



THE UNIVERSITY OF
MELBOURNE

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SUBMISSION TO THE INQUIRY INTO INNOVATION AND CREATIVITY:
WORKFORCE FOR THE NEW ECONOMY

MARCH 2016



The University of Melbourne is pleased to make a submission to the standing Committee on Education and Employment's inquiry into *Innovation and Creativity: Workforce For The New Economy*.

The University is a world-class research-intensive university, which has more than 50,000 students (approximately 42,500 full-time equivalents), 7,400 staff, over 338,000 alumni internationally and an annual budget exceeding \$2 billion. In 2014 the University's expenditure on research was \$1.1 billion, reflecting a sustained effort to grow investment in research and is a pivotal part of a renowned biomedical precinct in Parkville, hosting over 10,000 of the world's brightest scientific minds. The University is advancing a strategic program of scaling-up our research and innovation capability as we seek to derive ever more economic and societal value from our world-class research. This in turn better equips our graduates with the skills and capabilities they will need to be successful in the workplace of the future.

There is strong evidence that the University of Melbourne's graduates are highly sought after. Many of our students secure their desired position soon after completing their course or while they are still studying. Employers know our graduates are highly skilled and job-ready. More than 80 of the world's leading organisations personally visit our campus each year to recruit students, including: IBM, Microsoft, Telstra, ANZ, Commonwealth Bank and NAB, BHP Billiton, Credit Suisse, Deloitte, PricewaterhouseCoopers, Rio Tinto, Shell, The Boston Consulting Group.

The University of Melbourne seeks to prepare all graduates with the skills necessary for the jobs of the future, which require increasingly adaptable workers to match the pace of technological development.

This submission addresses the terms of reference and makes specific recommendations:

KEY THEMES

1. **Build on the success of the demand driven system to ensure universities can continue to meet demand for different areas of study**, as students are the best judge of their future skills needs. Achieve this by:
 - a. **driving greater transparency** in the resourcing of teaching and education through an agreed resourcing benchmark, and;
 - b. **maximising return on investment in the current system** through improved productivity in university operations, better targeting of government-funded equity support and modification of the demand-driven system to facilitate

greater flexibility and sustainable growth

2. **Support universities to address factors which discourage closer partnerships between universities and industry by:**
 - a. **supporting resources and translation infrastructure to drive forward commercialisation**, including co-investment with universities in mechanisms such as Venture Catalysts to support early stage proposals, as well as effective operation of the CSIRO Innovation Fund, Biomedical Translation Fund, and expansion of the CSIRO's ON innovation and accelerator program.
 - b. **co/investment in coordinated measures to enhance the impact of publicly funded research**, including support for scaling-up successful start-up incubators on campus, modification of the R&D Tax Incentive to make it work as intended, complementary support for university-led reforms of academic incentives and rewards for research impact, and new 'third stream' funding to support collaboration.
 - c. **Gateway resources and programs to boost knowledge transfer, collaboration and engagement** between key research sectors, including investment in co-location opportunities and further consolidation of intellectual property arrangements.
3. **Remove red tape faced by universities**, as it is a barrier to being able to offer qualifications meeting the needs of the new economy and fastest growing sectors.
4. **Continue to support tertiary education entrepreneurship programs and incubator and accelerators**, whether they are public or private.
5. **Develop an *Australian Higher Education Taskforce*** to drive and help enable government and universities to deliver the workforce for the new economy

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Summary of recommendations

Funding and regulation

- *Deliver greater transparency in the resourcing of teaching and education through an agreed resourcing benchmark.*
- *Ensuring equity funding follows students and is allocated transparently on the basis of enrolment.*
- *Modify the demand driven system to include postgraduate coursework and sub-bachelor degrees through a 'cap and trade' mechanism.*
- *Continue to explore the ways to make university reporting to the Commonwealth more efficient.*
- *Work with State governments to remove red tape such as ministerial approval for land acquisitions and disposal (except where land is in the name of the Crown).*
- *Apply existing accounting standards for financial reporting but remove the specific disclosure requirements required by State and federal governments.*
- *Establish an Australian Higher Education Taskforce to drive reform.*

University-industry collaboration

- *Support universities in their efforts to foster incentives for academics to build collaborative endeavours including recognition for industry collaboration and secondments into industry.*
- *Provide support for translational infrastructure and commercialisation mechanisms.*
- *Co-invest with universities in mechanisms such as Venture Catalysts to address the translation gap currently faced by early stage research commercialisation proposals in public research institutions.*
- *Develop a new or 'third stream' of funding separate to that supporting the research base to create appropriate incentives for universities and industry to collaborate.*
- *Modify the R&D Tax Incentive to improve collaborative research outcomes and ensure optimal return on public investment.*
- *Partner with universities and industry to develop large-scale innovation infrastructure to support co-location of research efforts between universities, industry and other partners.*
- *Develop and publish a consolidated intellectual property framework to operate under a single Ministry, similar to that implemented in the UK, to provide clearer guidance for Australian innovation agreements in academia and industry.*
- *Continue to provide support for entrepreneurship programs and incubator and accelerators.*

Introduction

Melbourne University's curriculum caters for students who enter University at undergraduate or graduate level from a variety of backgrounds and with a variety of goals: those sure of their chosen path; those who have not yet determined their future vocation; and those who begin on one path then discover another. Central to the University's curriculum are six broad, three-year undergraduate Bachelor degrees, characterised by both disciplinary depth and academic breadth. These degrees prepare students for direct employment or further study, whether in a professional graduate program or a research higher degree. This provides students with greater flexibility, both in terms of subject choice and the timing of vocational decisions.

Melbourne graduate programs differ significantly from undergraduate programs in their depth and level of specialisation, preparing students for specific professions or research studies. They need to address an increased diversity in student circumstances and therefore require flexibility in the University's mode of delivery. Melbourne's annual cohorts of research higher degree graduates amount to nearly a tenth of Australia's total research higher degree graduates.

The University is one of the country's largest research organisations, with annual expenditure on research second only to the CSIRO. The University is working to extend its excellence in research activity by implementing fundamental measures on the campus level to drive innovative research and engagement with industry. These measures include developing our innovation and technology precinct Carlton Connect, creating the teaching and learning spaces and infrastructure that support the contemporary learning experience, as well as making significant investments in our commercialisation operations and capabilities.

The National Innovation and Science Agenda provides essential policy and program measures that will facilitate and coordinate investment in research, commercialisation and skills to promote these new and emerging industries. NISA recognises that universities, government and industry are crucial participants and partners in the process of building, operating and leveraging Australia's innovation ecosystems and each has complementary and interdependent but distinct roles.

Australia is still in the early stages of building self-sustaining innovation ecosystems and shaping a national culture that values and embraces entrepreneurship. For the Australian economy to function optimally in the digitally transformed world, it must continue to produce world-leading research, turn more public research into commercial outcomes, generate higher levels of business research and development (R&D), adapt and diffuse new technologies and skills and participate more effectively in global value chains.

Response to terms of reference

1. The extent to which students are graduating with the skills needed for the jobs of today and of the future

Preparing graduates for future work at the University of Melbourne

The University of Melbourne seeks to prepare all graduates with the skills necessary for the jobs of the future, which require increasingly adaptable workers to match the pace of technological development. Alongside the core disciplinary knowledge and skills gained through a degree, there are a number of ways that the University offers opportunities for our graduates to become the agile workforce of the future.

As part of our program to prepare graduates for future work- whatever pathway they choose - we have a comprehensive and interlinked set of initiatives to support and challenge them. The Melbourne Careers Centre works with students to help build their employability and career management skills by providing a range of careers programs and resources. The Centre also works with the University's academic faculties to embed career development learning within the academic curriculum. In addition, the Centre works closely with employers and professional bodies to enhance their capacities and create positive connections between them, the University and students.

The Careers Centre provides services for every student including one-on-one consultations with a career counsellor, with specialists in all areas of study offered. This is complemented by degree-based career workshops on all aspects of career and skills developed, such as finding appropriate high value internships. The Centre also offers cohort-building events, career fairs and industry nights across all areas so students can understand what skills and qualities employers are looking for. The Centre's career exploration seminars bring guest speakers from industry to answer questions about a comprehensive variety of professions and ensure that students have the best chance to succeed in building their skills profile.

The University also encourages all students to develop independence, as we believe this is the best preparation for the increasingly dynamic and competitive labour markets of the future. Should they require, the University continues to work with graduates after completing their studies, as all alumni have access to the University's online resources, as well as access to the Career Development Services including the Careers Drop-In Service.

The University helps to broaden the experience of students by offering the opportunity to complete part of their degree overseas in one of the following ways: through an exchange, where they 'Swap' places with a student from another institution; through study abroad

where they study at an institution that does not have an exchange agreement with the University of Melbourne (which ensures they can study where they desire) or; through our short-term overseas program, where students can take up an international internship or placement, or study a University of Melbourne overseas subject. These programs provide the opportunity to visit leading institutions worldwide, including the Free University of Berlin, Humboldt University of Berlin, Trinity College, Dublin, Technion – Israel Institute of Technology, and the Hebrew University of Jerusalem, the University of Bologna, University of Tokyo, University of Amsterdam and University of Twente to name but a few. The University offers students a number of mobility scholarships and has had a number of New Colombo Plan (NCP) scholars, with students heading to China, Japan and Singapore to extend their studies as part of the NCP in 2015.

The demand driven system allows universities to deliver the skills needs of the future

University degrees have historically delivered great value; graduates earn more, have better employment outcomes and contribute to healthier, happier societies. Higher education is a critical enabler of economic mobility. Undertaking tertiary education is one of the most significant investments a person and often their family can make.

Yet, in recent decades an ongoing issue worldwide has been ensuring education systems have the capacity and flexibility to meet aggregate skills requirements within national economies. It has been long acknowledged by the OECD and governments alike that it is hard to centrally direct educational systems by predicting graduate skills needs into the future. The difficulty in ‘picking winners’ is exacerbated by the necessarily long lead time required to modify educational offerings combined with the several years individuals spend to undertake a degree. It commonly takes four to six years to complete undergraduate and postgraduate study, and in this time the identified skills shortage areas can change. International evidence consistently shows that intermittent skills shortages are a universal feature of labour markets.

For much of the 20th century, governments in Australia and internationally have sought to match educational offerings with skills needs by forecasting the need for different courses, and using this data to decide what was taught where and when. The advocacy of employers and others groups (such as peak bodies) was a chief mechanism for government assessing changing skills needs, yet this was never systematic. System constraints (historically determined allocations to different universities) and the inherent difficulty in predicting future demand for skills meant there were periodic mismatches between the perceived need for particular graduate skills, such as engineering and IT, and demand for them in the economy.

The demand driven system, introduced in 2012, was designed to help address the deficiencies of a centrally directed system and meet changing skills needs. The competitive dynamics the system creates a more market sensitive system which means where skills shortages emerge and demand for the relevant courses increases, in which a university or other higher education institution (HEI) can respond to emerging skills shortages by making new offerings without direction by government. In effect, it sets up a market-driven mechanism for adjusting courses to match skills needs.

There is evidence that the system is working to meet skills needs. The Government's Review of the Demand Driven System in 2014, found that "on the early evidence, the higher education system is more reliably adapting to skills shortages than it did before."¹ This is an important finding, because it shows the system is working despite the inherent time lag constraints mentioned previously. Where short term skills gaps do emerge, other mechanisms such as in-house training or skilled migration immediately fill aggregate skills gaps. Moreover, in a competitive labour market, wages and conditions offered to employees determine what attracts people with relevant qualifications and experience to a particular job. There is little that education policies and providers can do to influence labour markets, and this too is a consideration for prospective students and educators, especially for skills domains in industries prone to cyclical employment demand.

The demand driven system has to-date helped deliver flexibility, overcoming the inherent difficulty in matching educational offerings to skills needs. Nonetheless, there is an opportunity to refine the system further to ensure it continues to adapt to the long-term structural needs of the labour force. Some key measures the government could undertake include:

- driving greater transparency in the resourcing of teaching and education through an agreed resourcing benchmark, and;
- maximising return on investment in the current system through improved productivity in university operations, better targeting of government-funded equity support and modification of the demand-driven system to facilitate greater flexibility and sustainable growth.

Greater transparency in resourcing for education

Making the demand driven system work even more effectively to meet the skills needs of the future economy, means ensuring students have access to courses which meet their individual needs. A key element enabling students to make informed decisions is understanding what they and government invest in through the fees and subsidies

¹ Kemp, David and Andrew Norton, Report of the Review of the Demand Driven Funding System, p 26.

contributed for teaching and research. The current parameters and governance machinery for public support for teaching and research were established in a very different policy environment a quarter of a century ago and are no longer fit for purpose.

There is now little meaningful relationship between the cost of higher education and its price. Government sets the level of public and private subsidy per student, yet Commonwealth support for teaching continues to reflect the Relative Funding Model developed nearly three decades ago, with limited tweaks and adjustments over time. Similarly, student contribution rates are based on historic assumptions about cost and future earnings that have been modified in ad hoc ways over time meaning they are now inequitable for many.

a. An agreed benchmark for the cost of quality education

Judging what is a reasonable cost for study is crucial to ensuring potential students make informed decisions about the course of study that is in their own best long-term interests, and those of the overall labour market. The lack of a clear and settled formula for the cost of quality education undertaken in a strong scholarly environment makes it difficult for students, universities and governments to judge what is reasonable. Through enhanced understanding of the cost of delivering quality education, broad agreement can be reached about a reasonable benchmark of total per student resourcing for each area of study at all course levels, according to an agreed level of quality. Adoption of a resourcing benchmark would allow the commencement of an informed conversation about policy and funding measures— including setting the Commonwealth and student contributions, the mix between per place and block funding/loadings, and a reasonable growth path to put the teaching system on a sustainable resourcing path into the future.

A resourcing benchmark exercise undertaken collaboratively by universities and governments would establish whether there are genuine cost differences between modes of delivery, types of education, the course level, the scale or operation and the characteristics of the educational and scholarly environment. The resourcing benchmark could also take into account substantial differences in the cost of education delivery between the major metropolitan areas and between metropolitan and regional locations, as well as for that occurring in institutions with a strong research ecosystem informing and inspiring the quality of teaching.

An evidence-based resourcing benchmark detailing the resources required to deliver quality education consistent with student and public expectations would be established with recognition that some degree of subjective judgement will always be inherent in any assessment of quality. Nonetheless, the process of developing the benchmark, alongside the final benchmark itself, would be a significant improvement on the current arrangements.

A transparent and widely supported resourcing benchmark would be a critically important tool for politicians, university leaders and the public to assess current education practices and examine ways to make universities more effective and efficient, while at the same time ensuring students are resourced to receive the best possible higher education.

Recommendation

Deliver greater transparency in the resourcing of teaching and education through an agreed resourcing benchmark.

Maximising returns on public investment in education

To ensure universities can educate graduates to meet future skills needs, they must continue to improve productivity in their operations and deliver better outcomes from available resources as they work to adapt to the changing needs of their students, the public and employers. Information sources such as the government's Quality Indicators of Teaching and Learning (QILT) website demonstrate how universities are working towards better graduate outcomes and higher retention rates, and provide a transparent incentive for institutions to strive for greater quality outcomes and offerings. In concert with university-led efforts to establish a nimble higher education system, government is well positioned to facilitate productivity improvements, and hence meet student demand and the skills needs of the economy, by refining the policy settings for access and equity and modifying the demand driven undergraduate funding system.

b. Refining equity measures to ensure resources are directed where they will have the most impact

Lifting the proportion of students who have been traditionally under-represented at university (including those who face socio-economic disadvantage) is important for equity reasons but is also critical to ensuring Australia has the most productive workforce. Improving outcomes in this area has proven slow work in Australia, but it is crucial to ensuring the nation has the best possible workforce, where no talent is wasted. While absolute numbers of low socio-economic status (SES) undergraduate students have increased, the proportion remains disproportionately low in total higher education enrolments. The proportion of low SES undergraduates has remained stable at around 16-17 per cent of all students during the previous decades. This means disadvantaged Australian students are proportionally little better off in terms of attaining entry to university than they were a generation ago.

To address this and make the most of current resources for equity and access, funding should follow students and be allocated transparently on the basis of enrolment. Public

funding to assist universities' equity and access programs would be incumbent on their enrolment and retention of low SES students.

Recommendation

Equity funding should follow students and be allocated transparently on the basis of enrolment.

2. Matters relating to laws and regulations that may act as a barrier to education providers being able to offer qualifications meeting the needs of the new economy and fastest growing sectors

c. Promote diversity in the demand driven system to include postgraduate coursework and sub-bachelor degrees through a 'cap and trade' mechanism

As self-accrediting institutions universities are able to meet student demand for education by developing new courses and subjects reflecting developments in knowledge and professional fields. While the self-accrediting nature of universities ensures they are able to offer relevant courses, they do face some government-imposed constraints on how they can offer new courses to students.

To ensure the most dynamic workforce possible, universities must be able to offer courses at all levels of study meeting student demand for skills from sub-bachelor to postgraduate level. The current design of the demand driven system prohibits this, as the system provides Commonwealth Supported Places to all undergraduate Bachelor students but not those studying at sub-bachelor level, while most Australian students pay full fees to undertake postgraduate coursework (non-research/PhD) qualifications at all levels of higher education. The 2014 Review of the Demand Driven Funding System underlined the complexity and incoherence of the rules around postgraduate coursework programs, finding the purpose of government subsidy to be unclear and the number of Commonwealth supported sub-bachelor degree places arbitrarily capped.

A coherent and sustainable system-wide solution is required to incorporate sub-bachelor and postgraduate education into the demand driven system. This must be achieved in a way that is fair to students, manageable in terms of public outlays, and supports institutional mission differentiation.

To achieve a clear and sustainable system, a cap and trade system would provide consistent policy settings around sub-bachelor, bachelor and postgraduate coursework, while providing universities with some control over growth in the demand driven system. Such a

system would mean capping and trading demand driven undergraduate places in a specific course and exchanging places at either postgraduate or sub-bachelor level in the same course. This would drive specialisation and through it student choice, and hence better meet skills needs.

Recommendation

Modify the demand driven system to include postgraduate coursework and sub-bachelor degrees through a 'cap and trade' mechanism.

d. Reducing red tape

Through addressing red tape there are gains to be made in the efficiency and effectiveness of higher education in ensuring that universities can continue to be responsive and agile in meeting student demand, which in turn allows universities to be more agile in responding to changing labour market and skills needs. Government and universities can work together to address red tape to wide benefit, and while it is a general problem for many sectors, there are some 'easy wins' for the higher education sector by addressing inefficiencies in financial and transactional oversight and approvals.

Responsibility for public universities is shared between the State governments (governance, and accountability to State Parliament), the Commonwealth Government (funding, regulation, and market design and management), and the institutions themselves.

At a high level, a key regulatory burden imposed on universities is a result of requirements in State enabling legislation duplicating reporting already in place between the Commonwealth and universities (and vice versa). To meet changing student demand for courses, there is a need for enhanced institutional autonomy that enables a nimble approach to educational strategy (to better meet market demand) within a framework of good governance and accountability.

State Government oversight should be commensurate with reputational and financial risks.

The State Government oversight of risk should take account of existing accountabilities and risk management frameworks. Universities are subject to scrutiny by the Auditor Generals, the Tertiary Education Quality and Standards Agency (which imposes threshold standards around governance and viability as a requirement for registration) and the Commonwealth Government (which imposes conditions for funding via Funding Agreements and the submission of data regarding performance across a range of measures).

Importantly, any risk oversight measures should be ‘fit for purpose’, should not add unnecessary costs for the State or for universities, and should not hamper universities’ capacity to be nimble and responsive to changing student demand and hence skills needs in the economy.

For example, a key piece of red tape affecting the University of Melbourne is regulatory requirements for current financial controls, including the requirement for the Victorian State Treasury to approve borrowing, leasing and commercial activities. The University of Melbourne is treated as a State Government entity for the purposes of borrowing. Under the terms of the University of Melbourne Act 2009, the Education Minister must seek Treasury approval when the University engages in “financial arrangements” including debt raising and the use of derivatives in the management of the University’s investment portfolio. The Treasury then writes a letter of approval to the University. This process is convoluted and takes time for what are ‘business as usual’ financial arrangements.

A number of reforms would enable a balance to be struck between institutional autonomy and state financial risk management.

Recommendations

Work with State governments to remove red tape such as ministerial approval for land acquisitions and disposal (except where land is in the name of the Crown).

Apply existing accounting standards for financial reporting but remove the specific disclosure requirements required by State and federal governments.

3. Factors that discourage closer partnerships between industry; in particular small and medium enterprises, the research sector and education providers; including but not limited to: intellectual property; technology transfer; and rapid commercialization

The University of Melbourne has been working to develop closer partnerships with industry in recent years by identifying factors discouraging engagement as well the means to address these. For the purposes of this inquiry the University would highlight several barriers to deeper collaboration between the universities and industry. These are their distinct cultures and incentives between universities and industry, lack of translation infrastructure and commercialisation mechanisms at the crucial ‘mid-pipe’ stage, and the need to leverage mechanisms such as the R&D tax incentive. In addition there is a need for reform of the Research Training System (RTS) to support the next generation of researchers in academia and industry.

e. Linking with industry and transforming university practice to align with social, economic and industry imperatives

The University already collaborates with around 300 industry partners across activities including innovative research, major institutional partnership, internship and education and access programs. Our Research @ Melbourne strategy will see the University aim to double our funding from industry and international sources by 2020 and guide the University's research investment towards innovative, interdisciplinary and collaborative enterprises.

Some of the industry partners or collaborators the University already works with are CSL Limited, Siemens Hearing Instruments, Colgate Palmolive, Ford, Rio Tinto, Rode Microphones, Australian Energy Market Operator, Cadbury Enterprises, GC Australasia, Sanofi Pasteur Inc, Procter & Gamble Australia, Bega Cheese Ltd, Seagull Technologies, Alcatel-Lucent (Bell Labs), Nasdaq, Asics Oceania Pty Ltd, IBM Australia, Think Spatial, Google, Microsoft Australia, Microsoft Research, Kraft Australia, Mondelēz International, Bluescope Steel, Telstra Corp Ltd, Australia Post, Westpac, TD Securities, PWC, Jobs Australia, Ostara Australia, Workpower Inc, Wise Employment, the Personnel Group, Matchworks and 18 health institutions including major metropolitan hospitals, amongst many others.

To build on this success and drive translation efforts, the University has made a major investment in a new Research, Innovation and Commercialisation (RIC) capability. The purpose of RIC is to facilitate research relationships for the University, as well as attracting the necessary resources and building internal capacity for successful commercialisation, which in turn reinforces our ability to conduct world-class research. This sophisticated business development resource has been put in place centrally and across every Faculty to work with leading academics to develop and nurture industry collaborative relationships, assist in broadening global networks and to identify basic research with the potential for translation into applied research and commercialisation.

Recognising that effective collaboration transcends national borders, the University has increased the number and value of its national and international industry collaborations, with a strategic emphasis on China, Germany, India and Latin America. The University has agreements with a majority of the world's 50 top-ranked universities. The University also has widespread international collaborations to leverage teaching and research potential, maintaining 239 international agreements with universities around the world.

The next phase in our strategy will see a significant focus on building engagement with industry and accelerating our commercialisation pipeline. The steps we are taking to build commercialisation prospects are outlined in more detail below.

f. Fostering better incentives for academics to build collaborative endeavours

One of the central challenges in the current system is a consistent mechanism to take research from the lab and develop it in such a way that it becomes an investable opportunity for business. Traditional incentives for academics have not generated large scale and effective engagement with industry. This is now changing as universities for their part are embedding greater incentives within the academic system that values and rewards industry engagement.

Universities are establishing methods for evaluating these less traditional markers of scholarship that are exercised through engagement and achievement of impact. Ensuring that enterprise activity and industry engagement are mainstream academic activities will have the most dramatic effect on academic behaviour. While optimising these settings occurs via institutional settings, the consequences impact directly on individual researcher behaviours. Knowing that an early career researcher can work closely with industry without impeding their promotion prospects is crucial to the choices they make. Adjusting incentives for academics is a powerful mechanism to achieve change.

The University of Melbourne is also on a path to introduce academic positions with a strong focus on collaboration in the form of enterprise professors. Through this program individuals would be appointed to make a distinctive, significant and active contribution, through their specialist industry, business or professional knowledge and experience, to the University's mission and activities. The appointees will make a special contribution to enhancing and extending university–industry connections, partnerships and alliances to strengthen research, teaching and learning, and graduate outcomes.

In addition, the University is developing models for sabbaticals and secondment programs, which facilitate flexible study leave, secondments and exchanges that are a key element of academic career building to reward high performance and replace day-to-day academic duties with specialised experience. The University is also prioritising and embedding engagement activities within teaching and learning, research, leadership and service activities and outputs across the university, through consistent application of principles that recognise engagement as a core and integral element of many disciplinary contexts.

Recommendation

Support universities in their efforts to foster incentives for academics to build collaborative endeavours including recognition for industry collaboration and secondments into industry.

g. Support for translation infrastructure and commercialisation mechanisms

The University welcomes the CSIRO Innovation Fund that incorporates a \$20 million expansion to the CSIRO ON accelerator programme for publicly funded research organisations to more rapidly prepare their research for commercial adoption. However, this is targeted at the commercialisation phase after the very early stage translation gap identified in this submission. As such, the Government should consider complementary actions to also address this earlier gap in the commercialisation continuum in public research institutions and, subsequently, in Australia's innovation ecosystem. Provision of support at the very early stage is critical to building a flowing source of potential commercialisation ventures that can go on to bid for seed and venture capital funding.

The market will not fill the translation gap as the nature of the endeavour means that most of these opportunities will never make a commercial return. This is why it is so important for the Australian Government and universities to work together to address this vital phase immediately preceding our research outcomes.

Unlike the US, and increasingly the UK, Australian research is seldom funded far enough to present viable investment opportunities. As a result, companies and investors seeking to leverage university-sourced intellectual property have access to better developed propositions in the US and UK. It is therefore unsurprising that those countries lead the world in accelerating the development of products or services from new inventions to commercial viability by providing specialised skills and resources to support the critical pre-Proof of Concept and pre-clinical junctures.

The University, for its part, is undertaking actions towards addressing the translation gap. We are examining the feasibility of hiring Venture Catalyst teams and ancillary infrastructure to cover that earlier and inevitable filtering stage of the commercialisation process.

The Venture Catalyst, in the form of a pool of capital with attached capacity and personnel, would become an essential gateway between industry and academia. This hands-on model would leverage the skills and experience of seasoned business builders across multiple projects to find the shortest path between the starting point and the point at which commercial investors might find the opportunity attractive.

Investing in the people to lead the catalytic process is also crucial. The skills and experience necessary to achieve great scientific breakthroughs are very different to those required for translating technologies into compelling products and services. At our University we have many world-class researchers, but we also need to build world-class commercialisation teams. While some researchers naturally possess both research and commercial skills, not

all do and nor would all researchers be expected to have commercial skills.

This is why public research institutions need to build reservoirs of management and business skills to complement scientific and technical skills. For every dollar spent on the research to develop a new product, many more will ultimately be spent on the downstream development and marketing activities necessary to successfully bring the product to market.

In this model, the investment community would be motivated to monitor Venture Catalyst activity given the deal flow potential but, equally importantly, the Venture Catalyst would be constantly engaging with industry to bring market intelligence into the institution. Given that the challenge of commercialisation is global in nature, universities may look for bilateral or multilateral partnerships in establishing Venture Catalysts.

Co-investment between universities and Government would enable the Venture Catalyst infrastructure to reach the scale and resourcing levels necessary for success.

The example of Fibrotech

A good example of why this early gap funding can make or break a commercialised invention is the biopharmaceutical company Fibrotech. Fibrotech develops new drug treatments to prevent the massive health burden associated with tissue scarring. The venture grew out of a number of high-quality interrelated research endeavours led by a University of Melbourne academic, Professor Darren Kelly, and would not have succeeded without his highly enterprising activities, personal acumen and the significant backing of universities and others.

Importantly, the product at the centre of Fibrotech was enabled to advance through early pre-clinical and clinical development by fee-for-service income, followed by crucial investment from Uniseed, a venture fund operating at the Universities of Melbourne, Queensland and New South Wales, and AustralianSuper, Medical Research Commercialisation Fund (MRCF), and Brandon Capital Partners. In May 2014, Fibrotech announced it had reached an agreement with Shire Plc, a global company, under which Shire agreed to purchase Fibrotech for an upfront payment of \$75 million.

The Fibrotech sale was followed by equally impressive deals with Spinifex and Hatchtech, with both University spinouts attracting BigPharma investment. More than \$1.8 billion has been raised in two years from sales of tech firms built on research from Australian universities.

Recommendations

Provide support for translational infrastructure and commercialisation mechanisms.

Co-invest with universities in mechanisms such as Venture Catalysts to address the translation gap currently faced by early stage research commercialisation proposals in public research institutions.

Develop a new or 'third stream' of funding separate to that supporting the research base to create appropriate incentives for universities and other commercial actors to collaborate.

h. Modify the R&D tax incentive to target collaboration

Current tax expenditure on the R&D tax incentive amounts to over a quarter of the Australian Government's support for science, research and innovation and is almost equivalent to funding for the NHMRC, ARC and CSIRO combined. This quantum of funds makes the incentive a powerful influencer of behaviour.

The University welcomes the NISA announcement of a review of the effectiveness and integrity of the R&D Tax Incentive to be conducted by the new independent body Innovation and Science Australia (ISA).

This financial year the Government is expected to spend \$2.9 billion on the R&D tax incentive that rewards research by industry. The tax incentive exists to support R&D that would not otherwise occur.

This significant funding pool for research could be more effectively targeted to fuel the collaborative research ecosystem desired by Government, universities and industry. The R&D tax concession should be scrutinised to identify where the incentive is having demonstrated impact, where it is leading to collaboration and where it is generating returns on investment through utilisation consistent with the principle of "additionality". In turn, Australia could expect greater research translation into commercial outcomes and, through collaboration, stronger alignment between the interests and priorities of industry and experts in academia. The R&D tax incentive could be modified to:

- ensure it focusses on R&D that would not otherwise have occurred and adjust policy settings to improve collaborative research outcomes and ensure optimal return on public investment (the principle of additionality)
- direct skills, resources and other supports for research in the catalytic phase of commercialisation, including in public research institutions, as this is an area not served by the marketplace (but will produce research that in time is likely to benefit

the wider Australian economy (spillovers)). Venture catalyst activity can increase levels of R&D if the pipeline of investable projects is enhanced.

- permit a wider set of research activities to be eligible including secondments by researchers into industry to work on R&D projects
- make it easier for SMEs to benefit from the tax incentive, especially where they utilise established research providers to solve their problems, by reviewing the minimum threshold for research spend; introduce quarterly tax credits for SMEs; and permit student internships and early career researcher secondments as an eligible R&D tax concession.
- encourage and leverage collaboration with public researcher providers and public research infrastructure by establishing a higher third tax concession tier for businesses to partner with those public research organisations.

The University acknowledges the NISA announcements of the ISA review of the tax incentive, and the expanded and refocused Innovation Connections (Expansion of Research Connections) program, which goes some way towards encouraging SMEs to collaborate with university research and innovation. The effectiveness of that program could be enhanced with a higher quantum to support its various components.

Recommendation

Modify the R&D Tax Incentive to improve collaborative research outcomes and ensure optimal return on public investment.

i. Provide gateway resources and programs to boost knowledge transfer, collaboration and engagement

Co-location is an important factor in innovative partnerships. As the cost of research infrastructure escalates, fewer universities can manage large-scale research agendas alone. This is why the Government's announcement of secure ten year funding for NCRIS was deemed critically important by the research sector to retain our world-class science and research capability.

Collaboration and international partnerships will drive excellent outcomes. Co-located precincts and hubs bring together government and researchers, established industry and start-up companies to address global problems and generate outputs that contribute to national prosperity. Importantly, our world leading research precincts provide critically important industry relevant, hands on, education for our students. Co-investment in collaborative research precincts would be a significant gateway investment to address constraints in resources and capacity at the university-end and greatly expand the outcomes

of research engagement.

In addition, there may be further gateway reforms to intellectual property (IP) that would enhance outcomes in collaborative research. The University is a research and teaching organisation with significant expertise in IP law, with extensive ownership of patents and utilises copyright, trademarks and online investment in digital media.

The University welcomed the prospective IP changes highlighted in the NISA and the release in September 2015 of the Australian IP Toolkit for Collaboration. To further simplify and streamline IP in Australia for the benefit of unlocking innovation, the Australian Government could explore the potential benefits of regulatory consolidation, as well as specific issues of existing overlap relating to copyright and design, trademarks, patents and consumer protection legislation.

Regarding IP, the higher education sector is in a unique position because it is not only a producer and consumer of IP but must share outcomes for public good and community engagement. However, the changing nature of the research funding environment and the imperative of collaboration has encouraged new modes of research practice between universities and industry, and has added complexity to IP interests.

The University recommends the consolidation of expertise into one agency that is responsible for IP, under the control of a single Minister. Currently, IP Australia in the Department of Industry, Innovation and Science is responsible for patents, trademarks, designs and plant breeders' rights, while copyright, circuit layouts, and arts resale royalties are part of the portfolio of the Minister of Communications. In other countries, one agency with a single Minister is responsible for these portfolios. This would enable greater co-ordination in policy review and more practical aspects of processing of rights.

Recommendations

Partner with universities and industry to develop large-scale innovation infrastructure to support co-location of research efforts between universities, industry and other partners.

Develop and publish a consolidated intellectual property framework to operate under a single Ministry, similar to that implemented in the UK, to provide clearer guidance for Australian innovation agreements in academia and industry.

j. Reform the Research Training Scheme

A distinctive feature of the Australian research workforce is that universities primarily employ it rather than being hired directly by business, government and not-for-profit organisations. The University sees great potential in a secondment program involving

university researchers working within industry and also embedding PhD candidates within new and innovating enterprises as a means to facilitate access to high-quality research while providing industry relevant skills to researchers.

Further, the efficient delivery of quality research higher degree (RHD) training is critical for the future of Australia's research effort. PhD degrees provide the unique skills mix needed for a career as a researcher and the RHD training system must continue to provide the future research workforce. Although Australia currently produces around 8,000 PhD graduates a year, only a fraction will ever work as an academic. Australia's RHD training system must be reformed to ensure all graduates gain the skills necessary to contribute their unique capabilities more broadly across Australian industry and society, in roles other than research academics.

The University has been developing ways to integrate further skills training into PhDs, within current program scope and time limitations. For example, doctoral students are offered placements through the Australian Mathematical Science Institute industry internship program. The interns work on a project that attempts to solve a key business challenge for their host company, working on-site with the organisation for half of their working time.

The University supports the development of targeted researcher and RHD student secondment and mobility programs to help overcome cultural barriers between universities and industry. We are taking action on-campus to develop such programs, but require support to scale-up the reforms. Measures in NISA that will be important in supporting universities' efforts in this regard include the Innovation Connections (expansion of Research Connections), which will provide matched grants to support graduate and postgraduate researchers' placement in business, and business researchers' placement in publicly funded research organisations.

Some of these activities could be made eligible activities under the R&D tax incentive, which would make it even more attractive for industry to engage with the Australian research workforce.

4. Relationships between tertiary education entrepreneurship programs and private incubator and accelerators.

The University sees an important role for linking entrepreneurship initiatives with incubators and accelerators whether they are privately or publicly supported programs. Getting entrepreneurship initiatives right is crucial to connecting emerging entrepreneurs with scientific and technical opportunities to foster innovation. This can be accelerated if

universities focus on creating entrepreneurial talent through the courses and programs they provide, especially those engaged in science, medicine, engineering, IT and mathematics.

In addition to formal entrepreneurial education the University is working to foster a broadly entrepreneurial culture including dynamic networking of students, researchers and industry leaders. For instance, the University is considering embedding entrepreneurship students in the venture catalysing stage of our research commercialisation pipeline, by requiring them to contribute to the development of a commercial value proposition and business development strategy for university-developed intellectual property. Similarly, the University's accelerator programs encourage interdisciplinary teams to build business acumen and potential for success.

In line with this approach, the University has launched a Masters of Entrepreneurship to train students in commercialising products and services and help them to launch their first business or build the strength of future businesses.

The Wade Institute of Entrepreneurship at the University's Ormond College delivers courses that incorporate lectures and mentoring from entrepreneurs and business leaders in co-operation with investment bank Credit Suisse, Australia Post and global law firm Corrs Chambers Westgarth. Commencing in February 2016, the Wade Institute will run a Masters in Entrepreneurship. The course is a collaboration between the University of Melbourne's Faculty of Business and Economics, the School of Engineering and Ormond College. The course will provide students with the knowledge and skills needed to develop, launch and grow innovative enterprises and to successfully commercialise products and services. The course will have a maximum of 60 students. During the course of the Masters (1 year full time), students will develop their own start-up initiatives to pitch for real funding to launch their enterprise. Every week the students will hear and meet leading entrepreneurs, investors and managers of incubators, accelerators and shared working spaces.

The Wade Institute also hosts the 3 Day Start Up (3DS) program. The 3DS program is a 72-hour learning-by-doing campus workshop that teaches entrepreneurial skills to university students in an intensive hands-on environment. The 3DS program began at the University of Texas in 2010 before expanding into universities across the globe.

The University is also home to the Melbourne Accelerator Program (MAP), which supports fledgling entrepreneurs to translate their ideas into businesses. Established in 2013, it is ranked number 1 in Australia and number 8 worldwide by the UBI Index of university start-up incubators. In 2015 MAP supported eight new start-ups, created two new places in their accelerator program, and secured partnerships or institutional support from the Nasdaq Entrepreneurial Center in the US, Australia Post, ANZ, Minter Ellison and Google, amongst others.

MAP has contributed important qualitative gains for locally-based innovation ecosystems by establishing productive links with international and corporate networks. For instance, the Nasdaq Entrepreneurial Center partnership will facilitate student exchange and alumni networking opportunities in Silicon Valley. The engagement of Australia Post with MAP will sponsor two new places in the start-up incubation program, which will be geared towards seeking out emerging, disruptive e-Commerce practices that Australia Post can accelerate at their business end.

The University continues to explore synergies between all forms of support catalysing innovation, including through formal entrepreneurship programs, embedded entrepreneurship initiatives and accelerator programs.

Recommendation

Continue to provide support for entrepreneurship programs and incubator and accelerators.

5. An Australian Higher Education Taskforce to drive reform

To help deliver many reforms outlined in this submission that enable government and universities to deliver the workforce for the new economy, a process is required to coordinate implementation, work with universities and industry and provide a holistic view. The University suggests this could be achieved through a dedicated Australian Higher Education Taskforce (AHET).

The AHET would have a diverse membership that provides expert advice to government on policy settings. It would lead the process of establishing a resourcing benchmark for education, the changes required to move towards funding closer to the full cost of research, and contribute to the creation of a structural adjustment package. The AHET would act as a senior, expert and independent central advisory and implementation body for government on the higher education system, taking account of the needs of government and its several departments to create a cohesive and world-class teaching and research system.

The AHET would be responsible for providing advice to government on long-term planning, resource allocation and regulation of higher education. It would operate within fiscal parameters set by government and provide advice based on higher education industry expertise with a policy focus on the long term.

Once initial reform tasks are complete, the AHET's role would change to assisting with longer term system design issues, as well as exploring ways to reduce regulatory burden.

Recommendation

Establish an Australian Higher Education Taskforce to drive reform.