, *U21 Ranking of National Higher Education Systems*, Melbourne, pp 11 & 17

## Research improves lives

The impacts of research can be felt everywhere. From the improvements to health and clinical practice in hospitals, underpinned by sound evidence provided by research; to the development of new technologies in telecommunications, manufacturing and mining that have allowed the standard of living of Australians to continue to increase; to better understanding how our society and environment functions –research impact is pervasive.

University research in Australia has directly improved people's lives. The discoveries of Australian university researchers have contributed to the development of the cervical cancer vaccine, the contraceptive pill, antibiotics, the bionic ear and many other important products. Australian university researchers collaborate with colleagues in other institutions, with other research agencies in Australia, as well as world-leading research institutions. Their work and discoveries provide the basis for improvements to the quality of life of Australians -- through improvements to the natural and built environments; through the enrichment of our communities through advances in history, literature and the arts; and through the additions to the body of evidence that improves policy, practice and culture.

It is important to note that not only do the discoveries of Australian researchers benefit Australians, but that international engagement and collaboration brings home expertise in international discoveries. Australia is a small nation, and remains a net importer of ideas, expertise and technology. Yet we cannot rely on the rest of world to conduct research on our behalf. Our engagement with global research allows us early access to technology and ideas, and our participation in global research enterprise allows us to leverage the expertise and resources of others. International teams of researchers gather the most talented and experienced people together to work on complex issues, and Australian researchers are valued members of such teams. By collaborating with international colleagues, we engage with ideas, technologies and capabilities that improve our own national welfare. Australia's universities are well respected and connected globally and are the vanguard of the nation's science and research links with the rest of the world.

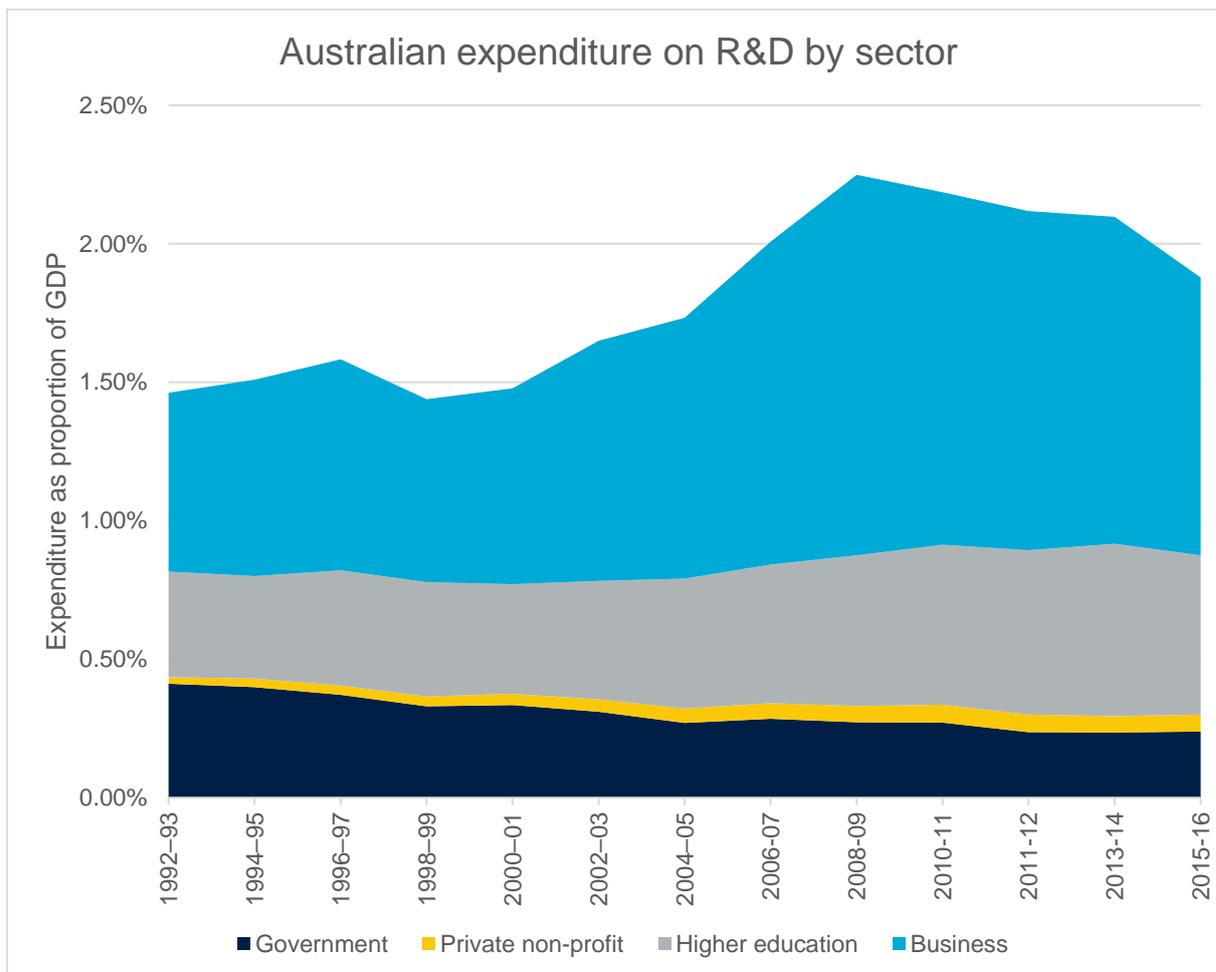
## Higher education is the backbone of Australia's research system

Over the past three decades, there has been a clear trend in the Australian research system. Government has increasingly conducted less research and development, and instead the higher education sector has undertaken more R&D on behalf of the nation. This has reflected both the expansion of the number of comprehensive universities as a result of the 1989-92 Dawkins reforms, as well as the increasing maturity of the Australian higher education research capability. Australia's higher education sector has remained the backbone of Australian research and development, maintaining a consistent capability in the face of external volatility.

This is of particular importance as the business sector struggles to consistently engage with R&D – the intensity of Australian business expenditure on research and development has been in decline for almost a decade. In fact, for the first time since OECD records began, Australia's business R&D declined in nominal terms in 2015-16.<sup>14</sup> Australian universities therefore perform an important function in providing stewardship of the Australian R&D capability, maintaining expertise against the ebb and flow of business investment.

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<sup>14</sup> Australian Bureau of Statistics 2017, *Research and Experimental Development, Businesses, Australia*; Organisation for Economic Cooperation and Development, *Main Science and Technology Indicators*, accessed 10 June 2018.



Source: Australian Bureau of Statistics, *Research and Experimental Development, Businesses, Australia*, various releases.

Despite the increasing importance of maintaining this national capability, university research increasingly relies less and less on government to resource this endeavour. Universities understand the necessity of investment in research and continue to develop new sources of revenue to fund it. In 2016, the Commonwealth funded 29.4 per cent of higher education research, with business (4.4 per cent) and state and local government (3.9 per cent) funding a relatively small portion. The majority of university research (55.8 per cent) is funded from general university funds.<sup>15</sup> Universities understand the importance of continuous development of research capability, as well as the importance of being able to expose undergraduate students to the latest knowledge, through teaching informed by research.

The importance of research to higher education and society at large cannot be overstated. Universities keep research at the core of everything they do. They create and disseminate knowledge for the benefit of society, they train researchers who are valued in both academic and commercial settings, they use research to produce graduates who are instilled with the latest knowledge and skills in their disciplines, and it is research, translated through commercialisation or application, that makes it possible for tomorrow to be better than the past.

<sup>15</sup> Derived from Australian Bureau of Statistics 2018, *Research and Experimental Development, Higher Education Organisations, Australia, 2016*, Australian Government, Canberra.

## PRINCIPLES FOR INVESTING IN RESEARCH

Australia's research funding system has developed over decades, and has numerous interconnected actors, schemes and drivers. Although we note this inquiry has restricted its scope to a portion of the research system, it is important to note that the degree of interconnection means examining parts of the system in isolation ignores necessary interdependencies. For example, although the funding system of the National Health and Medical Research Council has been excluded from this inquiry, NHMRC funded research is still undertaken by university investigators, whose salary is frequently drawn from sources other than NHMRC grants.

In light of the difficulty of focussing on isolated parts of the system, our submission will focus on principles that should guide the development or reform of research funding systems.

### 1. Long-term prosperity requires long-term planning

Researchers explore the unknown and attempt to understand the world around us. This frequently leads to advances in knowledge, technology and society, but this is not the case every time. Basic research, which works at the cutting edge of knowledge, takes courage and a fearless pursuit of the truth, through very complex terrain. No one believed that now Nobel Laureate, West Australian Professor Barry Marshall was right about what causes gastric ulcers. In fact, it took more than a decade for the community to accept what this risk-taker had proven.

The basic research undertaken today may not lead to a tangible application for decades – nevertheless, the application could not have occurred without the underpinning basic research. Although Einstein's theories of relativity would not have seemed particularly practical in the early part of the 20th century, modern GPS technology would not function without them.

This uncertainty means that the funding of research requires particularly patient investment. Discoveries that might have a 20- or 30-year gap before commercial deployment is possible are of substantial value to society, but it is difficult to mount a business case in modern commercial terms for them. It is also often the case that basic discoveries end up being applied in fields a long way from their discipline of discovery, making basic research a complex commercial proposition. We benefit today from the investment in research made by previous generations - investment in research and development is an intergenerational compact.

Government is a vital partner in research and development. Governments help make research possible through the provision of predictable, sustained resourcing, and implementation of stable, efficient policy frameworks. The talents and energy of researchers are best harnessed in solving the most difficult problems facing society, not endlessly chasing ephemeral funding. Proper planning and resourcing means that the right people can use the right tools to capitalise on inspiration at the right time, giving hard-working researchers the best chance of success.

It is in this light that Universities Australia commends the Government's recent commitment to a rolling research infrastructure funding and investment process, and budgetary commitments to developing new research infrastructure. However, Universities Australia also urges the Government to recommit to the Education Investment Fund, which sought to lay long-term foundations for investment in vital institutional-level infrastructure.

#### **Recommendation 2:**

Universities Australia recommends that the Government work towards full re-capitalisation of the Education Investment Fund, and recommencement of disbursements from investment earnings of the Fund.

The Australian research funding system is currently undergoing five very significant changes:

- the NHMRC's implementation of its structural review of grant schemes, which is making very substantial changes to the way Australia's largest grant schemes are administered;
- the implementation of the Australian Council of Learned Academies' Review of Research Training;
- the implementation of the Miles Review of Cooperative Research Centres;
- the Watt review of university research funding, which introduced large changes to the financial incentives for university research to encourage industry-funded research, and
- the changes to the Research and Development Tax Incentive announced in the 2018-19 Budget.

Universities Australia notes that while funding schemes do evolve, change needs to be introduced thoughtfully and carefully, and in full consultation with the sector. These changes then need time to bed down.

Frequent changes to grant or incentive schemes rob participants of confidence, and make it less likely that participants will use them or make the investments necessary to use them. We therefore strongly urge the Government to resist making further major changes to the research funding system until the impact of the current changes is known. Policy change should be undertaken with a sober, forward-thinking approach, driven by the need to safeguard Australia's current research capabilities and develop relevant new capabilities where opportunities arise.

### **Recommendation 3:**

Universities Australia recommends that proposals for further major changes to the research funding system not be considered until the effects of the current suite of changes are apparent.

## **2. Investigator-driven research is the foundation of knowledge discovery**

Although recent years have seen a shift in emphasis towards translating the outcomes of research into commercialisation, it remains vital to retain strong capabilities at each stage of the innovation pipeline. While further development of Australia's commercialisation and translation expertise is undoubtedly advantageous, the significant shift of Australia's research effort away from basic research towards applied research over the past two decades should be evaluated carefully. Similarly, while science, technology, engineering and mathematics (STEM) disciplines, along with those in the health sciences, have yielded significant economic and social wealth for Australia, a strong capability in the humanities and social sciences remains vital to the success of a well-integrated research system - the humanities underpin the breadth of modern thought. These disciplines allow us to better understand how our society works and help us to learn lessons from the past; lessons critical in crafting a future that best serves the needs of the community.

It is particularly important to safeguard and uphold the place of curiosity, or investigator-driven research in our research and innovation system. Directed R&D can, at best, synthesise and repurpose existing tools and knowledge into new applications. While this is still a worthwhile way of solving immediate or foreseeable problems, many big problems will be solved using ideas not yet conceived and technologies whose time has not yet come. Investigator-driven research allows talented researchers to explore the paths into the unknown, where academic rigour and merit directs, allowing society to see what may lie beyond the known horizon.

Simply put, it is impossible to determine from looking at a problem, what new ideas or discoveries might be needed to solve it. This means that an enduring commitment to investigator-driven research remains a prerequisite for progress. Critical inquiry is the bedrock of societal

advancement, and researchers must retain the freedom to inquire, study and test new theories or ideas. Discovery cannot be predicted nor hurried; the existence of a strong basic research capability underpins Australia's prosperity into the future.

### **3. Funding frameworks must promote integrity and excellence**

Research funding is a complex policy area with often unclear objectives and overlapping schemes. Currently, there are 136 separate schemes on the Australian Competitive Grants Register, and the Science, Research and Innovation Budget Tables contains more than 430 line entries for science, research and innovation programs that have existed at some point over the last four decades. While it is often deemed desirable to create a bespoke research grants scheme to accelerate progress on a particular area of policy priority, it remains equally important to ensure that the research funding system remains coherent and well-managed. A proliferation of piecemeal programs, with different objectives and funding rules, can undermine each other's success.

Therefore, it is important to consider the principles that should guide any research funding – integrity and excellence. Any funding mechanism should seek to encourage the best ideas, and to allow those ideas to stand up to challenge and critical examination. The application of expert peer review is the cornerstone research and remains the best mechanism way to assure the community that the government invests in the best possible research.

Peer review breeds excellence through the scrutiny of ideas. The review of ideas in grants by discipline experts allows for the comparison of individual research proposals in a way that is impossible through purely administrative selection. The community is best served if the most outstanding ideas are funded – for which the best mechanism of determination is peer review.

Peer review also promotes integrity within academic discourse, and similarly it promotes integrity within the funding of research. Expert scrutiny of proposals is a tested method of quickly excluding unfeasible or under-developed research ideas. By encouraging the best developed proposals and ideas, the community can be assured that they are investing in the best research.

#### **Recommendation 4:**

Expert peer review should remain and be reaffirmed as the core determinant of excellence for funding the most outstanding and deserving ideas.

The funding of research needs to look to excellence in basic and applied research, and to fund the best ideas wherever they are found. Systematic biases that prevent the most outstanding ideas being funded – such as barriers that prevent participation in research from the widest possible cross section of society – must be eliminated. In this, changes to the Research Training Program that give institutions the flexibility to increase participation of students in research higher degrees from a wider range of backgrounds are most welcome. However, the postgraduate research training cohort is sourced from high-performing undergraduates, and the funding freeze affecting universities is a serious threat to improving the diversity of the postgraduate cohort.

#### **Recommendation 5:**

The Australian Government should restore the demand driven undergraduate enrolment system to ensure the widest possible participation in the postgraduate research cohort.

#### 4. Flexible funding mechanisms are important

Universities conduct research through a wide variety of arrangements in partnership with a large number of external organisations. Many of these arrangements are ad-hoc, subject to strict but varying funding rules, and with a bewildering array of objectives. The management of these varying arrangements and partnerships is a formidable task. Despite the breadth of arrangements, they all rely on one thing: universities maintaining a core research capability which can be expanded or adapted to meet the needs of different priorities.

Universities therefore have an important role as the custodians of the nation's knowledge creation capability. Universities provide a vast array of services to the community, few of which are funded through competitive grants. The ability to deploy cutting-edge knowledge when needed rests on the maintenance of expertise, increasingly inside universities. Academic experts routinely advise governments and the community on issues of importance. University researchers partner with industries, governments and non-profits to develop solutions to difficult problems, from problems at a small, firm-level scale, right through to the most important economic, social and environmental problems.

The maintenance of this research capability is not able to be sustained through competitive grant income alone. Competitive grant income is often subject to strict conditions that forbid its use in the maintenance of base research capability. For example, Australian Research Council Discovery project grants may not be used to fund the salary of a Chief Investigator or Partner Investigator actually carrying out the project, nor may they be used to pay for necessary overheads of the university operating environment (eg the costs incurred with running a laboratory or an academic library). These costs must be funded from elsewhere, and these are known as the 'indirect costs' of research.

The gap between the full costs of research and those items which are funded through research grants means a separate, flexible funding regime is necessary. These 'block grants', principally the Research Support Program and the Research Training Program, allow universities to maintain a core research capability and to train research students. For many years there has been a significant gap between the full cost of research and the block grants provided by Government. Each new grant scheme that does not support the indirect costs of research makes this issue worse – to the point that in some cases, institutions may not be able to adequately support their researchers to undertake competitive grant research. On average, each dollar of competitive grants requires supporting, flexible expenditure of 85 cents.<sup>16</sup> Today, this is supported by the Research Support Programme, which took over from a number of separate block grants in 2016. In 2002, each dollar of fixed competitive grants was supported by 76 cents in flexible block funding. By 2014, this had fallen to only 46 cents in flexible block funding for each dollar in competitive grants.<sup>17</sup> Although this ratio of block funding has since recovered slightly, this reflects the cuts to competitive grants observed since 2014.

Flexible block funding supports not only the maintenance of expertise that lies in Australia's talented researchers, but also the infrastructure and resources necessary to conduct their research. Whilst the Commonwealth supports landmark and national research infrastructure, institutional research infrastructure remains a vital part of the Australian research system. Institutional infrastructure often supports new and emerging areas of research excellence, and without dedicated infrastructure funding through the Education Investment Fund, universities are increasingly trying to make their flexible funding and general university funds stretch further and further to maintain this infrastructure.

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<sup>16</sup> The Allen Consulting Group 2009, *The indirect costs associated with university research funded through Australian Competitive Grants*, prepared for the Department of Education and Training, p.54

<sup>17</sup> Universities Australia analysis based on research income data from the Department of Education and Training's *Higher Education Data Collection*.

These efforts are vital to the continuance of Australian competitive grant research, as well as the maintenance of a skilled research capability for industry to call on when needed. It is important that the Government continues to invest in the maintenance of this capability, on behalf of all Australians.

## 5. Support accountability, transparency and efficiency

Universities are an integral part of their community and are accountable to their community for their actions, decisions and achievements. As universities have welcomed a broader range of students into higher education, their links into their communities have become stronger and deeper. It is therefore important that decisions around research funding promote accountability, transparency and efficiency to build the mutual confidence of the community, government and researchers.

The research funding system has made significant progress towards transparency and accountability. Rigorous selection processes, clear and accessible guidelines, the involvement of experts and observers, as well as robust scrutiny and debate contribute to confidence in the research funding system. Expediency, limited contestability, excessive targeting and non-academic discrimination between grants are the enemies of confidence and transparency and should be minimised as far as possible.

Strategic research initiatives or priorities are a vital tool available to the government and the community to solve important problems with a coordinated approach. These initiatives can harness the collective strengths of Australia's research system with great impact, in ways that might not be possible through individual efforts. Such priorities should be supported by dedicated resources, rather than through earmarking portions of the existing research and innovation system. Utilising existing resources for individual priorities risks distorting the natural strengths of the research system.

Accountability and transparency also need to be balanced with the need for efficiency. Every effort must be made by the research sector, as well as the Government, to ensure that the investment in research is allowed to return its maximum value to the community.

The most obvious inefficiency in the research funding system is the onerous burden of continual grant application and reporting that weighs heavily on the shoulders of researchers. In 2012, Australian researchers spent more than *five centuries'* worth of time applying for grants in *just one* of Australia's research funding schemes – grant applications took 38 working days to complete on average.<sup>18</sup> Given that success rates for such grant schemes are typically around 20 per cent, this is a significant amount of time spent on grant applications that, for most academics, will not result in funding. This is an extraordinary opportunity cost for the sector, and results in substantial amounts of research time foregone. While Universities Australia supports a vigorous competition of ideas to ensure the best research is funded, reductions in administrative burden associated with grant application processes would be welcomed.

Similarly, a significant barrier to efficiency is the regulatory and reporting burden placed on the sector through differing requirements of schemes and agencies. Every dollar spent on collecting statistics, or providing reports to funders or Government, is a dollar that is not spent on research or teaching. Every new addition to a grant application process means researchers spend more time writing grant applications and less time conducting important research.

In the balance between accountability and productivity, there would certainly be efficiencies available to reduce the regulatory burden on universities. For example, the Excellence in Research for Australia exercise that costs the sector tens of millions of dollars, as well as significant opportunity cost in the diversion of academic time towards service for this exercise, is

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<sup>18</sup> Herbert, D, Barnett, A, and Graves, N 2013, 'Funding: Australia's grant system wastes time', *Nature*, vol. 495, p.314.

conducted every three years, yet its data collection period is six years. This means that half of the data that counts towards the ERA rating was counted in the previous data collection as well.

Each new funding or reporting scheme creates additional regulatory burden. Each new set of regulatory requirements diverts funding from teaching and research towards administration. Unlike the impacts on the private sector, these imposts are seldom quantified. To derive the greatest value for the community's investment, government should contemplate the additional regulatory burden of each change to requirements, and carefully balance the cost against any perceived benefit.

### **Recommendation 6:**

New policy initiatives likely to result in increased reporting or compliance requirements for the higher education sector should be accompanied by a Regulatory Impact Statement that quantifies the cost of the change.

## **6. Recognise and support Australia's place in the global research enterprise**

Universities are increasingly international enterprises and will only be more so in the future. International research collaborations deliver economic and social value to Australia; international students increasingly choose to study in Australia; and international engagement links Australian students, researchers and innovators with unique opportunities available in other countries. It is not possible to remain at the cutting edge of innovation without strong international partnerships; the modern research and innovation effort is bigger than any single nation.

International collaborations are increasingly the most successful model for creating ground-breaking new research results to tackle global challenges and harness huge opportunities. The Square Kilometre Array mega radio telescope, part of which is to be built in Western Australia, boasts involvement from countries covering more than 40 per cent of the world's population.

Smaller international partnerships and collaborations are also important. The Government's own New Colombo Plan recognises the value of international mobility of students to create closer economic and cultural ties between Australia and its neighbours. The National Innovation and Science Agenda has encouraged Australia's researchers to reach beyond our shores, through its [Global Innovation Strategy](#). International collaborative science programs commonly allow Australian researchers and innovators access to facilities and expertise not available in Australia, often for a tiny fraction of their true cost. In fact, government funding of these programs has been shown to attract leverage up to 7.7 times the government contribution.<sup>19</sup>

International engagement and collaboration is not an optional extra in higher education and research. World-leading teaching relies on strong links with regional and global partners, ensuring that Australian universities provide both Australian and international students with globally-relevant skills and knowledge. Researchers rely on international networks to stay up-to-date with the latest techniques and developments in the field. Indeed, scientific and research cooperation is vital to the national interest – such cooperation facilitates access to resources such as Japan's Himawari weather satellites, which underpin Australia's weather prediction capabilities.

Australia remains a relatively small economy, and despite our disproportionate contribution to the world research effort, we will continue to rely on utilising the expertise and resources of international peers. Australia's research funding system needs to explicitly acknowledge this and

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<sup>19</sup> Australian Academy of Science, 2001, *Program of international scientific and technological collaborations, funded as part of DISR's International Science and Technology Networks – a review*, Canberra, p.3, <http://web.archive.org/web/20090925161632/http://www.science.org.au/reports/16march01.pdf>

encourage the mobility of Australian researchers to and from other countries. Australians researchers constantly battle the tyranny of distance to collaborate with peers in R&D-intensive economies. The Australian research funding system must more explicitly encourage international collaborations, without which Australian research will stagnate. University researchers are at the forefront of forging international collaborations; these links must be supported more strongly, or our international collaborators will look to share their knowledge and resources with other nations.

**Recommendation 7:**

The Australian Government should expand support for international linkages for Australian researchers through the Australian research funding system.

## **CONCLUDING COMMENTS**

Australia's research system is an important foundation of economic and social prosperity and should be considered a national asset. The principles outlined in this submission provide a framework to guide policy-making and ensure the greatest value for public investment. Any changes made to the system should preserve the value of the asset, and consideration of changes to one part of the system should carefully evaluate the effects it might have on the entire system.