

**Australian Catholic University (ACU)
Response to the Australian Government
Paper *Boosting the Commercial Returns
from Research***

November 2014

AUSTRALIAN CATHOLIC UNIVERSITY (ACU) RESPONSE TO THE AUSTRALIAN GOVERNMENT PAPER *BOOSTING THE COMMERCIAL RETURNS FROM RESEARCH*

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Executive Summary

Australian Catholic University (ACU) welcomes the opportunity to respond to the Australian Government's paper *Boosting the Commercial Returns from Research*. ACU supports the Government's initiative to explore opportunities to improve Australia's economic performance through better translation of research into commercial outcomes.

ACU recognises that better translating research into commercial outcomes is a key part of driving innovation in Australia, growing research capacity, and boosting national productivity.

As a university with a unique specialisation and core strengths in Education and Health, ACU's key industry partners are the public sector and Education and Health services providers. From this perspective, achieving commercial outcomes through research may not necessarily involve generating ideas to design products that create large profits in a commercial private sector sense. Rather, it may more significantly involve generating research findings that create service delivery efficiencies and other research that can save government and industry money, whether in the immediate or longer term, or improve productivity.

Achieving 'commercial outcomes', particularly in the public sector and service-delivery contexts, is about driving the dollar further. For instance, research into disease prevention that assists in lowering illness in the population, or into new hospital management systems that serves to improve worker efficiencies, can reduce government costs by lessening present and future burden on the healthcare system and boosting productivity. Our research encompasses a public benefit that serves to improve workforce productivity and support national advancement.

International research and innovation systems that successfully translate their research into commercial outcomes support and promote the following objectives¹:

- Cooperation between researchers and industry
- Targeted research efforts
- Research excellence
- Entrepreneurship

ACU believes in adopting public policy positions to advance these objectives in Australia's research and innovation system and boost the commercial returns from research across the nation. They are also imperative if Australia is to remain globally competitive and boost national productivity into the future.

There are opportunities to better engage industry and university researchers in collaborative projects to boost the translation of research into commercial outcomes. ACU believes that government should:

- Provide additional targeted investment in the Australian Research Council's (ARC's) Linkage funding scheme to support more university-industry research collaborations.
- More broadly, ensure that government funding provides sufficient incentive for industry to seek engagement in collaborative research projects by:
 - Ensuring that research grants adequately and fully fund projects to meet their objectives.
 - Exploring opportunities to reduce the administrative and regulatory burden of applying for government funding to counter any potential disincentives to industry in seeking engagement in collaborative research endeavours.
- Explore opportunities to lift the profile of research undertaken at universities and their particular research capacities with industry, to encourage industry to come to universities to innovate or solve business and service delivery issues.

¹ Australian Government, *Boosting the Commercial Returns from Research* (2014), at 5.

- Encourage fractional appointments or staff secondments between universities and industry.

To better target research efforts, support research excellence, and encourage entrepreneurship in Australia, ACU believes that government must:

- Support a diversified research landscape where universities are funded to undertake quality research and play to their particular demonstrated research strengths.
- Endorse strategies that support research intensification across all universities, promoting:
 - Greater concentrations of research excellence.
 - Competitive and strategic allocation of resources based on 1) well-articulated research plans and 2) rigorous assessment of performance.
- Focus on quality over quantity in research assessment and administration. This would better serve research and innovation in Australia and more effectively advance the objective of high quality research, by freeing up additional resources for better investment in actual research and quality researchers.
- Facilitate active engagement in strategies to build international research engagement and collaborations. There is significant advantage to be gained from tapping into research talent and advances overseas by collaborating with the world's leading researchers and research institutes.
- Encourage universities to align research with their particular teaching strengths.
- Secure a policy environment which recognises that universities that are growing research capacity need to be supported and allowed sufficient time to develop their research strengths.
- Recognise the vital connection between university research and teaching, which underpin scholarship and innovation.

I. Collaboration between Researchers and Industry

There is opportunity to better engage industry and university researchers in collaborative projects to boost the translation of research into commercial outcomes.

ACU believes that government should:

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- More broadly, ensure that government funding provides sufficient incentive for industry to seek engagement in collaborative research projects by:
 - Ensuring that research grants adequately and fully fund projects to meet their objectives.
 - Exploring opportunities to reduce the administrative and regulatory burden of applying for government funding to counter any potential disincentives to industry in seeking engagement in collaborative research endeavours.
- Explore opportunities to lift the profile of research undertaken at universities and their particular research capacities with industry, to encourage industry to come to universities to innovate or solve business and service delivery issues.
- Encourage fractional appointments or staff secondments between universities and industry.

Additional Investment in the ARC Linkage Funding Scheme

ACU believes that there is significant advantage to be gained through additional targeted government investment in the Australian Research Council's (ARC's) Linkage funding scheme to support university-industry collaborations.

A particular point that has been made with respect to research undertakings is that institutions:

“...work on activities which get measured and rewarded. As universities are not really rewarded for collaboration, the funding formula has to change to specifically reward collaboration...The introduction of some targeted schemes at around two to three percent of total R&D funding (such as Third Stream funding and/or Knowledge Transfer Partnerships – as in the UK) would drive positive behaviour in universities and industry.”²

The Linkage funding scheme plays a vital role in facilitating collaborative research projects between higher education researchers and other parts of Australia's innovation system, particularly industry. Linkage funding supports national and international research partnerships between researchers and business, industry, community organisations, and other publicly funded research agencies.³ The scheme has been in operation since 2001 over which time it has been serving to deliver on its targeted objectives to⁴:

- Support the initiation and development of long-term strategic research alliances between higher education organisations and other organisations, including industry, in order to apply advanced knowledge to problems and/or to provide opportunities to obtain national economic, social or cultural benefits.
- Provide opportunities for researchers to pursue internationally competitive research in collaboration with organisations outside the higher education sector, targeting those who have demonstrated a clear commitment to high-quality research.
- Encourage growth of a national pool of world-class researchers to meet the needs of the broader Australian innovation system.
- Build the scale and focus of research in the Strategic Research Priorities.

² Australian Academy of Technological Sciences and Engineering (ATSE), *Strengthening links between industry and public sector research organisations – Communique* (2011) at <http://www.atse.org.au/Documents/Publications/Reports/Innovation/ATSE+Collaboration+Workshop+COMMUNIQUÉ.pdf>

³ Australian Research Council, *ARC Profile*, at http://www.arc.gov.au/about_arc/arc_profile.htm

⁴ Australian Research Council, *Linkage Projects*, at http://www.arc.gov.au/ncgp/lp/lp_default.htm

A notable benefit and attraction of the Linkage scheme is that industry partners do not engage or invest in Linkage projects unless they consider the research to be of relevance or strategic interest to them, and that it will create benefits that translate into commercial outcomes.

For example, ACU's collaborative research project with the NSW Police Force (NSWPF) (industry partner), and the University of Western Sydney (UWS), was initiated to address the NSWPF's concern that record numbers of their members are on psychological medical leave and are exiting the Police Force due to psychological stress and trauma (on any given day, an average of 12 per cent of the workforce is unable to be deployed). The NSW Police Commissioner Andrew Scipione particularly noted that "by collaborating with academic researchers from ACU and UWS, [the NSW Police Force] hope to develop practical applications and policies to build on current initiatives of the Workforce Safety Command."⁵ The research is geared to generate strategies for improving wellbeing, resilience, and retention in the NSWPF, which will boost workforce productivity.⁶ The research collaboration has been made possible through Linkage funding.⁷ In particular, it will directly address the national Strategic Research Priority of 'lifting productivity and economic growth'; contribute to maximising Australia's competitive advantage in critical sectors' by enhancing the long-term viability of the NSWPF as a critical service organisation; and deliver skills for the new economy by identifying innovative research-derived methods and systems needed to develop Australia's NSWPF human capital.

Additional targeted investment in the Linkage scheme, which has a proven track record of supporting research collaborations between universities and industry, would serve to boost the commercial returns from research by supporting more research projects geared to deliver commercial outcomes, lift workforce productivity, and produce public benefit.

Directing additional investment to the existing and effective framework of the Linkage scheme would also save government significant administrative costs that would otherwise be required to set up a new scheme, and avoid unnecessary bureaucracy.

Ensure Sufficient Incentive for Industry to Engage in Research Collaborations

If the Government is committed to its objectives to better translate research into commercial outcomes in order to grow research capacity, drive innovation in Australia, and boost national productivity, then it needs to ensure that research and research funding schemes are adequately funded and supported.

It is important that government funding supports the delivery of quality research and provides sufficient incentive for industry to seek engagement in collaborative research projects. Government should ensure that research grants adequately fund projects to meet their full objectives, as insufficient funding can impact on research and the effective translation of findings to produce commercial outcomes.

There is also a significant opportunity for government to explore options to reduce the administrative burden on industry and universities with respect to applying for government funding. This could serve to counter potential disincentives to industry in initiating or seeking engagement in collaborative research endeavours. For example, a study of 2012 National Health and Medical Research Council (NHMRC) Project Grants applicants estimated that each application took approximately '38 person days of work'.⁸ It further found that across all applicants an "estimated 550 working years of researchers' time...was spent

⁵ Australian Catholic University, 'May the Force be with you', at http://www.acu.edu.au/research/research_institutes_and_programs/ippe/ippe_news_and_events/may_the_force_be_with_you2

⁶ NSW Police Force 2011 statistics.

⁷ Equivalent in-kind financial support is also being provided by Australian Catholic University (ACU) and the University of Western Sydney (UWS).

⁸ See 'Centuries wasted applying for grants?' *The Conversation* (27 March 2013) at <https://theconversation.com/centuries-wasted-applying-for-grants-13111>; Herbert, D., Barnett, A. et al, 'On the time spent preparing grant proposals: an observational study of Australian researchers' (22 May 2013) at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664356/>

preparing...3727 proposals, which translates into annual salary costs of AU\$66 million.”⁹ Among the 285 participants studied who submitted 632 proposals, only 21 per cent were successful.¹⁰

As the Australian Academy of Technological Sciences and Engineering (ATSE) has identified:

“[Co-operative Research Centre] CRC, ARC Linkage, Enterprise Connect and Commercialisation Australia are all initiative in the right direction but are under-resourced...

Transaction costs of collaboration are too high. Legal complexities between industry and [Public Sector Research Organisations] PSROs need to be simplified. They are presently too dominated by risk avoidance.

Research organisations will work on activities which get measured and rewarded. As universities are not really rewarded for collaboration, the funding formula has to change to specifically reward collaboration. ERA in its present form is unlikely to change the amount of collaboration or the innovation dividend. The introduction of some targeted schemes at around two to three percent of total R&D funding (such as Third Stream funding and/or Knowledge Transfer Partnerships – as in the UK) would drive positive behaviour in universities and industry.”¹¹

Providing additional funding and reducing the administrative and regulatory burden of public research funding application processes would provide greater incentives for industry to compete for these grants and engage in research projects geared to produce commercial returns. If the funding on offer is insufficient and administrative processes are considered too burdensome, industry may be disinclined to engage in these processes. From a business perspective, it may be considered commercially unviable to spend significant time and money on substantial paperwork when the prospect of successfully accessing a small pool of funding is limited, and especially if it will not fully meet their funding requirements.

Lift the Profile of University Research Capacity with Industry

Australia’s universities are intellectual engine houses and host some of the world’s leading researchers. There is an opportunity to lift the profile of research undertaken at universities and their particular research capacities with industry, to encourage and raise awareness of the incentives for industry to come to universities to innovate or solve business and service delivery issues.

Australian universities support and advance a diverse research sector, with different universities housing different research specialisations; often linked to the particular unique profiles of the individual university. This stimulates innovation across a broad range of fields and communities across the nation. Evidently industry, including key areas of public sector operation, can significantly benefit from this research expertise to boost productivity or generate innovative ideas to propel their particular objectives. Greater collaboration, cooperation and alignment of university research with industry needs can lead to improved commercial outcomes, and this can be supported by raising the profile of university research to bring it into the consciousness of key industry figures.

If industry is to be more engaged in translating research into commercial outcomes, it is important to ensure that they are made especially aware of the research capacities and specialisations of universities.

In our case for instance, two examples of current research at ACU which is serving to deliver commercial outcomes, cost savings to government and improve efficiencies include the following:

⁹ Herbert, D., Barnett, A. et al, ‘On the time spent preparing grant proposals: an observational study of Australian researchers’ (22 May 2013) at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664356/>

¹⁰ Herbert, D., Barnett, A. et al, ‘On the time spent preparing grant proposals: an observational study of Australian researchers’ (22 May 2013) at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664356/>

¹¹ Australian Academy of Technological Sciences and Engineering (ATSE), *Strengthening links between industry and public sector research organisations – Communique* (2011) at <http://www.atse.org.au/Documents/Publications/Reports/Innovation/ATSE+Collaboration+Workshop+COMMUNIQUE.pdf>

- ACU's Mary MacKillop Institute for Health Research has undertaken groundbreaking research and produced world-first evidence to show how the lives of tens of thousands of men and women with atrial fibrillation can be improved, through an effective post-hospital discharge program of home visits and specialist care, rather than the standard management system. The outcomes of the research will not only lead to improved patient outcomes, but will also reduce the burden on Australia's hospital system and save significant costs for government and the healthcare system. Atrial fibrillation, from which almost 3.5 per cent of the Australian population suffers, is closely linked to debilitating and deadly strokes and heart failure. The estimated cost of atrial fibrillation is greater than 1 per cent of health care expenditure, with the greatest costs being associated with hospitalisation. The annual rate of hospitalisation for atrial fibrillation patients has tripled in the past 20 years and is expected to double again in the next 20 years. The world-first research study, 'SAFETY', conducted by ACU researchers has demonstrated that for every 100 patients with atrial fibrillation, the new program will reduce health care costs amounting to more than \$500,000, deliver seven fewer deaths, 1000 fewer days of costly hospital stay, and 1000 more days alive and out-of-hospital.¹²
- ACU researchers are working on a study to develop a regional health care program that reduces the risk of developing diabetes or cardiovascular disease (such as a heart attack or stroke) through better management of the risk factors that cause these diseases.¹³ If this program has positive results and is cost effective, more nurse-led clinics may be set-up in regional Australia to reduce death and ill-health from these diseases. This could reduce burden on the healthcare system and save government costs through disease prevention. Significantly, people living in regional areas have higher levels of these risk factors than people living in metropolitan areas. This is partly due to lower access to health care. ACU's 'MODERN' research project will examine whether a regional nurse-facilitated program is cost effective and whether, compared to usual care, it can be optimised to identify and reduce risks in high risk individuals; serving to prevent these diseases. Cardiovascular disease is one of the leading causes of death worldwide, and claims the lives of one Australian every twelve minutes. It is also one of Australia's largest and most expensive health problems. Diabetes, which affects four per cent of Australians, can lead to cardiovascular disease, and is the fastest growing chronic condition in Australia (around 280 people are newly diagnosed every day).¹⁴

Encourage Fractional Appointments or Staff Secondments between Universities and Industry

There are opportunities to more directly engage universities and industry with each other through cross-institutional fractional appointments or staff exchange agreements, which could facilitate and assist in building understanding of research/industry issues and in identifying additional opportunities for research collaborations geared to produce commercial outcomes.

ACU has been actively working to build its research networks and to develop its core areas of research strength through fractional appointments, both domestic and international. This includes some arrangements where staff work part-time at ACU and part-time at an industry partner. This initiative is building ACU's professional networks and relationships and will serve to assist ACU to engage in more research initiatives that generate commercial outcomes.

¹² Australian Catholic University, 'Putting SAFETY first', (18 November 2014), at http://www.acu.edu.au/connect_with_acu/newsroom/news/media_releases/repository/putting_safety_first

¹³ This research is being supported through a \$1.3 million National Health and Medical Research Council (NHMRC) grant.

¹⁴ Australian Catholic University, *Modern: The management to optimise diabetes and metabolic syndrome risk reduction via nurse-led intervention (MODERN) study – Information Brochure* (2014).

II. Research Excellence and Targeted Research Efforts

It is recognised that the international research and innovation systems that successfully translate their research into commercial outcomes support and promote targeted research efforts, research excellence, and entrepreneurship.¹⁵ ACU believes that these objectives can be advanced in Australia's research and innovation system by:

- Supporting universities to develop research specialisations and niche areas of research for national innovation and advancement
- Promoting strategic research intensification
- Building international research engagement and collaboration

Supporting Universities to Develop Research Specialisations and Niche Areas of Research for National Innovation and Advancement

ACU supports a diversified research landscape in Australia where universities are funded to undertake quality research and play to their research strengths.

Universities should be supported to conduct quality research in their identified areas of speciality and to develop niche areas of expertise in line with their particular strengths and strategic objectives.

Universities that are growing their research capacity need to be supported and allowed sufficient time to develop their research strengths, where they have a real capacity to do so.

ACU recognises that all universities cannot produce quality research in all areas. The benefit, however, of supporting competition and diversity within Australia's innovation system is that institutions are compelled to play to their respective strengths, which creates a dynamic research sector with a greater capacity to boost innovation.

Some of the most valuable research findings and endeavours have come from universities that have had the opportunity and support to develop their particular research specialities, or to pursue niche areas of research. Much of this research often takes place in Australia's smaller, younger and/or regional universities. It is important to recognise that institutional research priorities and strengths are often influenced by the unique circumstances of individual universities. For instance, an institution's research priorities may stem from, complement or be shaped by the particular geographic location(s) in which the university is established; they may be designed to advance the particular mission of the university; they may have been developed to address areas of community need; or a combination of these and other factors. The bottom line is that supporting a diverse university and research system is essential to producing diverse and valuable research that advances innovation in Australia and delivers commercial outcomes in the public and private sectors.

To illustrate:

- Deakin University (Deakin): Deakin's Institute for Frontier Materials (IFM) advances the University's research strengths in material science with a focus on innovative manufacturing technologies, and energy efficiency, resource and infrastructure sustainability, to address complex problems in the areas of energy, health, environment and manufacturing.¹⁶ The IFM was established to "address some of the major challenges facing society through innovations in materials design and performance."¹⁷ Deakin is also engaged in ground-breaking research in nanotechnology, a research area which "many believe will have a bigger impact on the future of

¹⁵ Australian Government, *Boosting the Commercial Returns from Research* (2014), at 5.

¹⁶ Deakin University, 'The Institute for Frontier Materials', at <http://www.deakin.edu.au/research/ifm/about-us/index.php>

¹⁷ Deakin University, 'The Institute for Frontier Materials', at <http://www.deakin.edu.au/research/ifm/about-us/index.php>

humanity than the Internet”.¹⁸ Research at Deakin’s \$1.9 million world-class the facility will have implications for developments in clean energy, environmental protection and health care, fibres and a number of other application areas. Deakin’s facility houses the world’s most powerful Atomic Force Microscope, the only one of its kind in Australia.¹⁹

- James Cook University (JCU) is now recognised as a world leader in tropical health and medical research and biotechnology. JCU makes a significant contribution to the health and economy of the community of northern Australia. JCU’s unique location - surrounded by the ecosystems of the rainforests of the wet tropics, the dry savannahs, and the Great Barrier Reef – has driven its research strengths and focus on the tropics, and enables researchers and students from Australia and overseas to study in a “diverse physical environment unparalleled by any university in the world.”²⁰ The tropical region, which includes Northern Australia, accounts for more than 40 per cent of the world’s population – a figure which is projected to grow to 50 per cent by 2050.²¹ JCU’s Australian Institute of Tropical Health and Medicine (AITHM) brings together a wide range of internationally recognised research experts in areas such as the control of vector borne diseases (dengue fever, malaria, and lymphatic filariasis), Group A streptococcal infection, and amphibian and aquatic infections.
- University of Wollongong: The ‘Simulation, Modelling, Analysis, Research and Teaching’ (SMART) initiative at the University of Wollongong draws on the University’s proven research strengths in the areas of engineering, commerce, informatics, law, and science to holistically assess infrastructure solutions.²² The research supports greater understanding of the interconnection and interdependencies of infrastructure assets and systems to drive multi-disciplinary infrastructure research and education. The SMART facility houses 30 integrated laboratories, a simulation and modelling hub, rail logistics research centre and 200 higher degree research students; and Australia’s first professorial chairs in infrastructure economics, infrastructure governance, infrastructure systems, and infrastructure modelling and simulation. This is one of the largest facilities of its type in the world. SMART is unique and is starting to play a major role nationally and internationally. For instance, the Universities of Oxford and Stanford recently invited the SMART unit to join them on major infrastructure bodies to assist them in advising their respective governments on critical infrastructure issues.²³
- University of New England (UNE) (Australia’s oldest regional university)²⁴: UNE conducts research into precision agriculture which encompasses strategic responses to agricultural management practices, new enterprise and technological developments that can create advances in agriculture; such as in crop production. UNE’s Precision Agriculture Research Group (PARG), formed in 2002, conducts multi-disciplinary research and runs numerous externally-funded research projects involving organisations such as the Grains Research and Development Corporation (GRDC), Meat and Livestock Australia (MLA), Grape & Wine Research & Development Corporation (GWRDC), and Sugar Research and Development Corporation (SRDC). Researchers are equipped with some of the latest agricultural technology, and promote

¹⁸ Deakin Research Communications – Deakin University, ‘The little science takes big steps at Deakin’ (17 August 2009), at <http://www.deakin.edu.au/research/stories/2009/08/17/the-little-science-takes-big-steps-at-deakin>; Deakin Research Communications – Deakin University, ‘Deakin enters the nanotechnology big league’ (15 March 2010), at <http://www.deakin.edu.au/research/stories/2010/03/15/deakin-enters-the-nanotechnology-big-league>

¹⁹ Deakin Research Communications – Deakin University, ‘Deakin enters the nanotechnology big league’ (15 March 2010), at <http://www.deakin.edu.au/research/stories/2010/03/15/deakin-enters-the-nanotechnology-big-league>

²⁰ James Cook University, ‘About JCU’, at <http://www.jcu.edu.au/about/>

²¹ Liberal Party of Australia, ‘Coalition commits \$42 million to tropical medicine at JCU’, at <https://www.liberal.org.au/latest-news/2013/08/22/coalition-commits-42-million-tropical-medicine-jcu>

²² University of Wollongong, ‘Vision’, at <http://smart.uow.edu.au/vision/index.html>

²³ Smart Infrastructure Facility – University of Wollongong, ‘About SMART’, at <http://www.smartmasterclass.com/page.aspx?pid=383>

²⁴ University of New England, ‘About UNE’, at <http://www.une.edu.au/about-une>

both industry-led research and research-led teaching.²⁵ Two UNE research students recently received international recognition at the 12th International Conference of Precision Agriculture at Sacramento USA, receiving outstanding graduate student awards.²⁶

- Australian Catholic University (ACU): With the nation’s largest cohort of nursing students, ACU has achieved an outstanding profile in selected areas of research such as cardiovascular nursing. ACU ranks as number 3 on the world database, SciVal, produced by Elsevier. The University also has distinctive strength in, for example, positive psychology and education, where it is arguably the nation’s leading research institution. ACU’s Institute for Positive Psychology and Education also houses the research team that established the nation’s most successful program in support of Aboriginal and Torres Strait Islander researchers (as measured by ARC Discovery Indigenous grants (see Behrendt report reference to UWS—this team is now at ACU).
- The University of the Sunshine Coast (USC) (established as a university only in 1996) has engaged in exceptional research in niche areas, including aquaculture, and sub-tropical and tropical hardwoods and continues to grow its research profile. For example, USC aquaculture researchers have been engaged, through the Seafood Co-operative Research Centre, in the spawning of the first southern bluefin tuna - *Time* magazine ‘hailed it as the second most important invention of 2009’.²⁷
- University of Tasmania (UTAS): The UTAS Institute for Marine and Antarctic Studies (IMAS) has a vision to position UTAS as the leading institution for marine and Antarctic studies, and advances the University’s research strengths in these fields.²⁸ Research at UTAS covers a number of important areas including sustainable fisheries and aquaculture, coastal and estuarine ecology, marine biodiversity, Southern Ocean marine habitats, ocean governance and policy, and the Antarctic environment. IMAS hosts over 200 staff and 140 graduate students, supports 107 higher degree research students, and also offers specialised short courses in niche research areas.²⁹ It is playing an important role in pursuing multidisciplinary and interdisciplinary work to “advance understanding of temperate marine, Southern Ocean, and Antarctic environments”, and in facilitating sustainable development for the benefit of Australia and the rest of the world.³⁰

Promoting Strategic Research Intensification

ACU promotes the adoption of strategies that support research intensification across all universities as this can produce:

- Greater concentrations of research excellence.
- Competitive, efficient and strategic allocation of resources.

Quality research is facilitated by a concentration of quality researchers. Analysis of the research assessment exercises carried out in the UK since the mid-1980s demonstrates a correlation in most disciplines between a critical mass of researchers and the quality of their research. Critical mass provides the collegiality, interactions, team projects, and breadth of approach that drive much high quality research as well as a strong research environment for research higher degree candidates.

²⁵ University of New England, ‘Precision Agriculture Research Group’, at <http://www.une.edu.au/about-une/academic-schools/school-of-science-and-technology/research/precision-agriculture>

²⁶ University of New England, ‘Precision Ag students scoop top awards at International Conference’ (23 July 2014), at <http://blog.une.edu.au/parg/2014/07/23/precision-ag-students-scoop-top-awards-at-international-conference/>

²⁷ Hare, J., ‘Pressure grows for teaching-only unis’ *The Australian* (2 February 2011), at <http://www.theaustralian.com.au/news/nation/pressure-grows-for-teaching-only-unis/story-e6frg6nf-1225998355456>

²⁸ University of Tasmania, ‘About IMAS’, at <http://www.imas.utas.edu.au/about-imas>

²⁹ University of Tasmania, ‘About IMAS’, at <http://www.imas.utas.edu.au/about-imas>

³⁰ University of Tasmania, ‘Institute for Marine and Antarctic Studies’, at <http://www.imas.utas.edu.au/home>

ACU recently implemented a research intensification strategy to boost its research performance in strategically identified and targeted research areas. To underpin its plan for research intensification, ACU abolished its multiple existing research centres and groups in 2013 and set about establishing seven new Research Institutes to align with the mission of the University³¹:

- The Mary MacKillop Institute for Health Research
- Institute for Positive Psychology and Education (IPPE)
- The Institute for Health and Ageing
- Learning Sciences Institute of Australia (LSIA)
- Institute for Social Justice
- Institute for Religion and Critical Inquiry
- Institute for Religion, Politics and Society (IRPS)

ACU's research intensification strategy is a whole of university approach involving Institutes and Faculties. It has involved the appointment of high profile, externally sourced, leaders to assume the directorships of these institutes, and to work with high calibre Institute members and Centre/Program leaders. The strategy involves:

- Strategically directing research funding to research proposals judged by external panels as being of excellent quality.
- Highly selective recruitment of researchers to form the membership of ACU's research institutes, based on assessment that requires that each academic staff member has:
 - The capacity to make a significant contribution to the research programs of an institute.
 - A demonstrated record of outstanding research aligned with one or more of the programs of an institute - normally demonstrated by success in attracting grant income (category 1, national competitive grant schemes) leading to outputs published in leading national or international journals and with prestigious book publishing houses.
- Internal capacity building to support and enable high achieving early career and mid-career researchers to contribute to specific research programs, led by more experienced researchers; and to provide a clear pathway from a faculty into an institute.
- Staff membership of an institute is reviewed annually, as part of the academic staff member's Performance Review and Planning process.

Build International Research Engagement and Collaboration

It is not financially viable or advantageous for Australia to seek to build research expertise and leadership in all areas of research. The Government has itself identified that "we cannot research everything and should focus research in the national interest."³² The reality also is that Australia is a small country, and there is a limited pool of researchers in any given research area in the country.

There is significant advantage to be gained from tapping into research talent and advances overseas by collaborating with the world's leading researchers and research institutes.

At ACU, we have been actively working to lift our research networks and widen our external reach to boost research in our core areas of strength. A particular strategy we have adopted to build our international research engagement and collaboration has been to offer fractional appointments to leading international researchers, to actively engage them in research in Australia through ACU. This builds strong professional relationships and substantial research connections and opportunities for ACU researchers to engage in collaborative research projects with their international counterparts. It also concurrently, albeit indirectly, opens up ACU researchers' access to the flow-on benefits of international research grants secured by these fractional appointees overseas and particularly, to the cutting-edge research projects in ACU's core research areas. Developing and securing more fractional appointments of

³¹ See Australian Catholic University, 'Research Institutes', at http://www.acu.edu.au/research/research_institutes_and_programs

³² Australian Government, *Boosting the Commercial Returns from Research* (2014), at 21.

leading international researchers to work in Australian universities is an efficient way to leverage the best minds in Australia and the rest of the world.

Additionally as part of our research intensification strategy, and recognising the strategic benefits that international research collaborations offer to Australian research, ACU requires its new research institutes to achieve the research performance that will enable them to establish collaborations with national and international concentrations of high quality researchers in the relevant fields. The appointment of professorial fellows on a part-time basis is a key strategy in facilitating these international partnerships, and is especially important in developing opportunities for early-career and emerging researchers who should benefit from opportunities to visit the prestigious institutions from which the professorial fellows will be coming. Equally, ACU is strengthening its research institutes through the recruitment of exceptional researchers based full-time at ACU. The institutes will carry a significant responsibility for strengthening ACU's research performance, profile and reputation into the future.

As articulated, there are significant benefits to be accrued by supporting and cultivating international research collaboration to boost the commercial returns from research and advance innovation in Australia. The following are core benefits accrued through international research engagement and collaboration:

- Supports resource efficiency - the skills, knowledge and facilities required to advance particular research projects are not always housed in an individual research institution or researcher. Research collaboration and the pooling of resources can produce research outcomes more efficiently.
- Facilitates the transfer of knowledge and skills – Engagement in international research collaboration can transfer new knowledge to Australian researchers more quickly and increase the likelihood of it being utilised and translated into outcomes that benefit the community.
- Stimulates creativity - Collaboration supports the cross-fertilisation of ideas that may in turn “generate new insights or perspectives that individuals, working on their own, would not have grasped or grasped as quickly.”³³ Such benefits are likely to be the largest when the collaboration involves partners from more divergent backgrounds.
- Extends research networks and lifts productivity – Fostering international collaboration can extend the contacts individual researchers have with other researchers in their research fields around the world, who they can contact for information or advice to further their research and enhance research productivity.
- Enhances research impact and dissemination - Using the increased network capability, findings can be “disseminated more widely, either formally through publications and conference presentations or informally through discussions. The chances are greater that literature review searches will produce one of the collaborating authors, increasing the likelihood that the results of the research will be located and used by others.”³⁴ Consequently, the findings are likely to have greater impact.

³³ Katz, J., Martin, B., ‘What is research collaboration?’ (1997) 26 *Research Policy* 1.

³⁴ Loan-Clarke, J., and Preston, D., ‘Tensions and benefits in collaborative research involving a university and another organisation’ (2002) 27(2) *Studies in Higher Education* 169; Eastern Michigan University, ‘Collaborative Research’.

Appendix A - Australian Catholic University (ACU) Profile

Australian Catholic University (ACU) is a publicly funded Catholic university, open to people of all faiths and of none. ACU operates as a multi-jurisdictional university with seven campuses across four states and one territory. ACU campuses are located in North Sydney (NSW), Strathfield (NSW), Canberra (ACT), Melbourne (Victoria), Ballarat (Victoria), Brisbane (QLD) and Adelaide (SA).

ACU is the largest Catholic university in the English speaking world.

Today, ACU has more than 30,000 students and over 1,800 staff.

While teaching, learning, and research at ACU is inspired by 2000 years of Catholic intellectual tradition, ACU is a diverse institution, attracting students and staff from a diverse range of faiths and backgrounds.

ACU graduates demonstrate high standards of professional excellence and are also socially responsible, highly employable and committed to active and responsive learning. ACU graduates are highly sought after by employers, with ACU graduates securing a 95 per cent employment rate which is higher than the national average.³⁵

ACU has built its reputation in the areas of Health and Education and is a major producer of nursing and teaching graduates in Australia.

ACU educates the largest number of undergraduate nursing and teaching students in Australia,³⁶ serving to meet significant workforce needs in these areas. Under the demand driven system, ACU has sought to focus and build on these strengths.

On 1 January 2014, ACU consolidated its previous six faculties into four:

- Faculty of Health Sciences;
- Faculty of Education and Arts;
- Faculty of Law and Business; and
- Faculty of Theology and Philosophy.

These new arrangements create a more efficient and competitive structure focused on the needs of industry and employment partners. ACU is also moving towards the adoption of a shared services model where suitable, to improve efficiencies, internal processes and better allocate resources.

ACU is committed to targeted and quality research. ACU's strategic plan focuses on areas that align with ACU's mission and reflect most of its learning and teaching: Education; Health and Wellbeing; Theology and Philosophy; and Social Justice and the Common Good.

To underpin its plan for research intensification, in 2013 ACU abolished its existing research centres and groups and set about establishing new research institutes, to align with the mission of the university. The strategy has involved the appointment of high profile leaders to assume the directorships of these institutes, and to work with high calibre Institute members and Centre/Program leaders.³⁷

- The Mary MacKillop Institute for Health Research (Faculty of Health Sciences)
- Institute for Positive Psychology and Education (IPPE) (Faculty of Health Sciences)
- The Institute for Health and Ageing (Faculty of Health Sciences)
- Learning Sciences Institute of Australia (LSIA) (Faculty of Education and Arts)
- Institute for Social Justice (Faculty of Education and Arts)
- Institute for Religion and Critical Inquiry (Faculty of Theology and Philosophy)
- Institute for Religion, Politics and Society (IRPS) (Faculty of Theology and Philosophy)

³⁵ *Graduate Destination Survey (GDS) 2012.*

³⁶ Hobsons, *The Good Universities Guide 2015 to Universities, TAFEs and Higher Education Providers* (2014).

³⁷ See Australian Catholic University, 'Research Institutes', at http://www.acu.edu.au/research/research_institutes_and_programs