07/06/2017

Office of Innovation and Science Australia
GPO Box 9839
Canberra ACT 2601

Dear Innovation and Science Australia (ISA),

The Australian Technology Network of Universities (ATN) would like to thank you for providing us with the opportunity to comment on ISA's 2030 Strategic Plan Issues paper.

The ATN is a national collaborative group of five major universities: RMIT University, Queensland University of Technology, University of Technology Sydney, University of South Australia and Curtin University. ATN Universities are all young, innovative, and have genuine linkages to industry as an inherent part of both our teaching and research.

Collaboration has always been important for the ATN and its members, and students are at the heart of everything we do. Our end-user approach to address research challenges in the world makes us increasingly the partner of choice by business, government and industry. With two thirds of ATN university research income coming from industry and end users since 2010, the ATN understands the importance of university and industry collaboration. Our graduates lead changes in society, provide innovative solutions to global problems and are equipped with the skills to enter the modern workforce.

ATN universities have a reputation for excellence across a range of discipline areas. 93% of ATN research is ranked at world-class or above. ATN universities are committed to high quality research that contributes practical solutions to real-world challenges. The ATN are also leading participants in Australia's Cooperative Research Centres linking government, industry and researchers.

The ATN is supportive of ISA's vision for Australia in 2030, noting that innovation is vital to future economic prosperity and universities are critical to achieving the goal of having a top tier innovation nation which is known for excellence in science, research and commercialisation. University – industry collaboration is critical to achieving this goal. The ATN universities collaborate with industry, government and other Australian education institutions. This collaboration is vital to knowledge transfer, the transformation of Australia into an innovative and highly skilled economy and the betterment of society. The ATN has long advocated for the development of a national collaborative strategy, that provides a coordinated approach to all of the many activities occurring and that may commence across numerous government departments.

The ATN notes that higher education does not feature prominently in the 2030 Strategic Plan Issues paper, which is a missed opportunity. Universities play a vital role in both innovation through research, and in educating students and equipping graduates with skills which foster

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ingenuity and innovation. Universities have a crucial role to play in the innovation agenda, and it is unfortunate that the 2030 strategic plan does not mention leveraging their innovation capabilities.

This submission will respond to each of the six challenges outlined in the paper.

Challenge 1: Bringing more firms, in more sectors, closer to the innovation frontier.

A highly innovative Australia requires more than just moving more firms closer to the innovation frontier, this requires a more innovative Australian population. Australian universities already actively engage and collaborate with industry using the latest in world class research to have meaningful impact. Continued engagement and collaboration between universities and industry will move more firms, in more sectors, closer to the innovation frontier. Existing collaboration programs should be leveraged. Schemes such as the ARC linkage grants go a considerable way in ensuring that knowledge transfer occurs. The continuation of these schemes will ensure that genuine links between universities, government and industry continue to be made. These grants utilise the innovative skills of universities and university researchers to solve problems facing Australian industry.

Graduates from Australian universities will help facilitate this change. They will be the future agile, innovative, and resilient workforce that will be needed for Australia to fully transform into an innovative economy. Ensuring that students are provided meaningful opportunities to engage with industry via work integrated learning throughout their studies will further assist in applying the latest in theoretical knowledge to problems faced by industry. Universities are actively changing the way they teach and train researchers to ensure they are well equipped for careers in industry. An example of this is the ATN Industry Doctoral Training Centre (IDTC)[1].

Cluster, accelerators, incubators and innovation precincts will all play important roles in further moving Australian industry closer to the innovation frontier. Universities currently operate in this space and a recent study undertaken by Universities Australia found that currently more than four in five start-up founders in Australia are university graduates[2]. The report also found that one in five founders have benefited from an acceleration or incubation program. This report confirmed that universities provide skills, training, support and the physical space that nurtures future entrepreneurs. ATN universities are heavily involved in hosting incubators and accelerators.

For example, the University of South Australia has the Future Industries Institute which focuses on creating high value, knowledge intensive alternatives underpinned by unique skill bases, infrastructure technology solutions and collaborative research relationships[3]. It brings together the University's world-class strengths in advanced manufacturing, nanomedicine, minerals and resource engineering and environmental science, and encourages researchers to blur the boundaries and build new relationships between industry and academia.

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[1] http://www.atn.edu.au/industry-collaboration/IDTC/ accessed 19 May 2017
[2] Universities Australia. (2017). Startup Smarts: Universities And The Startup Economy
[3] http://fii.unisa.edu.au/ accessed 19 May 2017.

The idea of a cluster to spur innovation is not a new one, and universities are at the heart of these clusters. A recent report, *ImagineSydney: Create* from Deloitte highlighted this. The innovation hotspots in Sydney were areas surrounding the University of Technology Sydney[4] and Melbourne's Urban Innovation District, a new collaboration between two universities (RMIT and University of Melbourne) and the City of Melbourne, furthering the case that universities are critical to influence innovation. The urban district is planned to leverage emerging technologies to build on Melbourne's characteristics to enhance education and economic outcomes through linking together several precincts containing world class research, market, cultural, and educational facilities[5].

It is evident that precincts address local challenges and opportunities and as such each precinct is different. Australia already has examples of precincts in inner city, suburban and regional settings. It is evident that they support entrepreneurship, collaboration, access to talent and link industry directly with researchers to tackle real world problems. We believe that supporting precincts is vital to fostering further collaboration. The ATN is glad that a National University Precincts Strategy is being developed. It is important that this strategy is a nationally coordinated approach to fully leverage the impact precincts can have on innovation.

Challenge 2: Moving, and keeping, government closer to the innovation frontier.

The Government's National Innovation and Science Agenda is a clear signal that the Australian Government is open to engaging with, promoting and supporting innovative parties. Further to this, funding initiatives that invite and encourage industry, government and universities to collaborate are effective mechanisms to influence behaviour. Releasing the National Research Priorities and funding Cooperative Research Centres (CRCs) and developing the National Roadmap for Research Infrastructure are other means to signal to the broader Australian industry that the government is eager to embrace wider innovation. A key element in ensuring the government remains close to the innovation frontier is in having an agile, responsive government unencumbered by unnecessary bureaucracy will most likely reduce the burden to partnering with government. Further, initiatives to achieve this aim must be well resourced in order to achieve meaningful change, at scale. The ISA 2030 initiative gives government an opportunity to identify gaps where the innovation frontier would benefit from direct government involvement.

Challenge 3: Delivering high-quality and relevant education and skills development for Australians throughout their lives.

The journey of lifelong learning begins early and traverses many educational stages and institutions, each building upon the other. It should be noted that education and skills development are not only achieved in educations institutions, rather on the job learning and development is also important. Despite this, universities extend beyond just providing technical knowledge and know how. University graduates are curious, inquisitive, driven and have a solid foundation in the practice of learning. In other words, university graduates have

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[4] https://www2.deloitte.com/au/en/pages/future-of-cities/articles/imagine-sydney-create.html accessed 19 May 2017

[5] https://shapermit.com/news-update/urban-innovation-district accessed 19 May 2017

learnt how to learn with a strong foundation in innovative problem solving, experiential learning, and peer to peer learning and teaching. These skills, fostered and engrained throughout their study ensure that graduates have the fundamentals to continue to refresh, update and learn new skills, capabilities and concepts; all of which drive innovation.

Universities are also implementing innovative teaching pedagogies such as the flipped classroom where there is a reversal of traditional teaching methods. Students are first exposed to new material outside of class, usually via reading or videos. Lectures and tutorials are then used to assimilate that knowledge through strategies such as problem-solving, discussion or debates[6]. Further, universities run programs to deliver employability skills training for students to ensure that graduates can integrate their knowledge into business to achieving innovation and impact. Many universities achieve this through the utilisation of work integrated learning courses. An example of this is the ATN e-Grad School[7].

The e-Grad School (Australia) (eGSA) is a virtual graduate school. Its primary aim is to recognise the broader career paths that research graduates now undertake and support these by offering the opportunity for Higher Degree Research (PhD and Masters by Research) students to develop non-discipline specific generic professional skills during their research training candidature. The eGSA model is a unique and contemporary model that has been running successfully for more than 12 years and provides training to research students across Australia via short fully online, flexible and easily accessible modules. The content of each module is responsive to the skills needs identified by non-academic employers of research graduates and offers foundational understanding of key concepts, authentic learning & case studies within community of practice environments. These courses cover industry and employer relevant skill building areas including Public Policy, Project Management, Research Commercialisation, Leadership & Communication, and Career Skills & Portfolio Management.

To date over 10,000 students have registered for training with eGSA, including ATN HDR students, HDRs from other Australian universities and a small number from New Zealand universities. Demographic data on students undertaking the eGSA modules suggest that most students are under 40 years of age, undertaking full time study in a PhD. Student satisfaction rates for all modules are routinely over 85%. Students who have completed the modules have indicated that they feel eGSA training has augmented their career goals and improved employment prospects.

Further, universities are currently engaging through outreach programs with schools to help develop skills in innovation and entrepreneurship. Curtin University for example has a successful partnership with schools in Western Australia as part of its Innovative Schools Consortium, allowing students to participate in workshops, and game-based learning to develop new skills and attributes[8]. As part of this Curtin also provides support to enable staff

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[6] Brame, C., (2013). Flipping the classroom. Vanderbilt University Center for Teaching. Accessed at http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/ accessed 26 May 2017
[7] http://www.egradschool.edu.au/ accessed 19 May 2017
[8] Curtin University. (2017). Innovative Schools Consortium. Accessed at: http://17986-presscdn-0-31.pagely.netdna-cdn.com/wp-content/uploads/sites/6/2017/03/InnovativeSchoolsConsortiumFlyer.pdf accessed 19 May 2017

to develop new curricula applying STEM approaches and transdisciplinary thinking to address real-world challenges[9]. UTS has launched STEAMpunk girls, a program that introduces high school girls to entrepreneurship and the science, technology, engineering, arts and mathematics industries, and promotes a transdisciplinary approach to problem solving[10]. This program is designed to help support young women in participating in the innovation conversation.

While the skilling of students is vital to ensuring that Australians receive a high-quality and relevant education, it also important to ensure that new methods of teaching pedagogy are vigorously researched and implemented. To that end, universities play a key role in continuously researching teaching and learning evidenced based methodologies which benefit not only the teachers of today, but also the teachers of the future. An example of this is the ATN's Excellence in Learning and Teaching Grants. This scheme is funded by ATN member universities to provide funding to facilitate scholarship and research into learning and teaching, and promote systemic change in the sector[11].

Finally, it should be noted that any policy initiatives that open up access to Australians at all stages of their lives is a welcome advance to improving their educational outcomes, and in turn the innovation prospects of Australia. To achieve this goal it is critical that Australia has properly funded educational intuitions, in both the vocational and higher education sectors.

Challenge 4: Maximising the engagement of our world-class research system with end users.

There are two main challenges to maximising the engagement of Australia's world class research system with end users. Firstly, properly incentivising collaboration and building upon existing collaborative mechanisms and secondly, ensuring that Australian research infrastructure is adequately funded.

It is widely acknowledge that traditional incentives for university research differ significantly from business research needs[12]. However, the Australian Government has made significant progress to changing incentives through initiatives such as reforming the Research Block Grant funding arrangements.

Universities are actively implementing policies to further promote collaboration between universities and end users. An example of this was the introduction of the ATN Intellectual Property (IP) principles, in 2016, a uniform consistent and transparent approach for industry to engage with ATN universities. The ATN's national approach to IP aims to:

- Actively promote greater commercialisation of university research by reducing barriers and complexities.
- Increase collaboration between industry partners and researchers from our five members.

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[9] http://news.curtin.edu.au/media-releases/curtin-shenton-college-partner-learning-innovation/ accessed 19 May 2017
[10] http://newsroom.uts.edu.au/news/2017/05/steampunk-girls accessed 30 May 2017
[11] http://www.atn.edu.au/scholarships-grants/learning-and-teaching-grants/ accessed 19 May 2017
[12] Sharma, A. (2013). Disconnect between research and national needs. Australian Financial Review. Accessed at: http://www.afr.com/news/policy/education/universities-need-to-address-disconnect-betweenresearch-and-national-needs-20130915-jh1ib accessed 19 May 2017

- Be responsive to industry needs by ensuring we act in a pragmatic, flexible and agile manner.
- Respect the tight timeframes and unique requirements of individual businesses.
- This means that industry can be reassured they will have a similar engagement experience, based on agreed principles, with a network of leading, technology focussed, universities, right across Australia[13].

Despite the inroads ATN universities have made in engaging with industry, there are further government actions which could incentivise increased mobility between academia and industry. The R&D Tax Incentive Review has recommended a package of measures to improve the R&D tax incentive's effectiveness and integrity. The proposal recommended the introduction of a collaboration premium for businesses to partner with publicly-funded research organisations, including the cost of hiring PhD graduates in their first three years of employment[14]. This recommendation is consistent with the recommendations of the ATN / PwC report 'Innovate and Prosper: Ensuring Australia's Future Competitiveness through University-Industry Collaboration'[15]. The recommendation, if adopted, would create stronger pathways between graduates and industry, while also fostering a greater culture of innovation. It should be noted, that while the recommendations extend to STEM graduates, expanding the recommendations to all graduates would see increased benefits as there are very few companies that rely solely on STEM graduates and innovation is not limited to only STEM. The ATN urges the government to adopt this recommendation.

The recently released National Research Infrastructure Roadmap outlines the future direction of nine research focus areas, along with providing a stocktake of what research infrastructure Australia currently has in each focus area[16]. Based on the stocktake, the roadmap outlines what research infrastructure Australia requires to meet the future needs of each focus area. While the roadmap provides a clear outline of future research infrastructure need in Australia, there is no mention about how this infrastructure will be funded. Government funding for research infrastructure in Australia remains uncertain. The Education Investment Fund, a $3.7 billion fund designated to fund university research infrastructure has been re-purposed by the government for budget repair and has resulted in reduced research infrastructure funding certainty[17]. To ensure Australia continues to have world class research facilities, adequate funding and funding certainty are vital. With the discontinuation of EIF, universities are utilising productivity savings to build essential university infrastructure needs. The recently announced higher education efficiency divided will further impact the ability of universities to

[13] https://www.atn.edu.au/industry-collaboration/intellectual-property/ access 19 May 2017
[14] Department of Industry, Innovation and Science (2016). Review of the R&D Tax Incentive. Available at: https://www.business.gov.au/assistance/research-anddevelopment-tax-incentive/review-of-the-randd-taxincentive accessed 19 May 2017
[15] PricewaterhouseCoopers and Australian Technology Network (2016). Innovate and Prosper: Ensuring Australia's Future Competitiveness through University-Industry Collaboration. Accessed at: https://www.atn.edu.au/siteassets/publications/atninnovateprosper.pdf accessed 19 May 2017
[16] Department of Education and Training. (2017). 2016 National Research Infrastructure Roadmap. Accessed at: https://docs.education.gov.au/system/files/doc/other/ed16-0269_national_research_infrastructure_roadmap_report_internals_acc.pdf accessed 19 May 2017
[17] https://www.universitiesaustralia.edu.au/Media-and-Events/submissions-and-reports/The-facts-on-university-funding/The-facts-on-university-funding accessed 19 May 2017

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fund research infrastructure. To fully maximise the engagement of our world-class research system with end users, it is critical that research infrastructure be adequately funded.

Challenge 5: Maximising advantage from international knowledge, talent and capital.

Maximising advantage from international knowledge, talent and capital is vital to meeting the aims of ISA's strategic plan. Initiatives such as the New Colombo Plan increase international mobility of students and increase the knowledge transfer among the Indo-pacific region. The New Colombo Plan supports Australian undergraduates to study and undertake internships in the region through a scholarship program for study and internships or mentorships support.

Universities, and university networks also have a signed MOUs with international universities, university networks and governments of all levels to aid in the mobility of students, researchers, and knowledge These agreements benefit not only the knowledge base of Australia but also increase international knowledge capital. These agreements and programs have another beneficial impact, signalling that Australia and Australian universities are open to engaging international at all levels of university operations.

Unfortunately recent announcements regarding the changing of 457 visas in Australia may impair Australia's ability to capitalise on world class researchers seeking opportunities with Australian institutions. Australia has ample room to create incentives to attract and retain high quality researchers which would benefit all of Australia, not only students through receiving their expertise but also the knowledge capital of Australian institutions. We look forward to working with the Australian Government to resolve these issues.

Challenge 6: Realising the benefits of bold, high-impact initiatives.

Challenge 6 is highly ambitious yet not out of reach for Australia to achieve. High-impact initiatives will require collaboration between government, industry and universities. While high-impact initiatives are welcomed, it is important to acknowledge and fund basic research as well as applied research. It is often said that basic research is just research that is yet to be applied. With the focus on developing high impact initiatives hindsight can often create the impression that picking the winners is easy. Rather, successful high-impact initiatives are the result of a well-funded, in-depth, rigorous and well-rounded research capabilities.

As noted above, the ATN are supportive of ISA's vision for Australia in 2030, especially that innovation is vital to future economic prosperity and universities are critical to achieving the goal of having a top tier innovation nation which is known for excellence in science, research and commercialisation.

University – industry collaboration is critical to achieving this goal, and as outlined above, leveraging upon the successful initiatives that have been undertaken by universities is a logical first step in meeting the aims of ISA's strategic plan. It is also imperative that universities and university infrastructure are properly funded to ensure maximum engagement with end-users.

Please do not hesitate to contact the ATN Directorate on (02) 5105 6740 or via e-mail at renee.hindmarsh@atn.edu.au to discuss any elements of the submission further.

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Yours sincerely,

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