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Deputy Vice-Chancellor Research

18 September 2015

Dr Ian Watt

Chair, Review of Research Policy and Funding

C/- Department of Education

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Submitted by email: Research.Review@education.gov.au

Dear Dr Watt,

Review of Research Policy and Funding Arrangements for Higher Education

Thank you for your 4 September 2015 letter to the Vice-Chancellor and for the opportunity to comment on the *Review of Research Policy and Funding Arrangements for Higher Education Issues Paper* (the Review). Given the scope of the Review, the Vice-Chancellor has asked me to respond on behalf of the University.

Please find attached our submission in the form of comments on eight key issues relevant to the Review's central concern: *how to ensure a productive future for Australia by maximising the translation of university research for economic and social benefit?* Our submission concludes with five high level policy recommendations for consideration by the Review panel.

Key issues

In summary, the key issues we raise in our submission are:

- 1. The importance of any new policy framework taking a holistic, long-term approach to build innovation and skills ecosystems, drawing on leading international approaches.** We argue that Australia cannot afford further piecemeal changes to discrete parts of the higher education and research funding system and that an integrated approach is required.
- 2. The central role that research excellence plays in supporting national capacity for innovation and productivity improvement, as well as our largest services export industry.** We argue that if Australia is to prosper in the global knowledge economy, then like our competitors in Asia, North America and Europe, we must find ways to grow and drive research excellence.
- 3. The importance of research training excellence.** We include with our submission our response to the Review of the Research Training System. We stress the need for coherent outcomes from both reviews, and recommend a budget neutral package of reforms designed to ensure the system is capable of producing graduates with the skills that will be essential if the higher education sector and broader economy are to remain internationally competitive.
- 4. The need for funding to reflect true costs.** We discuss the challenges we face in meeting the full costs of providing both excellent education and research under current regulatory and funding arrangements.
- 5. The challenges facing the Dual Funding System.** We discuss the very large and growing opportunity cost the Nationally Competitive Grant System imposes on researchers and institutions. We suggest that in the absence of growth funding for the research councils and research block grants, the Dual Funding System is becoming increasingly unsustainable and inefficient. We are also at risk of losing our best talent to our international competitors, wasting the large investments successive governments have made to build human capital and supporting infrastructure.

6. **The need to strike the right research balance.** We discuss the importance of public investment supporting an appropriate balance of basic and applied research, noting that Australia's trend towards applied research is at odds with the investment strategies of the most innovative universities and research funding systems globally. We also stress the importance of collaboration between a wide range of disciplines – noting that the solutions to the most complex problems facing society today and in the future increasingly require multidisciplinary approaches.
7. **The need for policy balance.** We argue that different policies and institutional strategies are required to improve levels of engagement with existing industry, and foster the creation of new industries by graduates and entrepreneurs. We argue that given the structure of Australian economy, the focus of policy and funding should be on creating an environment more conducive to the establishment of new enterprises (services as well as goods), whereas the Issues Paper seems most concerned about strengthening levels of engagement between existing industries and universities.
8. **The key barriers to knowledge transfer and research commercialisation.** We conclude by arguing that the scale of the cross-subsidisation required to support research excellence is the single greatest inhibitor to the translation and commercialisation of research in Australia today. We discuss other key barriers, including the opportunity costs our researchers face due to the administrative burden imposed by external funding schemes and reporting requirements, as well as relative weaknesses in our intellectual property and tax systems compared to international benchmarks.

Key policy recommendations

1. **Reform funding for domestic coursework students.** We urge the Review to call on the Australian Senate to reach a compromise solution in relation to the Higher Education and Research Reform Bill 2014.
2. **Reform the Research Training System.** We urge the Review to consider our proposed alternative model for the future of the research training system, set out in a separate submission to the parallel Review of the Research Training System.
3. **Reform the Dual Funding System.** We urge the Review to develop and consult on possible alternative models to the Dual Funding System that are more efficient and sustainable than the current arrangements.
4. **Address the decline in basic research.** Noting calls from various quarters to further shift our investment towards applied research, we urge the Review to consider very closely the continuing merits of such approaches, and to take expert independent economic advice on this question from a body such as the Productivity Commission.
5. **Focus on new industry generation.** We urge the Review to focus its efforts, and the weight of any possible funding or incentives, on creating an environment in Australia that is more conducive to the creation of the dynamic new industries of the future in the services and goods sectors that is a feature of outstanding innovations systems such as in the United States and elsewhere.

Your Review is vital to Australia's future prosperity, and we trust these comments are helpful. We look forward to discussing these issues and possible policy responses with the Review at the upcoming consultations sessions.

Yours sincerely,

Professor Duncan Ivison
Deputy Vice-Chancellor Research

Attachment A University of Sydney Submission to the Review of Research Policy and Funding Arrangements for Higher Education, September 2015

Attachment B University of Sydney Submission to the Review of the Research Training System, August 2015

Attachment A

Submission to the Review of Research Policy and Funding Arrangements for Higher Education, September 2015

Contents

Key issues	3
1. Innovation and skills ecosystems.....	3
2. Research excellence.....	4
3. Research training excellence.....	5
4. Research costs and funding	5
5. The Dual Funding System	6
6. Research balance.....	6
6.1 <i>The balance between basic and applied research</i>	6
6.2 <i>The disciplinary balance</i>	7
7. Policy balance.....	7
8. Key barriers to knowledge transfer and research commercialisation	8
Policy recommendations	9

Key issues

1. Innovation and skills ecosystems

A holistic, long term approach to policy is needed if we are to achieve permanent improvements in the translation of university research for economic and social benefit. We strongly recommend avoiding piecemeal changes to the research funding system that are unlikely to deliver the outcomes sought by the Review. In particular, we believe the Review should be focused on developing those policy settings that will enable the translation of our best and most innovative research into genuinely transformative outcomes for Australia – the new businesses, industries, techniques and approaches that will improve Australia’s standard of living, and create the economic growth and jobs of the future. Noting Australia’s relatively poor performance on international benchmarks of university-industry collaboration and innovation, we need to understand the underlying causes of weakness, and look to leading local and international examples of success, for insights about the best approaches to foster innovation and skills ecosystems.¹

We also need to ensure that as well as encouraging opportunities for the commercialisation of research, we support the translation of research that does not necessarily have high commercial value, but does have potentially significant social impact – for example in health, education and the social sciences. Some of our strongest ‘industry engagement’ occurs in the health system, where the levels of mutually beneficial collaboration are longstanding and enormous, but the benefits of which have not been systemically quantified in financial terms.² There are genuine risks that shifting funding drivers to include blunt metrics of research

¹ See for example, Froy F., *Global Policy developments towards industrial policy and skills: skills for competitive and growth*, Oxford Review of Economic Policy, Volume 20, Number 2, 2013, pp.344-360. See also the extensive literature on the key factors underpinning Silicone Valley’s growth, for example: Finegold, D. (1999) *Creating self-sustaining, high-skill ecosystems*, Oxford Review of Economic Policy, 15:1, p.60-81

² See for example, NHMRC Academic Health Research and Translation Centres: <https://www.nhmrc.gov.au/research/nhmrc-advanced-health-research-and-translation-centres/nhmrc-advanced-health-research-and-t>; See also; Buchanan, J., Jenkins, S and Scott, L. (2014) *Student Clinical Education in Australia: A University of Sydney Scoping Study*, The University of Sydney, Sydney, http://sydney.edu.au/business/_data/assets/pdf_file/0018/203256/WRC_Clinical_Education_Scoping_Study_2014065.pdf

commercialisation, for example, could damage such collaborations, which are already finely balanced in many instances due to the funding challenges facing both the health and education systems.

The current policy framework supporting the innovation system is not only complex and fragmented, but too often changes are made in one area with insufficient regard for the flow-on impacts that will occur elsewhere. For example, the recent shift to demand-driven funding for bachelor degrees, and the doubling of Australian Postgraduate Awards for higher degree by research students, have both had flow on impacts for the Research Training System, which were not considered when the policy decisions were taken. The Review needs to consider such interdependencies and may need to make recommendations about the need for reforms in areas that lie beyond its terms of reference.

2. Research excellence

The University of Sydney welcomes the recognition in the Review's terms of reference and the Issues Paper of the importance of strong investment to support research excellence. The presence of high quality university research and supporting infrastructure underpins Australia's capacity for innovation and productivity improvement. It is also vital for the overall competitiveness of our higher education sector, which is responsible for our largest services export industry (\$17 billion in 2014) and fourth largest export earner overall.³

Universities are knowledge organisations with diverse roles in generating, acquiring and transferring knowledge through publication and intellectual property, education and training, community and industry engagement. Within this mix, the achievement of research excellence has always been a driving force.⁴ It is becoming ever more critical due to the globalisation of higher education and research. Our competitors in Asia, North America and Europe are pursuing deliberate strategies to grow and strengthen their research and innovation systems by focusing on research excellence.⁵

Total levels of public investment in our tertiary education system have been rising, but as a proportion of GDP, remain significantly below the OECD average.⁶ Over the last decade, while the Australian Government's total investment in science, research and innovation has increased, it has declined both as a share of GDP and of total government expenditures.⁷ The establishment of the Medical Research Future Fund may help reverse these trends (in time) for health and medical research, but substantial cuts to non-health research are still anticipated over the forward estimates in the 2015-16 Commonwealth budget.⁸ If Australia is to improve its capacity for innovation it will also need to find innovative ways, in difficult budgetary circumstances, to support and drive research excellence.

Low and decreasing levels of research block grant funding make it particularly difficult for universities to invest in activities such as research commercialisation because they are struggling to meet the costs of providing the infrastructure and support needed to do high quality research in the first place. In our view, this is the single greatest inhibitor to the translation and commercialisation of research in Australia today.

This is frustrating, because we know that our universities have the talent and capacity for delivering outstanding commercialisation and social impact outcomes based on research excellence. For example, the Australian Centre for Field Robotics (ACFR), based at the University of Sydney, has generated not only ground breaking robotics research, but attracted large amounts of industry funding for the translation of that research into new, automated, remote mining systems that are helping to transform the natural resources industry. Moreover, the Faculty of Engineering and Information Technologies, within which the ACFR sits, was ranked at the highest level – '5', or 'well above world standard' – in the last Excellence in Research Australia (ERA) exercise in 2012. This demonstrates that the best research, more

³ Australian Trade Commission, *Why Australia - Benchmark Report 2015*, p.42

⁴ LERU, AAU, Go8, China 9, HEFEI Statement on the 10 Characteristics of Research Universities, 2014: http://www.leru.org/files/news/Hefei_statement.pdf

⁵ Group of Eight, *Government Research Funding in Selected Countries*, 2014

⁶ OECD, *Education at a Glance 2012, OECD Indicators*, p.246

⁷ Department of Industry, *Australian Key Innovation Indicators*, July 2014, p.2.

⁸ Commonwealth Treasury, *Budget 2015-16, Budget Strategy and Outlook, Budget Paper No.1*, p.5-16

often than not, leads to the greatest opportunities for commercialisation and translation. Excellence and impact go hand in hand.⁹

3. Research training excellence

63% of the \$1.7 billion Research Block Grants Scheme is allocated to support universities to provide research training for domestic and international students. As the Issues Paper notes, Australia's Research Training System (RTS) is currently the subject of a separate expert review, and there is a need for coherent outcomes from both reviews. We have made a detailed submission to the RTS Review, arguing that the current system requires urgent reform. In our assessment, current policy and funding settings supporting the system are not capable of continuing to produce graduates with the skills and capabilities that will be essential if the higher education sector and broader economy are to remain internationally competitive.

The current research training regulatory and funding model encourages quantity over quality, and provides funding incentives for universities to enrol and graduate as many students as possible. This is leading to what we have described as the 'tragedy of the RTS commons', where the real value of RTS funding received per student is now 25% less than in 2002.¹⁰ The situation is only likely to deteriorate further as graduate numbers continue to grow as a result of the demand-driven reforms of bachelor degrees that occurred in 2012. We have proposed an integrated, budget neutral package of reforms designed to give providers flexibility to develop innovative research training pathways, whilst ensuring that available funding is allocated to drive quality. Our submission to the RTS Review is **attached**, and we provide it as our response to the Issue Paper's questions about research training and employment.

4. Research costs and funding

The University of Sydney, like all Australian research-intensive universities, is the recipient of substantial funding from the Australian Government to support its education and research activities. In 2014 we received \$413 million under the Dual Funding System for competitive grants (mostly ARC and NHMRC), other funding from other Commonwealth agencies, and through the Research Block Grant (RBG) Scheme.

The challenges all Australia's research-intensive universities face in meeting the full costs of their core education, research and research training activities have been examined closely and confirmed by many reviews over the last decade.¹¹ The former Australian Government introduced the *Sustainable Research Excellence* (SRE) block grant in 2009 to address the growing gap between funding provided under the Dual Funding Scheme and the true cost of supporting nationally competitive research grants.

The aim of the SRE was to more than double the value of RBG funding support provided in relation to nationally competitive grants, by increasing it to 50 cents in the dollar by 2013. As the Issues Paper notes, in 2015 the funding ratio remains at around 25 cents. We estimate that the total cross-subsidy to support the direct and indirect costs of our research activities remains at more than 1 dollar for every dollar of national competitive grant income, and that our overall cross-subsidy to all research activities from discretionary sources remains at around 30 cents in the dollar, or more than \$250 million annually.

This funding cross-subsidy is essential not only to meet the indirect costs of supporting our research activities (including infrastructure) but increasingly the direct cost shortfall of nationally competitive and other grants. For example, the salary gap between what the NHMRC provides for its fellowships, and the true cost to the University of employing the fellows, currently ranges from \$18,000 to \$74,000 annually, depending on the level. It is a similar story for ARC fellowships and grants.

⁹ <http://www.acfr.usyd.edu.au/>

¹⁰ University of Sydney, Building a Culture of Research Excellence, Strategic Planning for 2016-20, Discussion Paper No.4, August 2005, p.11

¹¹ For example, House of Representatives Standing Committee on Industry, Science and Innovation, *Building Australia's Research Capacity*, 2008; Cutler et.al. *Venturous Australia, Review of the National Innovation System*, 2008, Bradley et.al. *Review of Australian Higher Education 2008, Sustainable Research Excellence Policy Research Block Grant and Transparent Costing Exercise*, 2010; Lomax-Smith et.al. *Higher Education Base Funding Review*, 2011

Under current regulatory and funding settings, universities receive relatively stable public funding to support their core activities of education, research and research training. No dedicated recurrent funding is provided to support university knowledge transfer activities. These functions therefore compete for funding from finite discretionary revenue sources. We have responded rationally to these funding realities by seeking to cut our costs, grow revenues from relatively low risk activities such as student fees and philanthropy, and sustain loss-making education and research activities considered vital to maintaining the quality, breadth and depth of our activities.

Maintaining this breadth and depth is not a luxury we can do without. As we make clear below, the most successful research and innovation systems in the world are harnessing their multidisciplinary strengths to address the most challenging scientific, social and economic problems of our time, as well as develop new ground-breaking research that will build the industries of the future.

Adjusting regulation and funding settings to better reflect the actual costs of core research and education activities would free up resources to invest in strengthening knowledge transfer activities, as well as supporting other worthwhile services such as increasing financial assistance for students from disadvantaged backgrounds. While addressing the overall sustainability of the higher education funding system would be the preferred outcome, an alternative would be to establish a dedicated *Third Stream* funding program as the UK Government did more than decade ago.¹² We caution against diverting RBG or other existing funds for such purposes, however, as doing so will only serve to further compound the funding challenges for core activities outlined above.

5. The Dual Funding System

A key strength of Australia's Dual Funding System for university research is that it gives institutions some capacity to be strategic, which may not be available under schemes where infrastructure and indirect costs are tied to each grant. This flexibility is important because it allows universities to reduce duplication, for example, by investing in shared research infrastructure and other services, or to build research capacity in areas identified as strategically important.

Key weaknesses include, as discussed above: the large and growing gap between the true costs of supporting Nationally Competitive Grants programs, and the large cost (in staff salaries and opportunity costs) of the time required by staff to win external grants. For example, a 2013 survey of 3727 applicants in one major NHMRC scheme in 2012, found that on average they spent 34 days preparing each proposal. The study estimated this amounted to some 550 working years of researchers' time, and a salary cost to employing institutions of \$66 million.¹³ With success rates for most ARC and NHMRC schemes continuing to decline, now 13.5% for NHMRC Career Development Fellowships, 14.9% for Program Grants and as low as 8% for some schemes, the total salary and opportunity costs of Australia's Dual Funding System are very significant and growing. Both the ARC and NHMRC are working with the sector to try to reduce the pressure on the schemes, but all stakeholders recognise that in the absence of additional funding to increase success rates there are no easy solutions.

6. Research balance

6.1 *The balance between basic and applied research*

Over the last 40 years the *basic* research share of all research undertaken by Australian universities has declined from around 77% to 45%, while over the same period, the *basic* research share of United States' academic institutions has remained stable at around 75%.¹⁴ We note that the Productivity Commission has raised concerns about the trend in Australian publicly-funded research programs from funding *basic* to *applied* research, recommending that

¹² Centre for Business Research, Cambridge, Evaluation of the Effectiveness and Role of HEFCE/OSI Third Stream Funding; http://www.cbr.cam.ac.uk/fileadmin/user_upload/centre-for-business-research/downloads/special-reports/specialreport-evaluationeffectivenesshefce.pdf

¹³ Herbert D.L. et. al. *On the time spent preparing grant proposals: an observational study of Australian researchers*, BMJ Open, 2013; <http://bmjopen.bmj.com/content/3/5/e002800.full.pdf+html>

¹⁴ Group of Eight, Backgrounder 30, *World University Rankings: ambiguous signals*, October 2012, p.46

available funding should be targeted towards research where market failures are substantial and the public interest greatest, rather than at research and development activities that are likely to be pursued by private firms.¹⁵ The 2014 National Commission of Audit made a similar recommendation.¹⁶

As the Issues Paper notes, the United States is widely recognised as having one of the most successful innovation systems in the world. We encourage the Review to look closely at key differences in the weighting of research investments of the United States and Australian governments, and to assess whether Australia is striking the right balance between curiosity-driven and applied research.

Another highly successful country for the commercialisation of research – Switzerland – has maintained a principle of 80% of its funding going to basic research, on the basis that the most promising and potentially transformative ideas and approaches are more likely to emerge in this context.

6.2 The disciplinary balance

Australia has recognised strengths in health and medical research, and it is appropriate that addressing the community's current and anticipated health challenges will always be a priority for governments. Nevertheless, already in excess of 50% of total Australian Government funding for research is directed towards the medical and health sciences fields. The establishment of the Medical Research Future Fund, combined with the implementation of new strategic research priorities and cuts to other research areas, will result in a further concentration of investment in these areas.

The strength of Australia's higher education innovation system depends on the maintenance of educational and research strengths across a broad range of disciplines. Increasingly, it is recognised that the solutions to the most complex problems facing society may be found through multidisciplinary approaches – bringing knowledge and perspectives from a variety of disciplines to attack research problems in different ways and from different angles. This is particularly the case for generating transformative social impact, where technological and scientific innovation needs to be married with high quality social science and humanities insights.

This is certainly the approach we are taking in many fields, including in the areas of obesity, diabetes and cardiovascular disease within the newly created Charles Perkins Centre.¹⁷ Such approaches are only possible, however, if strength is maintained across the disciplines. Another key characteristic of the United States' research system, also increasingly reflected in the United Kingdom, is the relative breadth and depth of research capacity that they possess across all fields. This is not a characteristic of the Australian system, and is likely to impact our relative capacity for innovation.¹⁸

7. Policy balance

The Review is concerned with maximising the economic and social benefits from university research through improving the levels of university engagement with existing industry (1.2.5) and fostering the creation of new industries to drive economic growth, employment and prosperity (1.2.8). The Issues Paper states at 1.2.9 that improving engagement between researchers and industry should see improvements in Australia's levels of new-to-the-world innovations and industries. We are not convinced that this will be sufficient.

Commercialising research outputs is only part of what drives an innovative economy. Data released recently by the Deputy Governor of the Reserve Bank, Philip Lowe, show that over the last decade by far the strongest areas of employment growth in Australia have been in the services sector in roles requiring high-level skills.¹⁹ Lowe called for a renewed national focus on

¹⁵ Productivity Commission, *Public Support for Science and Innovation*, 2007

¹⁶ National Commission of Audit, *Toward Responsible Government - Phase 1 Report*, February 2014, p.169

¹⁷ <http://sydney.edu.au/perkins/>

¹⁸ For a detailed bibliometric analysis of national research system performance see: 1994 Group, *Mapping Research Excellence: research excellence and research funding policy*, September 2011

¹⁹ Lowe P., Deputy Governor, Reserve Bank of Australia, *Building Strong Foundations*, Address to the Australian Business Economists Dinner, 25 November 2014: <http://www.rba.gov.au/speeches/2014/sp-dg-251114.html>

investment in human capital to ensure Australia has a workforce equipped with the high-level skills needed to support existing industries and deliver new ones.

The creation of new industries is not predicated only on the commercialisation of research, but may also result from a cohort of highly skilled graduate entrepreneurs. In the United States, Forbes Magazine's ranking of the most entrepreneurial universities and colleges in the North America mines LinkedIn data to identify the proportion of alumni and students who are new business founders and owners.²⁰ Even a decade ago, alumni of MIT (which ranked second behind Stanford in the 2015 list) had some 25,600 active companies employing over 3 million people.²¹ Many, but by no means all of these companies involved the commercialisation of research generated by universities.

The reasons for significant differences between Australia and the United States in research commercialisation and new business creation reflects a complex mix of structural, geographic, cultural, policy, funding and tax factors. Critically, there are a limited number of large-scale manufacturing and technology firms with a strong presence in Australia. Therefore, the focus of Australia's knowledge transfer policy may need to be rewarding education and research excellence and providing an environment that is highly conducive to the creation of new industries and jobs based on intellectual property generated by universities, but also on the skills and knowledge of their graduates. In our submission to the Research Training System Review we recommended longitudinal tracking of the career outcomes of higher degree by research graduates. There may also be value in the Australian Government working with the sector to establish appropriate measures of graduate entrepreneurialism.

8. Key barriers to knowledge transfer and research commercialisation

While new products and services may be created by existing industries, a different set of policies are needed to support the generation of new businesses and industries created by entrepreneurial graduates and others who might wish to take advantage of intellectual property and knowledge generated by universities.

As discussed above, the first key impediment we face in our knowledge dissemination role is the large and growing gap that exists between funding received for core education, research and research training activities, and their true costs. All Australian research-intensive universities currently sustain these core activities through heavy cross subsidisation from revenue streams over which they have discretion. This inevitably limits the resources available to invest in other important areas, including so called knowledge-transfer activities.

Reducing the overall funding gap for core educational and research activities, and enabling us to provide research staff with greater employment continuity, would unlock substantial resources. More staff time and funding would then be available, for example, to support knowledge-transfer activities, improve levels of student engagement with industry during their studies, and provide more training and incentives to students and staff to encourage entrepreneurship.

The second major impediment is the direct and opportunity costs incurred by our researchers and support staff due to the administrative burden imposed by external grant and reporting requirements. Exercises such as the Excellence in Research for Australia initiative (ERA) have produced valuable data about Australia's research system and the performance of individual institutions. The process is costly for the Government and universities, however, and imposes a significant internal administrative burden on academic and support staff. Public accountability for taxpayer funds is an important principle that we support, but we must also ensure it does not become a cost burden that inhibits the achievement of the very objectives universities are expected to deliver.

The overall costs and benefits of adding research impact assessment to ERA, as occurred in UK recently through its Research Evaluation Framework (REF) system for example, need to be

²⁰ Chen L. Startup Schools: America's Most Entrepreneurial Universities 2015:

<http://www.forbes.com/sites/liyanchen/2015/07/29/americas-most-entrepreneurial-research-universities-2015/>

²¹ Block, G. D., Chancellor, University of California, Los Angeles, *Globalisation and Innovation: the Transformation of Higher Education in the 21st Century*, in 2012 *International Presidential Forum on Global Research Universities: Effective Education and Innovative Learning*, Kaist Press, 2012

considered carefully. While on the whole our assessment is that the ERA is worthwhile, and should be continued on a 3-5 year cycle, we note that the United States and other countries that perform strongly on engagement and innovation measures, do not rely on external assessment mechanisms like the ERA or REF. Moreover, there are concerning reports that the UK's REF approach to impact assessment has spawned a costly and time-consuming new process of research impact case study writing.²²

A third key impediment is that Australia's intellectual property, tax and other policies do not currently create an environment that is as conducive to research commercialisation as is the case in leading innovative countries such as the United States. There have been some significant recent improvements made to the tax arrangements for share options in start-up companies, and in relaxing restrictions of the use of patents for experimental use. Further work is required in relation to the rules for IP arising from research funding provided by Commonwealth agencies other than that of the NHMRC and ARC, as well as in the critical 'proof-of-concept' phase of the research commercialisation process.²³

Policy recommendations

1. Reform funding for domestic coursework students

We discussed policy and funding interdependencies throughout our comments above, but especially in relation to the need for a holistic, long term approach if we are to achieve improvements in the translation of university research for economic and social benefit. Reform of the financing of higher education teaching activities is needed urgently to encourage innovation, competition, and to allow funding to better align with the actual costs of delivering high quality learning environments in all disciplines. We cannot have a strong research and innovation system without a strong education system, and successive reviews have found that the current funding framework for domestic coursework students threatens the quality and sustainability of the system as a whole.

We urge the Review to call on the Australian Senate to reach a compromise solution in relation to the Higher Education and Research Reform Bill 2014.

2. Reform the Research Training System

In our separate submission to the Review of Research Training System we discuss the key weakness of our system compared to international benchmarks, and argue that the system limits provider capacity for innovation and rewards institutions that focus on quantity over quality. We propose as a solution an integrated package of budget neutral reforms, which have at their heart the establishment of Research Track Master's programs, supported through the Commonwealth Grants Scheme, as the new standard pathway to an Australian PhD.

We urge the Review to consider our proposed alternative model for the future of the research training system.

3. Reform the Dual Funding System

We have discussed the pressure the gap between funding and actual costs (both direct and indirect) of supporting National Competitive Grants system places on institutions and researchers. The Sustainable Research Excellence initiative was developed after a very extensive review and consultation process to alleviate this pressure, but has fallen well short of its original goal due to repeated deferrals in its rate of growth. Meanwhile, the research system has continued to grow (encouraged by the demand-driven funding reforms) while funding for NCG schemes has plateaued. The resulting reduction in success rates has increased the opportunity costs and uncertainty for researchers. Australia should ideally commit to steadily grow public funding for the most outstanding peer reviewed research over the forward estimates. If that is not possible in the short term due to budget constraints, consideration must be given to designing an alternative funding model which reduces the wasted administrative

²² <http://www.theguardian.com/education/2013/nov/12/research-excellence-framework-impact-consultants>

²³ Here we recommend consideration of the Bayh Dole Act type reforms for Australia, as well as reconsideration of the programs supporting proof-of-concept activities under the former Commercial Ready scheme.

burden, provides researchers and institutions with more funding continuity, whilst ensuring that funding is focused to support the most outstanding research.

We urge the Review to develop and consult on possible alternative models to the Dual Funding System.

4. Address the decline in basic research

We noted in Section 6 that Australia's relative poor performance in innovation and productivity has occurred even though the balance of our publicly funded research effort has shifted markedly from curiosity-driven to applied research over the last 40 years. As a result our research profile now stands in stark contrast to those of some of the countries that perform the strongest on relevant OECD benchmarks.

Noting the calls from various quarters to further shift our investment towards research of direct interest to industry, we urge the Review to consider very closely the continuing merits of such approaches, and to take independent economic advice on this from a body such as the Productivity Commission.

5. Focus on new industry generation

Building on recommendation 4 and our comments under Section 7 and 8, ***we urge the Review to focus its efforts, and the weight of any possible funding or incentives, on creating an environment in Australia that is much more conducive to the creation of the dynamic new industries of the future in the goods and services sectors that are a feature of outstanding innovation systems found in the United States and elsewhere.***

Developing an integrated suite of policies across the areas of: IP; tax; superannuation; migration and visa policy; industry/skills ecosystem; entrepreneurship training and mentoring; proof-of-concept; and building *third stream* knowledge transfer and research commercialisation capacity in universities and other publicly funded research agencies, would have a substantial positive long term impact, especially if implemented alongside a coherent package of reforms to the regulation and funding of higher education and research. Noting that there are limits to what can be achieved practically without adding costs to the Commonwealth budget, however, we would welcome the opportunity for further discussions with the Review about realistic policy options, including potential areas for offsetting savings.

Ends/

Attachment B



University of Sydney Submission to the Review of the Research Training System,
August 2015

31 August 2015

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Submitted online: <http://www.researchtrainingreview.org.au/submissions/make-a-submission/>

Dear Mr McGagh

Review of Australia's Research Training System Discussion Paper

Thank you for the opportunity to comment on the *Review of Australia's Research Training System Discussion Paper* released by ACOLA in August 2015.

Securing Australia future place in the world

Your review is critically important, not only to the University of Sydney - as one of the largest providers of higher degree by research graduates in the country¹ - but to the future strength of the entire innovation system and the broader economy that it supports.

As Philip Lowe, Deputy Governor of the Reserve Bank, argued recently:

*"We (Australia) need to be at the high value-added end in much of what we do... this is why investment in human capital is so important. It is through human capital that we can create the goods and services that can deliver on this aspiration. The quality of our human capital is critical to our ability: to solve complex problems; to develop and use technology; to deliver premium quality goods and services; and to respond quickly and well to an ever-changing world. So one of the challenges that lies ahead is to create the environment that encourages the investment in human capital that is ultimately required to sustain the high living standards and high returns to savers that we should be aspiring to."*²

While the research training system review is important to the economy, it also presents an opportunity to shape our identity as a creative and innovative people, who excel not only in sport, agriculture and resource extraction, but in advancing knowledge and understanding in a broad range of areas for the betterment of humankind and the world.

We are therefore pleased the Government has appointed a panel of experts with a formidable collective understanding of the global innovation system, as well as of the history, strengths and weaknesses, and practical workings of Australia's higher education and research systems. We note also that many panel members have led research, analysis and national debate over the last decade about the need and options for reform of our research training system.

¹ Higher Education Research Data Collection (HERDC) - the University of Sydney currently accounts for around 16 per cent of total student higher degree by research load, and we offer research degrees across the largest number of disciplines in Australia.

² Lowe P., Deputy Governor, Reserve Bank of Australia, *Building Strong Foundations*, Address to the Australian Business Economists Dinner, 25 November 2014: <http://www.rba.gov.au/speeches/2014/sp-dg-251114.html>

Key Review term of reference

While all of the Review's terms of reference are important, it is under reference 4 (removing regulatory barriers to facilitate innovation) where we hope the Review Panel will focus its efforts. It is through consideration of practical options for reform that the solutions to the challenges described in the other terms of reference will need to be found - recognising that any change will need to build on the current arrangements and may need to be budget neutral in the short term at least.

Past reviews and outcomes

The University has engaged with many reviews relevant to the research training system conducted over the last decade.³ At least two of these identified the key challenges and risks facing the system, and recommended changes that, if implemented, would have had a positive impact. A third confirmed the funding challenges universities face in meeting the full costs of providing internationally competitive higher degree by research training, while other reviews, programs and attempted policy responses have sought to address the funding challenges the higher education sector faces in meeting the actual costs of teaching and research.⁴

Unfortunately, only relatively minor adjustments to the policy and funding framework have occurred in response to these reviews.⁵ The policy changes that have been made have not addressed the underlying regulatory and funding issues that, in our assessment, severely limit institutional capacity to respond to the various concerns to which your Review's terms of reference relate. In some cases, the changes have served to compound the situation, for example by stimulating further growth in HDR student numbers despite the system as a whole being supported by a funding envelope that is essentially fixed.

Other relevant current reviews

This review of the research training system is occurring alongside the review of university research funding and policy the Australian Government has commissioned as part of its plan to boost the commercial returns from research. The terms of reference that review include providing advice to the Government on how to ensure the quality of Australian university research and research training, allocate research block funding more simply and transparently, and provide incentives for universities to increase and improve engagement and collaboration with industry and other end users of research. The table we have provided at **Attachment A** summarises in a page the history, purpose and funding drivers of each of the six block grant programs that together make up the \$1.7 billion Research Block Grant Scheme. Currently, some 63 per cent of research block grant funding is provided to universities to support research training activities. We therefore trust that there will be close engagement between both reviews and that their recommendations in relation to the future purpose and allocative mechanisms for the research block grants will be in close alignment. We note that the outcomes of the Government's current *Re:think* review of the tax system, could also be highly relevant to the research training system, particularly in relation to possible reform of the R&D Tax Concessions and other initiatives that could either improve or impact negatively the level of private sector collaboration and engagement with universities and other public sector research organisations.⁶

³ House of Representatives Standing Committee on Industry, Science and Innovation, *Building Australia's Research Capacity*, 2008; Cutler et.al *Venturous Australia, Review of the National Innovation System*, 2008; DIISR *Evaluation of the Commercialisation Training Scheme*, 2010; Deloitte Access Economics for DIISR, *Examining the full cost of research training*, 2011; *Sustainable Research Excellence Policy Research Block Grant and Transparent Costing Exercise*, 2010; *Higher Education and Research Reform Bill 2014 (Cth)*; *Higher Education Reform Amendment Bill 2014 (Cth)*

⁴ Deloitte Access Economics *ibid*; Lomax J. et al, *Review of Higher Education Base Funding 2011*

⁵ Key recent changes to the research training policy and funding system include: **2008-12** Increase in new commencing APAs from 1580 to 3500 **2009** Institutional Grants Scheme (IGS) replaced by the Joint Research Engagement Scheme (JRE) - with Category 1 HERDC Income removed as a funding driver **2010** Increase in value of APAs from \$20,007 to \$22,500, with CPI Indexation (\$25,849 in 2015); DIISR accommodates Macquarie University's 3+2+3 HDR pathway through funding agreement **2011** Commercialisation Training Scheme ceases **2012** JRE Engineering Cadetship program introduced; Changes made to RTS guideline to allow reporting of 50% completion (to encourage joint MA/PHD provision).

⁶ <http://bettertax.gov.au/>

International competitiveness

The diagram below is a simplistic representation of the traditional pathway to an Australian PhD. While it is now unusual in Australia for students to move directly from secondary school, to full-time undergraduate studies, through to full time PhD studies, the pathway depicted was more the norm when the current block funding system supporting the research training was established in 2002. Today, while the average age of commencing PhD students in Australia is in the mid-thirties, and close to 50 per cent were in full-time work in the year prior to commencing their studies, there remain some students, particularly in the sciences, who may still follow the traditional full time path.⁷

The traditional Australian Higher Degree by Research Pathway



While the situation varies between disciplines and there are risks in generalising, our considered assessment is that at the system level Australia's current model of research training does not compare favourably with leading international benchmarks.

Moreover, taken as a whole, we do not believe the current policy and funding settings supporting Australia's research training system remain fit for producing graduates with the skills and capabilities that will be essential if our higher education system and the broader economy are to remain competitive. In our view, Australia's research training system has key strengths and weaknesses relative to leading international benchmarks. A number of these are outlined below.

Key strengths

- Income contingent loans and Commonwealth income support make undergraduate and professional entry postgraduate coursework programs relatively accessible.
- Australian HDR graduates enter the workforce relatively quickly.
- Our HDR graduates have strong employment outcomes compared to other domestic students.
- There are no up-front fees for most HDR students, and fewer opportunity costs due to shorter duration – once again making the system relatively accessible.
- The funding model encourages providers to grow student numbers and achieve timely completions.
- The funding model also encourages providers to focus on reducing costs and efficiency.
- The system continues to produce some graduates who achieve at the highest level internationally.

Key weaknesses

- In some disciplines (particularly in the humanities, sciences and social sciences) the system prepares students relatively poorly for the rigours of completing a research degree and embarking on a research career at international standards of quality.
- The Honours degree, while high quality in some disciplines and institutions, does not align well with leading international models (North America and Europe other than the UK).

⁷ Group of Eight, *The Changing PhD, Discussion Paper*, March 2013, p.15:

https://go8.edu.au/search?search_fulltext=documents%20go8%20policy%20analysis%202013%20changing%20phd%20final%20pdf

- Overall, Australia has less rigorous entry, advancement requirements and completion requirements, for example, few entry exams or oral defences of the thesis.
- In some disciplines the scope is too narrow due to inadequate time, and there is generally an absence of comprehensive advanced PhD-level coursework.
- Again, due to time and funding constraints, there is limited scope for industry engagement.
- The regulatory and funding frameworks are inflexible, limiting provider capacity for innovation and for the development of alternative research training pathways.⁸
- The funding model encourages quantity over quality, providing funding incentives for institutions to enrol and complete as many students as quickly as possible.
- As a result, funding per place continues to decline in real terms, further limiting institutional capacity to invest in quality and innovation.
- The system is increasingly sustained by cross-subsidisation from other income sources, limiting provider capacity to recruit top domestic and international talent through scholarship support, or to address the disparities in the participation of under-represented groups highlighted in the Discussion Paper.
- The system reinforces undergraduates remaining local, within the institution where they completed their undergraduate studies, thus promoting stagnation.
- While hard data will take time to obtain, feedback from some disciplinary experts indicates that Australian HDR graduates are increasingly not considered competitive for early career positions with the best institutions internationally.
- Feedback from potential international candidates in science disciplines in particular also suggests a growing awareness at the elite level that the Australian PhD is no longer competitive with offerings in North America and Europe.
- Despite recent increases in the Australian Postgraduate Award stipends, levels of financial assistance available to students makes full time study very challenging, particularly in high cost cities such as Sydney.⁹
- There is limited benchmarking of graduate quality between institutions and disciplines, nor tracking of graduate outcomes and levels of employer satisfaction.

Demand-side issues

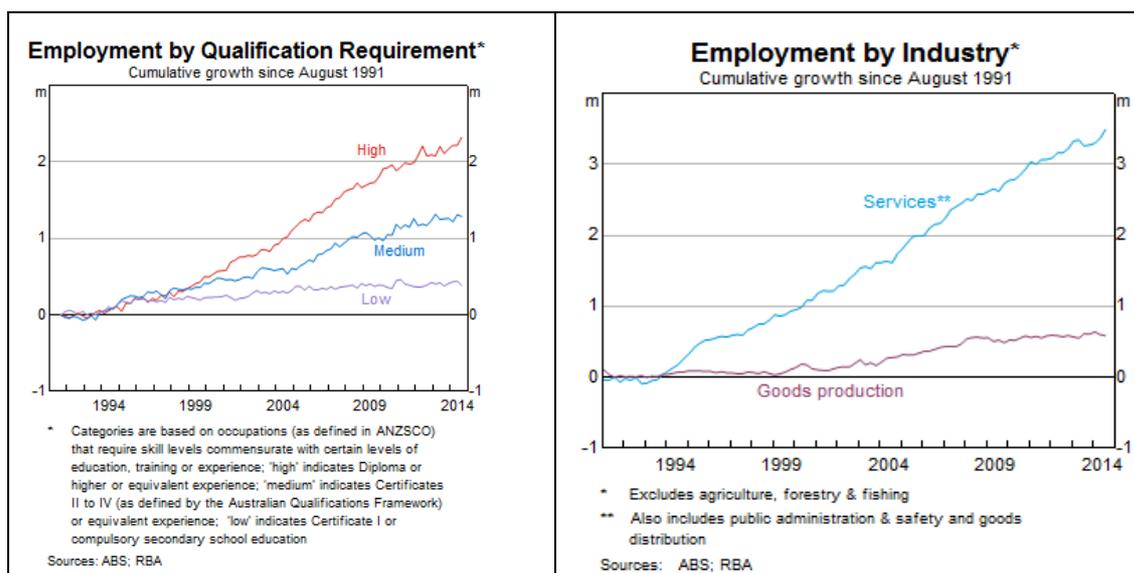
While the Review's term of reference are primarily concerned with higher degree by research graduate *supply* issues, and concerns about the quality and relevance of programs and graduates, close consideration of *demand* side issues is also vital if effective policy solutions are to be found. As the Discussion Paper notes, in line with international trends, Australian HDR graduates are increasingly pursuing careers outside of academia as their numbers continue to grow at a much faster rate than secure research roles become available in the higher education sector. This situation may change in the near future as baby boomer academics retire at increasing rates, and as the sector continues to expand. Here we note that projections of demand for PhD graduates in the United States and Australia suggest continuing strong growth in demand in some disciplines in particular.¹⁰ Moreover, as the following two charts from the Reserve Bank show, over the last twenty five years by far the largest sources of employment growth in Australia have been in fields requiring higher level skills and qualifications, and in the services sectors.

⁸ Here we note that an arrangement has been agreed between the Commonwealth and Macquarie University, which does accommodate a new pathway to the PhD: http://www.hdr.mq.edu.au/information_about/research_training_degrees/additional_info/mres_pathways There may be merit considering the 'Macquarie Model' for broader application across the sector.

⁹ With the value of the tax free APA stipend for full-time students well below the minimum wage of \$34,159 pa in 2015, there remains a strong case for further increases above CPI. While research students are not employees, they are nevertheless major contributors to the research outputs of universities, medical research institutions and other not-for-profit organisations.

¹⁰ Group of Eight, *The Changing PhD, Discussion Paper*, March 2013, pp.24&28: https://go8.edu.au/search?search_fulltext=documents%20go8%20policy%20analysis%202013%20changing%20phd%20final%20pdf

Trends in Australian Employment Growth by Qualification level and sector 1991-2014



Source, RBA <http://www.rba.gov.au/speeches/2014/sp-dg-251114.html>

Based on these long term trends as well as survey feedback from employers about satisfaction with university graduate skills,¹¹ we are not convinced that the answer to building new high value human capital based industries lies simply in requiring universities to embed more generic professional skills training and industry-based placements within their research training programs, and especially within the PhD given its primary purpose and current short duration compared to international benchmarks. Successive supply-side efforts to address this area of concern have not been particularly successful Australia. There is, however, a growing 'skills ecosystem' literature on which the Review could draw, focussed on identifying key factors that need to be present in an economy in order to support the development of high value knowledge industries.¹² Research is needed to determine, for example, whether Australian business and industry employs PhD graduates into the same kinds of roles for which they are recruited in noted epicentres of innovation and knowledge transfer like Silicon Valley.

Moreover, we know that in the health and medical research fields, for example, very large numbers of our students enrolled in Master's and PhD programs are clinicians employed full or part time in the public or private health sectors. This is one professional area where levels of university/industry collaboration are exceptionally strong and of enormous mutual benefit. The success of our health and medical research engagement model was acknowledged recently when the National Health and Medical Research Council recognised the *Sydney Health Partners* collaboration as one of four outstanding Australian examples of Advanced Health Research Translation Centres.¹³ There may be value in the Review considering the AHRTCs as examples of Australian skills ecosystems and knowledge precincts, where university/medical research institute/public and private sector industry collaborations are very strong.

There are also *supply* and *demand-side* issues that need closer consideration in relation to the employment pathways for higher degree by research programs into academic roles. While secure research-focussed postdoctoral and other early career research positions are scarce compared to the numbers of graduates in many disciplines, there are other opportunities for graduates – particular in roles that involve more teaching. The Commonwealth Department of Education's Office for Learning and Teaching recently commenced funding a project that seeks to strengthen the role of the PhD in preparing graduates for rewarding careers in academia and

¹¹ Oliver D. et.al, Workplace Research Centre, *Employer Satisfaction Survey, Report for the Department of Education*, June 2014: <https://education.gov.au/employer-satisfaction-survey>

¹² See for example, Froy F., *Global Policy developments towards industrial policy and skills: skills for competitive and growth*, Oxford Review of Economic Policy, Volume 20, Number 2, 2013, pp.344-360.

¹³ <https://www.nhmrc.gov.au/research/nhmrc-advanced-health-research-and-translation-centres>

industry, with a particular focus on developing knowledge and skills for higher education teaching.¹⁴

The critical importance of the PhD as the pinnacle research qualification

Public good research conducted in universities and other non-profit organisations is an increasingly global and competitive activity, in some disciplines requiring extremely expensive infrastructure that is beyond the capacity of any one institution or even nation to provide.¹⁵ It is therefore essential that the Australian PhD remains academically competitive with the best models in the world. Rather than introduce further legislative prescription of program requirements, we would strongly suggest the review recommend reform that gives providers the flexibility to design new research training pathways. These new pathways should be capable of ensuring that:

1. the Australian PhD, as the pinnacle Australian academic qualification, is undeniably internationally competitive;
2. there are exit points along the research training pathway where graduates can emerge with strong professional skills attractive to industry; and
3. the funding model provides incentives that reward providers who focus on quality over quantity.

Preferred pathway to a research career

We have given some initial thought to designing an alternative Australian research training framework capable of providing better outcomes for government, industry and universities. The preferred model we propose for consideration and discussion with the Review Panel is set out below. It is not dissimilar to the model that the Commonwealth Department of Education has recently accommodated for Macquarie University, and which an acknowledged expert on Australia's research training system, Professor Max King, Dean of Graduate Studies at Monash University, has recommended for some time.¹⁶

A possible future standard structure to an Australian PhD



Benefits of the proposed model

- The new intensive research Master's broadens the scope of the full PhD pathway by supporting specialised coursework, teaching preparation and generic skills development, thus producing graduates with high level research and professional skills, better prepared for the workforce *or* a PhD.
- High-level professional skills training and industry engaged learning opportunities are provided predominantly at the Bachelor and Master's levels for some disciplines.
- The Master's could also allow for embedding with research teams internationally and with industry where appropriate.
- The integrity of the PhD as the pinnacle qualification for an academic or research career is preserved.
- There is stronger alignment with international models (Europe/North America).
- The quality of graduates is increased at all levels, making them more competitive internationally for academic *and* other professional careers.

¹⁴ <http://www.itl.usyd.edu.au/tandlresearch/reframing-phd/>

¹⁵ See for example the Square Kilometre Array - <http://www.ska.gov.au/Pages/default.aspx>; the Human Genome Project - <http://www.genome.gov/10001772>; CERN's Large Hadron Collider - <http://home.web.cern.ch/topics/large-hadron-collider> and the Australian Synchrotron - <http://www.synchrotron.org.au/>

¹⁶ http://www.hdr.mq.edu.au/information_about/research_training_degrees/additional_info/mres_pathways; King M. Pro Vice-Chancellor (Research and Research Training), Monash University, *Submission to DIISR Research Workforce Strategy Review*, 10 August 2010

- The model can be budget neutral, through the redistribution of existing CSP, RTS and JRE funding, and by supporting research track Master's through the CSP/HECS/FEE-HELP system.
- It provides enhanced opportunities for top international students to transition to PhD studies with appropriate financial support (currently a significant weakness).
- Coupled with improved competitiveness and financial aid, the model boosts attractiveness to high quality students currently predisposed to programs in North America and Europe.
- The new pathway strengthens the education and research system generally, underpinning new knowledge generation, innovation, and international education exports.

Reforms proposed for consideration and discussion

To implement an alternative research training system framework such as proposed above, in a way that was budget neutral, would require reforms at all levels of the pathway made in a way that would ensure the all aspects of the resulting package work together. The key changes to existing funding and policy that would be required to support such a model could be the:

1. possible phase out of Honours in some disciplines;
2. introduction of a research track Master's stream managed by the Commonwealth under the CGS, supported by student contributions through HECS/FEE-HELP; and
3. redirection of research block grant funding currently supporting research master's degrees to provide additional support for PhD students.

Other changes proposed for consideration to achieve an integrated package include the following.

Bachelor Degrees

- Increase base funding per Commonwealth Supported Places through changes to funding clusters and/or increases to student contributions.

Master's Degrees

- Resolve postgraduate CSP allocation policy - including to accommodate a research-track Master's stream supported by CSP/HECS/FEE-HELP/International Student Fees.
- Allocate research-track Master's CSP places to providers based on assessment of quality and taking account of national research priorities.
- Support industry engagement through incentives and support for skills ecosystems
- Provide Youth Allowance for domestic research-track Master's students.
- Use savings from research Master's phase out to provide scholarship support for international students on the research track.

The PhD

- Define the purpose of the PhD – as new knowledge generation and the production of graduates with the most advanced research and transferable professional skills.
- Keep the PhD free of tuition fees for students.
- Redefine the purpose and objects of the Research Training Scheme – to support the PhD only.
- Add 30 per cent of the Joint Research Engagement Scheme to the Research Training Scheme.
- Increase funding per RTS place – consider all options including capping student numbers.
- Increase the APA scholarship per student – consider all options, including reducing the number of awards.
- Align the duration of the RTS and APA funding to provide support for up to 4 years.
- Make RTS funding by discipline contingent upon satisfaction of a research and research training quality standard – independently assessed against international benchmarks.
- Substantially increase the number of IPRS scholarships available with savings from the research Master's phase out.

The University of Sydney looks forward to engaging with the Review as it proceeds. We will continue to refine our ideas, discuss with other providers and gather evidence in support of our arguments and suggestions for reform.

Please do not hesitate to contact me or Mr Tim Payne, Director, Higher Education Policy and Projects, Office of the Vice-Chancellor and Principal (tim.payne@sydney.edu.au, ph 02 9351 4750) if you would like to discuss any aspect of our submission.

Yours sincerely,

(Signed version to follow)

Professor Philippa Pattison
Deputy Vice-Chancellor Education

Attachment A University of Sydney University Research Block Grants Summary Table

Attachment B University of Sydney ACOLA Research Training System Review Submission
in Template

Australian Research Block Grants Ready Reckoner

Scheme ¹	Year commenced	Funding	Funding Drivers				Policy objective	
			Research income		Publications	HDR Completions		HDR load
		2013-14 (\$m)	Category	%	%	%	%	
RIBG	1995	224	1	100	-	-	-	To supports universities in meeting the indirect costs of their competitive grant research activities.
SRE	2010	170	1	100 ²	-	-	-	To supports universities in meeting the indirect costs of their competitive grant research activities.
JRE ³	2010	333	2,3,4	60	10	-	30	To support and encourage collaboration between universities, industry and end-users.
RTS	2002	672	All	40	10	50	-	To enable universities to provide research training for domestic students undertaking master or doctorate degrees by research.
IPRS ⁴	1990	22	All	40	10	50	-	To supports research excellence and research effort in Australia by supporting universities to attract high quality international research students to Australia. Funding covers tuition fees and health care costs for the recipient. Supports around 330 scholarships a year. Numbers have not increased in 20 years.
APAs ⁵	2002	266	All	40	10	50	-	To provide financial support for high quality domestic post-graduate research students undertaking doctorate or masters degree by research at an Australian institution. APAs assist with student general living costs. Supports around 3500 scholarships annually at \$24,700 tax free in 2013. APA numbers were doubled by the former labor government to their current levels.
Total		1,687						

Sources: Science and Innovation Budget Tables 2014, Commonwealth Other Grant Guidelines for Research and Scholarships, ANAO Report on the Research Block Grant Scheme 2013

Prepared by: Tim Payne, Director, Higher Education Policy and Projects, Office of the Vice-Chancellor, the University of Sydney, August 2015, tim.payne@sydney.edu.au, ph: 9351 4750.

¹ Research Infrastructure Block Grant (RIBG); Sustainable Research Excellence (SRE); Joint Research Engagement Scheme (JRE); International Postgraduate Research Scholarship Scheme (IPRS), Australian Postgraduate Award Scheme (APA).

² The SRE scheme has an allocation formula similar to the RIBG, with funding based on providers' ACG research income. This reflects their common aim to support the indirect cost of Australian competitive grant research activities. However, the methodology for calculating SRE allocations is more complex due to the SRE scheme's additional aim to support universities to build and maintain research excellence through the implementation of best practice financial management, performance and reporting frameworks. It includes a transparent costing component, and an excellence component, which also has regard for performance in the Excellence in Research for Australia (ERA) review process.

³ The JRE Replaced the Institution Grant Scheme from 1 January 2010, removing Category 1 income as a driver to promote business/university collaboration.

⁴ The scheme was first implemented in 1990 as the Overseas Post-graduate Research Scholarships, with the current funding allocation formula commencing in 2002. This scheme was brought under the umbrella of the Research Block Grant program in 2008.

⁵ Implemented in 1995, with the current funding allocation formula commencing in 2002

REVIEW OF AUSTRALIA’S RESEARCH TRAINING SYSTEM – CONSULTATION RESPONSE FORM

Please read the submission guidelines before completing and submitting this form. This form should be submitted through the [consultation website](#). **Submissions should be evidence based, provide examples where possible, and address the consultation questions.**

YOUR DETAILS

Name	Professor Philippa Pattison, Deputy Vice-Chancellor Education
Organisation	The University of Sydney
Level in organisation at which submission has been authorised	Deputy Vice-Chancellor, with Delegation from the Vice-Chancellor
Contact email	philippa.pattison@sydney.edu.au

EXECUTIVE SUMMARY

Please provide an executive summary of no more than 300 words of your submission

The current policy settings supporting Australia’s research training system are not capable of producing graduates with the skills and capabilities that will be essential if our higher education system, international education exports, and the wider economy are to remain internationally competitive.

Feedback received from experts across the disciplines suggests a growing concern domestically and internationally that Australian PhD graduates, even from our best institutions, are not considered competitive with their counterparts from institutions in North America and Europe. Prospective international students also report concerns about the quality of Australian higher degrees compared to alternatives available to them elsewhere.

Our assessment is that there is an urgent need for major regulatory and funding reform, to give providers greater flexibility to develop innovative research training pathways, and to ensure that scarce available funding is distributed to promote efficiency and the pursuit of the highest possible quality research training.

Numerous reviews of the research training system conducted over the last decade have recommended significant reform, yet minimal changes have been made to the policy and funding frameworks that have been in place since 2002. Some reforms have actually compounded one of the key challenges the system faces – providing high quality research training to rapidly increasing numbers of students within a funding envelope that is essentially fixed except for indexation.

The Review's terms of reference are focused on the *supply-side* of the skills debate. While this is important, there is also a need for the Review to consider *demand-side* issues, and how to ensure that Australian industry can take full advantage of the advanced skills and qualities of higher degree by research graduates. What is the fundamental purpose of the PhD? Why is it that Australian industry employs less HDR graduates in research roles than occurs in North America? Why are levels of university/industry engagement in Australia so strong in some sectors (eg. health and medical research and the mining sector) yet in others apparently relatively weak? Is the growing literature about how to foster 'skills ecosystems' (exemplified by innovation epicentres like Silicon Valley) informative for Australia?

We appreciate that any reforms to the research training system may need to be budget neutral, given the state of Commonwealth finances. In that context, we have given some initial thought to potentially budget-neutral reforms that could meet the objectives of government, universities (as custodians of the disciplines), business and industry. These are set out in our attached covering letter.

We urge the Panel to be bold and creative with its recommendations, and look forward to engaging with the Review as it progresses.

Question 1 - What are the research skills and experiences needed to be an effective researcher?

Specialised knowledge, skills, understanding and experience

Advanced disciplinary/multidisciplinary knowledge as appropriate for the field and an international research career; research design; research methods; research ethics; data generation, collection, storage, information analysis synthesis and presentation; proposal writing; strategic planning; project management; time management; leadership; people management; cultural competence; grant and financial management; fundraising; intellectual property; research commercialisation; foreign languages (in some fields); industry knowledge and experience; ability to communicate ideas and information to specialist and non-specialist audiences, including through teaching.

Question 2 - What broader transferable qualities do HDR graduates need to develop to succeed in a wide range of career pathways? Should these skills be assessed, and if so, how?

Core transferable qualities

Intelligence, curiosity, creativity, critical thinking, problem solving, honesty, project management; adaptability, time management and communication skills – oral and written.

Assessment

These core qualities should be assessed formally by higher education providers throughout a student's pathway to completion of a research degree, integrated with the assessment of disciplinary knowledge and specific professional skills. Assessment approaches and techniques will depend on the discipline and level of study. They should form part of assessment of learning outcomes against the relevant standard for each course.

Need for better data to inform policy and practice

While anecdotal reports abound, there is limited reliable information available about how the quality of Australian university graduates compares between disciplines and institutions domestically, or relative to international benchmarks.¹ The availability of better information of this type would not only assist with policy development, but help to improve institutional practice, and inform student choice. If used appropriately such information should also serve to improve graduate outcomes.

Policy options

Regular independent external review

There could be value in the Australian Government working the university sector to develop an independent process to periodically assess the quality of Australian HDR graduates (both specialised and generic skills) compared to international benchmarks. This could be developed as part of the TEQSA provider reaccreditation process and build on the extensive literature that is developing

¹ See the *Development of Performance Measures* report of the former Australian Government's Advancing Quality in Higher Education Reference Group, June 2012, <http://docs.education.gov.au/system/files/doc/other/aqhereport.pdf>

globally around the development of robust methods to assess and benchmark graduate learning outcomes.²

Longitudinal tracking of HDR graduate outcomes

An alternative to establishing a potentially costly and onerous process to benchmark HDR graduate quality through ‘ERA-like’ peer review, would be to track longitudinal data about Australian HDR graduates outcomes and career pathways. The work led by Professor Mark Western and his team at the University of Queensland’s Institute of Social Science Research during the late 2000s on Australian PhD graduates employment outcomes and job attributes 5 to 7 years from completion provides a good foundation for such work.³

Graduate and employer surveys

Another option for assessing the appropriateness of the transferrable skills acquired by research students would be to periodically gauge employer attitudes. The University of Sydney’s Workplace Research Centre led a project for the Commonwealth Department of Education in 2014 to develop and pilot a new combined graduate and employer survey to assess the extent to which graduates of different universities and disciplines were equipped with skills needed for success in the workplace.

The study’s report included a thorough literature review, on which the conceptual framework for the pilot survey was based. While the project encountered some practical delivery challenges, it provides a strong foundation for the development of such a national survey instrument, which could be readily adapted for use in relation to HDR graduates.⁴ We commend the report to the Review Panel as providing a comprehensive overview of the history and current state of graduate and employer surveying, as well as a sophisticated and fully tested survey instrument focused on graduate employability skills.

Question 3 - What other broader capabilities should HDR graduates develop during their research training?

Other important qualities

Independence, diligence, persistence, patience, objectiveness, open-mindedness, attention to detail, competitiveness, ability to work as part of a team; ability to analyse information critically and synthesise complex information, concepts and theories.

² See for example the OECD’s Assessment of Higher Education Learning Outcomes (AHELO) project, with Australia’s involvement being led by ACER: <http://www.acer.edu.au/aheloau>,

³ See for example: Western M, et al, *PhD Graduates 5 to 7 Years Out: Employment Outcomes, Job Attributes and the Quality of Research Training, Final Report*, The University of Queensland Social Science Research Centre, November 2007

⁴ Oliver D. et.al, Workplace Research Centre, *Employer Satisfaction Survey, Report for the Department of Education*, June 2014: <https://education.gov.au/employer-satisfaction-survey>

Question 4 - What skills and capabilities do employers in Australia need from HDR graduates?

See responses to Questions 1-3 above. See also *Workplace Research Centre, Employer Satisfaction Survey*, Report for the Department of Education, June 2014; <https://education.gov.au/employer-satisfaction-survey>, pages 22-29. Key skills and capabilities emerging from the employer generic skills literature and frameworks fall into the following categories: basic/fundamental skills; people-related skills; conceptual/thinking skills; personal skills and attributes; skills and understanding of business and industry; skills related to the community.

Question 5 - What research skills and capabilities are needed to ensure Australia's research system remains internationally competitive?

For the necessary research skills and capabilities see our responses to Questions 1 to 4 above. The research training system not only underpins the research system, but the national innovation system.⁵ The most competitive countries appreciate that their future prosperity depends largely on their capacity for new knowledge generation, productivity improvement, economic diversification, and on their preparedness to respond to the unknown major social, health, economic and environmental challenges they will face in the future.

Through the tough recent economic times, countries like the US, Canada, France and Germany, have continued to take long term views about support for their research systems – investing heavily and strategically in public good research and infrastructure, including in their universities. Developing countries, particularly in Asia, are also massively increasing their investment in university education and research to grow their knowledge and skills bases.⁶

Question 6 - What research skills and capabilities are needed from HDR graduates to ensure Australia is ready to meet current and future social, economic and environmental challenges?

See responses to Questions 1-5 above.

⁵ See for example, Cutler et al, *Venturous Australia*, Review of the National Innovation System, 2008

⁶ Group of Eight, *Government Investment in Research in Selected Countries 2014*:

<https://go8.edu.au/publication/government-research-funding-2014-selected-countries>

Question 7 - What features of the research training system should be retained to ensure our graduates are internationally competitive?

Key features of Australia research training system

1. A continuum. While there is no 'normal' pathway to a successful research career, all levels of the education system play a role, and need to be strong if a nation is to have strong research and innovation system. Learning and growth continues for most researchers once their careers are well-established.

The linear Australian path to a research career



2. Structure of the 'university' component. While the route and time taken to complete an Australian research higher degree now vary widely between individuals and disciplines, the 'traditional' pathway around which the current policy and funding framework was built required completion of a bachelor's degree at honours level, followed by a Research Master's or PHD.

Traditional Australian HDR Pathway



3. Policy and funding. The research training system is supported by complex policy and funding arrangements that falls under different parts of the *Higher Education Support Act 2003 (Cth)*. For their Honours degree, domestic students have access to a Commonwealth Supported Place, HECS for their student contribution, and means tested income support from the Commonwealth through the Youth Allowance system. Providers receive funding under the Commonwealth Grants Scheme (CGS) based on their full time student load. For the Research Master's or PhD, there are currently no fees for eligible domestic students. Providers receive funding through the Research Block Grants Scheme. Eligible domestic students may receive financial assistance through the Australian Postgraduate Awards (APA) Scheme, while a small number of higher competitive scholarships are available for international students. Providers may charge 'full fees' for International students for coursework and research degrees.

4. Accessibility. The availability of Commonwealth and HECS supported places for eligible coursework students in undergraduate and some postgraduate courses, means university tuition fees pose no upfront barrier to study at these levels. Similarly, if admitted to a place in a higher degree by research program, there are no tuition fees, so no upfront barriers. Nevertheless, people from disadvantaged backgrounds remain under-represented in coursework programs, with the disparities even greater for higher degrees by research.

5. Duration. While completion times can vary, generally it takes less time to complete a PhD in Australia than it does in North America and some European countries. Providers receive funding support for up to 3.5 years full time equivalent study for each domestic student, while eligible students can receive a Commonwealth Scholarship for a maximum of 4 years. The standard timeframe for completion of a PhD in science disciplines in leading countries is closer to 6 years.

Key strengths and weaknesses

For a summary of the key strengths and weakness of the current research training system see page 3 and 4 of the University's cover letter.

Aspects that should be retained

The University of Sydney believes the following features of the current system should be maintained: up to a four year undergraduate degree, supported by the Commonwealth Grants Scheme; income contingent loans for Commonwealth Supported Students in coursework programs; income support for eligible coursework students; the Research Training Scheme - but for PhD students only; no tuition fees for PhD students; the APA and IPRS scholarship schemes with the later needing to be expanded significantly.

Question 8 - How should the research training system be structured to produce high quality researchers who can contribute to Australia's future prosperity and wellbeing?

See pages 3-7 of the University's attached covering letter for our initial thoughts about how Australia's research training system could be restructured to address key weaknesses and produce higher quality researchers who can contribute to Australia's future prosperity and wellbeing.

Question 9 - How can entry and exit pathways to and from research training be better structured?

Under the alternative research training framework we have proposed for discussion, a key new element would be created in the form of an intensive 12-18 month research track master's program, supported through the Commonwealth Grants Scheme and through student contribution under the HECS system.

Under our proposal, though Honours may be phased out in some disciplines, selected students would continue to receive advance research preparation as part of their bachelor degree, as well as embedded professional skills and experiential learning in industry and the community. At the completion of the Master's, students would only progress to the PhD if they satisfied very high entry standards, but could exit the system at that point equipped with advanced research and professional skills that should be attractive to employers .

Question 10 - How can barriers to participation in HDR programs be overcome so that more candidates from non-traditional backgrounds, including indigenous students, undertake research training?

Issues of the participation in higher education by candidates from under-represented backgrounds, including Aboriginal and Torres Strait Islander students are complex. There are no simple solutions and any strategies take time to deliver outcomes.

At the University of Sydney we are taking a holistic approach to addressing such under-representation. In relation to increasing Aboriginal and Torres Strait Islander participation this includes, for example: recognition and leadership at the highest levels with the University through the appointment of an Aboriginal person to the level of Deputy Vice-Chancellor to develop and lead implementation of the University's relevant strategies; deeper and more meaningful engagement with students from disadvantaged backgrounds in primary and secondary schools; the establishment of alternative entry pathways and scholarship support for target groups; the provision of additional support and mentoring for such students once they enter University; the embedding of cultural competency elements in all course curricula to build respect and understanding; early identification of Aboriginal and Torres Strait Islander students with potential for leadership and research careers; and innovative programs such as our Breadwinners to address the very real financial challenges that potential students from these backgrounds face when contemplating a research degree.⁷

Our strong assessment, however, is that if the research and research training systems were funded more adequately, resources that are currently required to cross-subsidise core activities, would become available to provide greater levels of financial and other supports for under-represented groups at all levels of higher education.

⁷ <http://sydney.edu.au/scholarships/current/breadwinners.shtml>

OTHER SUPPORTING INFORMATION

Further supporting information not covered in your answers to the consultation questions should be provided here

See attached covering letter for additional supporting information.