

31 August 2015

Mr John McGagh
Chair, Review of Australia's Research Training System
C/- Australian Council of Learned Academies
Domain LPO
PO Box 33223
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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 current 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

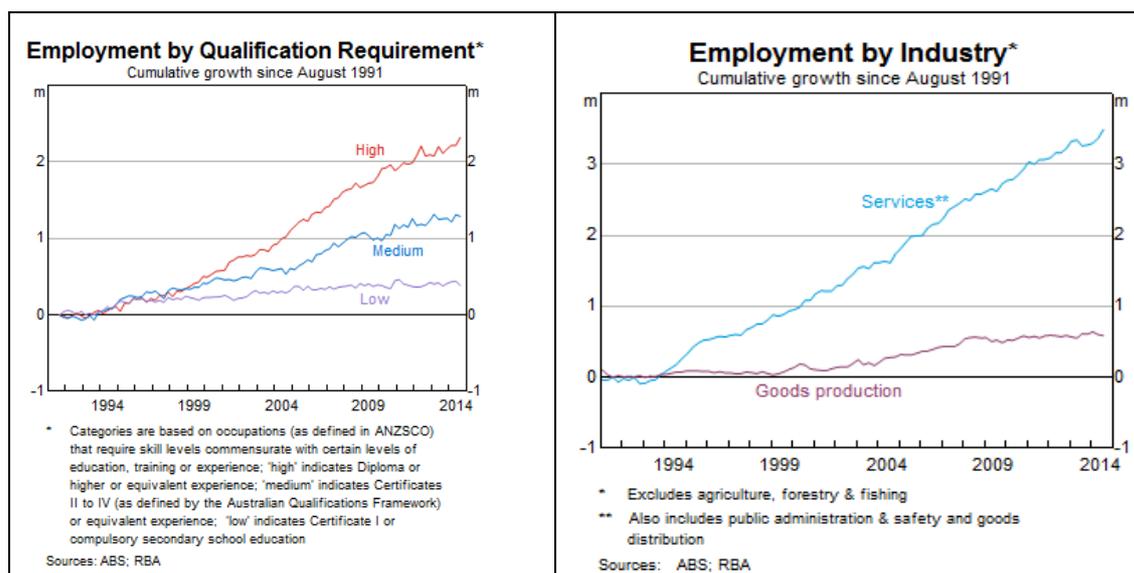
While the Review's term of reference are primarily concerned with higher degree by research graduate *supply* issues, and concerns about the quality and relevance of programs and graduates, close consideration of *demand* side issues is also vital if effective policy solutions are to be found. As the 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-dq-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 copy 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.
JRE³	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.
IPRS⁴	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.
APAs⁵	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.