UNIVERSITIES AUSTRALIA

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# Submission to the Inquiry into innovation and creativity: workforce for the new economy

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# Executive Summary

Australia is experiencing a period of profound economic and social change occurring at a rate not seen since the industrial revolution. The new knowledge economy requires unprecedented economic and labour market agility. It is estimated that 40 per cent of existing jobs are likely to disappear in the next 10–15 years.[1] The challenge is to ensure that these are replaced with jobs that emerge from reconfigured and new industries, as well as through the creation of new and innovative ideas.

Universities Australia's *Keep it Clever: Policy Statement 2016* argued that Australia's universities are uniquely placed to produce the next generation of innovators and career-ready graduates that will create and fill the jobs of the future. Our universities are the only institutions that link all elements of advanced scholarship, skills creation, research, innovation and development. They are key contributors to Australia's economic future, providing the building blocks for our transition to a productive, diverse and internationally competitive knowledge economy. Key facts and figures on the Australian university sector are reported in Universities Australia's Higher Education and Research Facts and Figures.

The university sector alone cannot drive the innovation needed to secure Australia's future prosperity. Increasing industry recognition of the benefits from research and innovation, and galvanising businesses to become active partners is crucial. Leadership and support from governments at all levels can help provide the necessary catalyst for change.

The Government's National Innovation and Science Agenda (NISA) is a positive step in providing the necessary policy architecture for Australia to evolve into an innovative and creative nation. The current debate on higher education and workforce policy would greatly benefit from an injection of the same longer-term, whole-of-government aspirational thinking that led to, and underpinned, the development of the NISA.

[1] Durrant-Whyte, H, McCalman, I, O'Callaghan, S, Reid, A & Steinberg, D 2015, 'The impact of computerisation and automation on future employment' in Committee for Economic Development of Australia, *Australia's future workforce?*, CEDA, Melbourne, p. 58.

Universities Australia recommends the Australian Government:

*(i)* ensure a stable, predictable and appropriate funding and regulatory environment for universities, in order for Australia to meet its future workforce needs;

*(ii)* maintain funding for the Office of Learning and Teaching (OLT) to support continued innovation in quality university teaching;

*(iii)* defer proposed cuts to the Clinical Training Fund, announced in the 2015–16 Mid-Year Economic and Fiscal Outlook (MYEFO) for at least 12 months and undertake appropriate consultation with the sector;

*(iv)* improve the effectiveness of the R&D Tax Incentive in driving additional business research and development activity, and greater industry collaboration with Australian universities;

*(v)* introduce appropriately funded targeted programs to complement the R&D Tax Incentive in supporting technology and knowledge transfer and industry–university collaboration; and

*(vi)* consult with the university sector on the design of the Incubator Support Programme to ensure a coordinated and strategic approach to investment in entrepreneurial skills and supports.

# 1. Graduates with the skills for the jobs of today and the future

## 1.1 Australia's future workforce

Australia's ability to compete in the global knowledge economy requires a workforce that is highly skilled and flexible, digitally literate and with employees able to work effectively in different work contexts. Australian universities are uniquely placed to deliver the higher education needed to prepare students for 21st century careers.

Future employment growth is predicted to occur in sectors that will require highly skilled graduates.

It is estimated that around 3.8 million new graduates will be needed over the next decade.[2] The Australian economy will require 2.1 million more skilled graduates than were needed in 2015 and an additional 1.7 million skilled workers will be needed to replace those exiting the workforce as the population ages.

Five major industries are projected to need at least 30 per cent more skilled graduates in the next decade: education and training; health care and social assistance; professional, scientific and technical services; public administration and safety; and finance and insurance services. Each of these sectors is estimated to require at least 100,000 additional employees with university qualifications compared to 2015 levels. Finance and insurance services will need around 100,000 extra graduates, while education and training will require 570,000.[3]

The rapid rate of change in the economy and the employment market means adaptability and skill transferability will be increasingly important. Universities are uniquely well-placed to provide the broad skills in research, communication and critical thinking needed to equip young Australians for increasingly varied careers. In this era of labour market disruption, generic skills and knowledge will be as important as specific vocational competencies in contributing to a graduate's employability.

It is expected that today's young people will hold as many as 17 different jobs, in five different careers, over the course of their working lives. Retraining and upskilling will become an essential and regular part of our working lives. Employers have expressed an increasing demand for graduates who can demonstrate 'soft skills' such as critical thinking, problem solving, communication, leadership, emotional intelligence and digital literacy, to complement deep content knowledge and vocational competencies.

## 1.2 Outcomes for university graduates

Employment outcomes for university graduates are extremely positive, reflecting the quality and relevance of Australia's higher education system. In May 2015, only 3.4 per cent of

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[2] Deloitte Access Economics 2015, *The importance of universities to Australia's prosperity*, Deloitte Access Economics Pty Ltd, Canberra.

[3] Ibid.

graduates with a bachelor degree or higher were unemployed, compared to 8.7 per cent for those without post-school qualifications.[4]

Although graduates are taking longer to establish their careers than they did prior to the Global Financial Crisis (GFC), employment outcomes for recent graduates remain strong. This trend in immediate employment outcomes for graduates is not limited to Australia; in the US and the UK, graduates are also taking longer to establish their careers than in the years leading up to the GFC.

In 2014, of those bachelor degree graduates available for full-time employment, 68.1 per cent were in full-time employment within four months after completing their qualifications; while 20.3 per cent were in part-time employment.[5] Employment prospects for new graduates improved markedly in the first few years following course completion. On the basis of previous surveys, full-time employment rates for this graduating cohort are expected to increase to approximately 80 per cent in 2017.

## 1.3 Universities build graduates' skills for the workforce

Australian universities continue to provide their students with high-quality, relevant and contemporary learning experiences that meet changing student, employer and society needs and expectations. In 2014, 93.8 per cent of Australian universities' bachelor degree graduates expressed broad overall satisfaction with their higher education experience.[6] In particular:

- 90.0 per cent broadly agreed that their course helped them to develop their ability to work as a team member;
- 95.4 per cent said that their course sharpened their analytic skills;
- 95.1 per cent said that their course developed their problem-solving skills;
- 93.8 per cent agreed that their course had improved their skills in written communication;
- 94.0 per cent agreed that, as a result of their course, they felt confident about tackling unfamiliar problems;
- 94.9 per cent agreed that their course had helped them to develop the ability to plan their own work;
- 94.6 per cent agreed their course provided them with a broad overview of their field of knowledge;

[4] ABS 2015, *Education and Work, Australia, May 2015*, Cat No. 6227.0.

[5] Graduate Careers Australia 2015, *Graduate Destinations 2014*, Graduate Careers Australia Ltd., Melbourne.

[6] Graduate Careers Australia 2015, *Graduate Course Experience 2014*, Graduate Careers Australia Ltd., Melbourne.

- 93.8 per cent agreed their course developed their confidence to investigate new ideas;
- 95.4 per cent agreed that they had learned to apply principles from their course to new situations;
- 95.6 per cent agreed that they considered what they have learned from their course is valuable for their future; and
- 95.8 per cent agreed that their university experience encouraged them to value perspectives other than their own.

Australian universities are committed to continued innovation and improvement to ensure that teaching practices are of the highest quality, meet the evolving needs of students and employers, and fully exploit the opportunities afforded by rapid technological change. Learning analytics are becoming increasingly sophisticated, enabling universities to benchmark their teaching performance against student satisfaction and to monitor student progress, performance and engagement so that intervention can occur when and as required.

The national benefit of the Office of Learning and Teaching (OLT) and its predecessors in adding quality and capacity for innovation to Australia's leading industries should not be underestimated. The competitiveness of Australian higher education relies on our demonstrated capacity for, and commitment to, intelligent innovation, continuous improvement and delivery of high-quality learning.

The importance of this work for Australia's economic competitiveness and the future quality and sustainability of the workforce cannot be overstated.

## 1.4 The demand-driven system: delivering more skilled graduates

In a rapidly changing economy, it is more difficult than ever for governments, universities and industry to predict the labour market needs of the future with precision. This makes it all the more important to produce a sufficient number of graduates with the adaptability and breadth of knowledge and skills needed to succeed in the new economy.

In 2009, the previous Government made the historic decision, with strong bipartisan support, to uncap the number of Commonwealth-supported universities places available. The resulting demand-driven system has transformed the higher education sector, and enjoys bipartisan political support.

The demand-driven system was introduced to ensure that the number of skilled graduates would be sufficient to meet the labour market needs of the future. The 40 per cent attainment target supports this purpose.

The need to increase the number of graduates has been similarly recognised around the world. The United States aims to be the world's leading nation for university attainment by 2020, with 60 per cent of 25-34 year olds with a degree (including two year degrees). The European Union (EU) has set a 40 per cent target by 2020. Eight EU countries had met or

exceeded this target by 2013.[7] University enrolments are booming across Asia: in China, student numbers doubled between 2002 and 2014.[8]

The same imperative applies to Australia. New industries, and innovative advances in traditional industries, are required to secure national prosperity and maintain our status as a high-wage economy with an effective safety net. Future industry growth will be in sectors that depend on highly skilled, highly educated workers such as education, social services, financial services and public administration.

The demand-driven system has been effective. Between 2007 and 2014, the number of Bachelor graduates increased by 21 per cent; more than twice the growth rate in the preceding six years.

## 1.5 The demand-driven system: putting students in the driver's seat

The demand-driven system was an important deregulatory reform, which aimed to make students and universities—rather than the Government—responsible for decisions about the number of places offered and in what fields. As a result, university places are now available to all qualified applicants.

Since places are no longer allocated centrally, universities are able to respond more effectively to match supply with demand.

Universities Australia agrees with the premise on which the demand-driven system is based, that is, that in a properly informed market, students are best placed to make study choices in their own long-term interests. In addition to overall unmet demand for places, the previous system led to persistent shortages of places in areas in high demand, such as allied health, engineering and science.

Student demand is driven by students' awareness of skills shortages and employment opportunities, rather than caps and allocations set on the basis of unreliable projections of labour market needs.

## 1.6 Extending the demand-driven system

Contrary to the original policy intention, the demand-driven system has been limited to Bachelor degrees only. Extending the demand-driven system to associate degrees would assist in filling skills gaps in the economy, provide more choice for students who may be better suited to associate degree study, and provide an alternative entry route to university for those less well-prepared. Associate degrees are valued by employers because they provide practical skills that can be applied immediately in the workplace. These degrees build student confidence and increase their potential to succeed, along with providing a

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[7] EurActiv 2013, *Eight EU countries hit 2020 education goals early: Eurostat,* http://www.euractiv.com/section/eu-priorities-2020/news/eight-eu-countries-hit-2020-education-goals-early-eurostat.

[8] ICEF Monitor 2015, *Chinese universities increasingly forced to compete for students',* http://monitor.icef.com/2015/08/chinese-universities-increasingly-forced-to-compete-for-students/

pathway to further education. For prospective students who are academically less well-prepared, a completed associate degree markedly improves retention and graduation rates when they go on to undertake study for a higher qualification.

## 1.7 Work integrated learning and the workforce

Australian universities equip students with the necessary skills and attributes that are transferable across industries and disciplines. Universities are incorporating the latest developments and industry best practice into curricula to ensure graduates are career-ready and equipped with the full suite of skills needed to succeed.

Work integrated learning (WIL)—where a student gains valuable practical workplace experience directly related to their university course—empowers students to understand, adapt to and apply skills in the workplace. Universities Australia has partnered with the Australian Collaborative Education Network, AiGroup, the Australian Chamber of Commerce and Industry, Business Council of Australia, the Australian Department of Education and Training and the Office of the Chief Scientist to deliver the National WIL Strategy. The Strategy aims to remove barriers, boost enablers and expand WIL opportunities. By bringing universities together with industry, the Strategy is a crucial step in ensuring that graduates transition successfully from study to work.

WIL is also a key mechanism for promoting long-term relationships between universities, small to medium-sized enterprises (SMEs) and the broader research sector. It is these relationships that provide the foundation for innovative collaboration.

The Government's participation in the National WIL Strategy is very welcome and acknowledges the importance of this issue to Australia's future productivity and prosperity. Coherent and whole-of-government policy is essential if we are to ensure Australia produces the graduates needed for the jobs of today and of the future.

## 1.8 Clinical placements and the health workforce

Clinical placements are crucial to developing the skilled health workforce that Australia needs. Placements are recognised as mandatory components of courses in many health disciplines. The need for skilled workers across a range of health disciplines and professions will only increase due to an ageing population, advances in medical technology and heightened patient expectations of health care. Despite this increase in demand, clinical placement capacity has diminished to the point that future demand for health professionals looks unlikely to be met. There are placement shortages of up to 24 per cent in some disciplines, including dentistry, physiotherapy, midwifery, dietetics and audiology, and up to 8 per cent in nursing. These shortages have been exacerbated by cuts announced in the 2015–16 MYEFO to the Clinical Training Fund (CTF) and Integrated Clinical Training Networks (ICTNs). This funding contributed substantially to increased placements and subsequent employment in rural locations as well as in aged care, primary care and mental health care.[9]

[9] Within some individual universities, growth in aged, primary and mental health care placements directly due to the CTF was 66 per cent, 109 per cent and 138 per cent respectively.

The subsequent impacts on adequately preparing our future health workforce are serious. Beyond the immediate pressure on universities and higher education facilities of placing trainees, placement shortages will impact on Australia's ability to adequately address increasing levels of chronic disease and health issues associated with an ageing population. The required investment in clinical placements and our future health workforce skill mix is small in comparison with the costs of treating chronic disease in its later stages.[10]

# 2. Laws and regulations that may act as a barrier to education providers

## 2.1 Universities' commitment to quality assurance

Australian universities are autonomous institutions. They are responsible for accrediting their own awards and courses and all universities have well-developed, rigorous internal quality assurance procedures. Existing courses are subject to regular review and new courses are assessed through a demanding process to establish their academic quality, before being accredited by the institution's Academic Board.

Universities have a strong incentive to work proactively to maintain quality. Aside from formal procedures, universities rely in an intensely competitive market on their reputation for quality and academic rigour.

In reflecting the self-accrediting, autonomous nature of universities, the regulatory framework for Australian higher education is a risk-based system that is predicated on strong and effective self-regulation.

In addition, the national higher education regulator TEQSA sets minimum standards for all higher education providers. TEQSA monitors universities' quality assurance policies and practices and will intervene where there is evidence that a provider may not be meeting minimum standards, or is not meeting its own standards for assuring the quality of its courses.

## 2.2 Higher education regulation: a partnership approach

A review of TEQSA acknowledged that higher education regulation:

> *…is best managed within a framework where providers themselves are predominantly responsible for maintaining and enhancing quality and supported in doing so. This will allow providers to spend more time focussing on their core business—providing quality higher education that will benefit our nation for generations to come.*[11]

[10] Centre for Strategic Economic Studies & Institute of Population Research 2008, *Investing in the Future: An Assessment of the Returns to Investment in Health Innovation.*

[11] Lee Dow, K & Braithwaite, V 2013, *Review of Higher Education Regulation Report.*

The review found that:

> *TEQSA regulates a sector that for the most part was already compliant, self-regulating, and monitored. It may well be that TEQSA's blank slate approach as part of its "independent" position has set-up an environment of regulatory over-reach.*[12]

Fortunately, the Review addressed the finding of regulatory over-reach through the application of an approach based on the principles of risk, necessity and proportionality that acknowledged universities' effective and robust self-regulation.

In general, self-regulation does not impede universities' efforts to supply high-quality graduates to the labour market. This should continue to be the case.

Universities welcome constructive and frank engagement with governments about expectations and assessments of the sector's performance and are committed to ensuring that graduates continue to possess the skills and knowledge that they require for long-term career success.

## 2.3 The importance of predictable funding

Along with an appropriate regulatory regime, universities need stable and predictable funding. The university sector has endured two years of uncertainty about major elements of funding. The 2014–15 Budget announced a 20 per cent cut to the Commonwealth Grants Scheme (CGS), and while this has not been legislated, it remains Government policy until the Government decides otherwise. Similarly, efficiency dividends on university funding, and a move to a less generous indexation factor are still factored into the Commonwealth Budget.

How the Government might approach university funding going forward remains unclear. This uncertainty makes it harder for universities to plan their future activities and especially inhibits innovation in teaching and learning and other university activities.

Many in the sector fear further funding cuts of some kind, which would be in addition to cuts made in every Budget since 2013. Furthermore, public funding for universities in Australia has been in decline for 20 years. In 1995, public investment in Australia's universities was 1.12 per cent of GDP. By 2011, this figure had fallen to 0.74 per cent of GDP—well below the OECD average of 1.13 per cent.[13]

To continue to provide the high quality of education that students need and expect, and to prepare graduates for 21st century careers, universities need sufficient, stable and predictable levels of financial resources. Without this, they are unable to invest in the teaching excellence, technology and the infrastructure needed to underpin a world-class university system.

## 2.4 Innovation in learning and teaching

Support for innovation in learning and teaching is critical for maintaining and enhancing Australia's competitive position as a global provider of high quality higher education. Staying at the forefront of modern learning and teaching practices requires ongoing investment in

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[12] Lee Dow, K & Braithwaite, V 2013, Review of Higher Education Regulation Report.

[13] OECD, various years, *Education at a Glance.*

teaching research and development. This is efficiently achieved in projects undertaken for the benefit of the entire sector through the OLT.

Overall capability of the OLT and its predecessors has been substantially reduced by funding cuts made over a number of years. In the 2015–16 Budget, the program funding was reduced by a further 36 per cent. The Government has advised that it intends for the work of the OLT to be transferred from the Department to the university sector and that universities will be invited to host the centre. The success of this approach will depend to a large extent on the level of the Government's ongoing commitment to supporting teaching innovation and excellence.

## 2.5 QILT

Universities Australia welcomes the Government's Quality Indicators for Learning and Teaching (QILT) initiative which provides students, providers and the community with more accessible, timely and reliable information on higher education performance. The information provided is based on a coherent suite of surveys that cover higher education experience from commencement to employment. When fully implemented, it will provide universities and other non-university higher education providers with high-quality, timely data to benchmark their performance and pursue continuous improvement in key areas such as teaching practices, learner engagement and student support. The indicator suite will also provide national level information on the student experience, enabling Australia to benchmark key performance indicators against the USA and UK. QILT will significantly improve the information available to prospective students and their families to inform decisions about university study. Better informed decision making will not only help students, but will make the demand-driven university system more efficient and effective, and improve the supply of skills to the labour market.

## 2.7 A quality reputation underpins international education: Australia's third largest export industry

Australia's reputation for quality and excellence is crucial to maintaining our competitive position as a major provider of services to international students, an $18.6 billion export industry. The Australian Government's National Strategy for International Education, expected to be released in the first half of 2016, will be crucial in ensuring Australia's continued success in delivering international education services and creating strong global education and research links.

# 3. Factors that discourage university and industry collaboration

## 3.1 Barriers to collaboration

The statistics on Australia's low level of industry-university collaboration are well known and well documented. Australia ranks last of 26 OECD countries for the percentage of innovation-active businesses collaborating with universities and other research institutions.

It is important to note that there are some major background factors that make collaboration more difficult than it is in some countries. For a start, SMEs make up a very

large share of total businesses in the Australian economy (70 per cent of employment and 55 per cent of economic output). There are few large companies of the kind that account for much of the business investment in research in North America, Europe or Japan. Multinational companies have a strong presence in Australia, but their research and innovation activities tend to be located elsewhere. For a global company, it is likely that research that is able to be commercialised will be more feasible and yield a bigger return in a European or North American office. Finally, Australia's economy has been reliant on the resources sector and primary industries to a much greater extent than the other advanced economies with which we typically compare ourselves. Australia also has a high proportion of firms in low to medium technology industries, for example in the services sector.[14]

Nevertheless, even allowing for these facts, the proportion of both large and small Australian businesses that collaborate with universities is very low. According to OECD data for 2008–2010, 4 per cent of large Australian businesses and 5 per cent of SMEs collaborated with universities or other public research agencies. In the United Kingdom, the figures were 30 per cent for large firms and 20 per cent for SMEs, while in Finland 70 per cent of large businesses and 30 per cent of SMEs collaborated.[15]

## 3.2 National Innovation and Science Agenda

The National Science and Innovation Agenda (NISA) includes important initiatives to encourage universities to better engage with business. The success of these 'supply side' initiatives, however, will be limited unless complemented by targeted incentives to encourage industry and other research end users to 'reach into' universities.

Australia's universities and industry must work in close partnership if we are to create the new products, processes and industries needed to secure our future prosperity. Governments, universities and businesses have identified Australia's low levels of collaboration between industry and researchers as a major barrier to making a successful transition to a productive and internationally competitive innovation nation.

The creation of Innovation and Science Australia and the review of the R&D Tax Incentive provide an opportunity to improve the effectiveness of incentives for industry to undertake research and development and to collaborate with publicly funded research institutions.

The NISA includes other positive initiatives to foster collaboration. The move to a continuous application round under the Australian Research Council (ARC) Linkage Projects will remove a major barrier for industry to collaborate with university-based researchers. The Innovation Connections initiative, which expands and refocuses the existing Research Connections program, provides another avenue to drive new collaborations led by SMEs. Universities Australia encourages the Australian Government to consider additional and expanded direct support initiatives to encourage industry to seek out, and collaborate with, university researchers.

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[14] Smith, K H & West, J 2015, *Australia's Innovation Challenges: Building an Effective National Innovation System*, quoted in Department of Innovation, 2014, Boosting the Commercial Returns from Australian Research, p.13.

[15] OECD 2013, *Science, Technology and Industry Scoreboard 2013*, p.127.

## 3.3 R&D Tax Incentive

Australia is unusual in the extent to which it relies on the R&D Tax Incentive to drive business innovation and collaboration with researchers.[16] Universities Australia welcomes the current review of the R&D Tax Incentive and has provided a detailed submission to the review panel.

The cost of this incentive has increased faster than that of any other program supporting science, research and innovation (SR&I), growing from around 15 per cent of total SR&I spending in 2005–06 to almost 30 per cent in 2014–15.

Despite its size ($2.9 billion in 2013–14), only 0.6 per cent of businesses in Australia registered for the R&D Tax Incentive in 2012-13. Business expenditure on R&D is concentrated in a limited number of large businesses. Australia's performance in producing innovation remains underwhelming, as does the percentage of innovative firms in our manufacturing and services sectors (the lowest and second lowest, respectively, in the OECD[17]).

Further, only a small proportion of the claimed tax benefits relate to investment by businesses in research conducted with universities and other publicly funded institutions. The introduction of a premium tax concession rate for businesses collaborating with public research institutions could substantially improve its effectiveness.

Indirect tax incentives are broad-based, untargeted instruments and are not necessarily the best mechanism for achieving specific policy objectives, such as boosting industry and research collaboration. Direct funding can better target the parts of the sector that most need support and the types of innovation that deliver the greatest benefits. Direct incentives can be particularly effective for SMEs and startups. The OECD has highlighted that direct subsidies are more targeted towards long term research and R&D tax schemes are more likely to encourage short-term applied research and boost incremental innovation rather than radical breakthroughs.[18]

## 3.4 Direct support for business innovation and technology transfer

Other countries are investing in direct support initiatives targeting industry–research collaboration. The United States Small Business Technology Transfer (STTR) program, for example, has been in place since 1994 and has been a great success in lifting the level of commercialisation by SMEs of publicly funded research. In the period 2001–12 around $US262 billion was awarded through this program.

Canada's Engage Grants are targeted at assisting SMEs to solve a company-specific problem through university–SME collaboration. Denmark provides Innovation Vouchers to SMEs to facilitate their access to public sector research, with a specific focus on research translation.

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[16] Bell, J, Dodgson, M, Field, L, Gough, P & Spurling, T 2015, *Translating research for economic and social benefit: country comparisons*, Report for the Australian Council of Learned Academies.

[17] OECD 2016, *Main Science and Technology Indicators.*

[18] OECD 2014, *Science and Technology Industry Outlook 2014*, p.156.

On the 'supply side' of the equation, the UK Higher Education Innovation Fund (HEIF) provides a stream of university block funding that directly supports the sector's research and innovation engagement activities. The HEIF is only a small proportion of the UK Government's investment in university research (£160 million for 2015–16) but is clearly helping universities to embed changes and increase the focus on linking with end-users of research both locally and internationally.

The HEIF is only one of a number of programs and initiatives with significant additional funding put in place by successive governments in the UK to improve their innovation performance. The growing momentum in the UK cannot be attributed to any one program or initiative, but there are clear lessons to be learnt from the long-term and cross-party commitment to increasing engagement.

Non-financial support measures, like mentoring and network development are an important component of the overall policy mix, and are particularly effective for SMEs and startups. Increasing the level of research, science and innovation expertise in senior management positions and the employment of research trained staff in industry are also important ways to create long-term cultural change in industry.

## 3.5 Venture capital and commercialisation funding

Job creation, innovation and research commercialisation depend on access to venture capital. However, the level of venture capital investment in Australia is declining. As a percentage of gross domestic product, venture capital investment is low compared to other OECD countries.[19] Additionally, Australia's ability to transform world-leading research into new products and industries has been hampered by stop-start approaches to increasing available capital. The initiatives in the NISA aimed at increasing access to capital are very welcome and, combined with other sectoral initiatives to create and package opportunities for investors, should lead to an improvement in the overall numbers and success rate of innovation investment.

The Biomedical Translation Fund is another welcome initiative to increase investment in the biomedical commercialisation process. However, this fund only relates to one sector and the issues around commercialisation are much broader. Further consideration needs to be given to replicating this model for other areas including advanced manufacturing, engineering, and information and computer sciences.

In recognising the strong start made by the NISA, it will be important to monitor access to venture capital and commercialisation support.

## 3.6 Intellectual property and copyright arrangements

Depending on how they are configured, arrangements for intellectual property (IP) and copyright can promote research collaboration between universities and industry, or they can make such collaboration more difficult. Universities are working to develop new and

[19] Bell, J, Frater, B, Butterfield, L, Cunningham, S, Dodgson, M, Fox, K, Spurling, T & Webster, E 2014, *The role of science, research and technology in lifting Australian productivity*, Report for the Australian Council of Learned Academies.

more streamlined solutions in IP. However, copyright law continues to impede knowledge transfer.

The patent system provides an important mechanism for further leveraging Australia's world-class research capabilities for broader benefits, including through the translation and commercialisation of research. Australia's universities are committed to the effective management and transfer of intellectual property (IP) to industry partners and end-users. Every university has listed their patents on IP Australia's Source IP site, making it a comprehensive searchable source of Australia's university-held patents.

Easy Access IP, developed by UNSW Australia and adopted by six other Australian universities, provides an alternative to traditional commercialisation routes. In situations where university IP is difficult to commercialise because it is early in its development or presents too many uncertainties for industry, Easy Access IP provides a mechanism for industry partners to access IP quickly and for free, under a one page agreement. These targeted, innovative initiatives break down major barriers for businesses to collaborate with universities, but much of their success will depend on businesses 'reaching in' to universities.

The ability to publicly disseminate research results is key to building successful engagement and collaboration with industry. However academic engagement and collaboration is being impeded by Australia's existing copyright regime which is overly prescriptive, inflexible, complex and expensive to administer. For instance, under our existing copyright system a university may be prevented from making higher degree theses publicly available online—an important aspect of the dissemination of knowledge—unless any third party content is removed or the rights holder has given permission. Similarly, dissemination of early stage research through conferences, group presentations and peer symposia may be prevented or made more difficult by the copyright system.

A broad and flexible fair use copyright exception would better support greater collaboration between universities and industries to drive innovation. Knowledge transfer encompasses interaction between academia and wider society, including industry. For this reason, the copyright system should include a clear legislative intention that commercial uses are not per se unfair and therefore not permitted.

# 4. Entrepreneurship, incubators and accelerators

## 4.1 University entrepreneurship programs

Australia's universities have a unique role to play in producing and training entrepreneurs as the only institutions that integrate education and research. They are the incubators for innovators as well as innovation. There has been a substantial investment by Australian universities in recent years to foster a culture of innovation and entrepreneurship.

Australian universities are establishing student incubators to encourage entrepreneurship and support the creation of startup ventures by students, researchers, and recent alumni. ilab at the University of Queensland provides funding, mentorship and assistance with competitive grant applications to support entrepreneurs to move to early-stage, investor-ready companies. Since 2000, ilab has fostered 140 startup companies, raised over $80 million in grant and investment capital, and created over 800 technology jobs. The University of Wollongong is developing an innovation ecosystem in the Illawarra region

through iAccelerate, which has supported over 57 companies and created over 119 new jobs in the last two years.

Universities are responding to the shift to higher levels of self-employment, coupled with the need for more creative approaches to industrial restructuring and transformation, by integrating innovation and entrepreneurship into the higher education curriculum. The Wade Institute will be launched in 2016 by the Ormond College in the University of Melbourne as a dedicated entrepreneurship institute to deliver undergraduate and postgraduate courses, including a masters degree in entrepreneurship, and provide facilities for students to pursue startup ideas and receive mentoring from experienced entrepreneurs. Programs like Tin Alley beta offer tech startup internship program for computer science students from the University of Melbourne, Deakin University, La Trobe University, Monash University, RMIT University, Swinburne University of Technology and the University of Tasmania.

## 4.2 Implementing the Incubator Support Programme

Universities Australia welcomes the Government's modest investment in the new Incubator Support component of the Entrepreneur's Programme announced as part of the NISA. Public investment in incubator programs is a common feature of leading innovation countries including Israel and the United States.

Support from the ACT Territory Government played a crucial role in the creation of the CBR Innovation Network and offers a model for further partnerships between universities, private incubators and government. The CBR Innovation Network brings together the Australian National University, University of Canberra, UNSW Canberra, CSIRO and NICTA to facilitate pathways for students into startups and industry. Its initiatives include GRIFFIN Accelerator, which provides seed funding and intensive mentoring; STIR, a crowd-voted micro-grants program for people under 30, and the KILN Incubator to support high-growth potential entrepreneurial ventures.

The impact of the Incubator Support Programme could be substantially increased if it employed a coordinated and strategic approach to investment in entrepreneurial programs, leveraging off the sector's experience. Universities Australia recommends that the Australian Government consult with the university sector along with industry to help determine the most effective and efficient design for the program.