

# UNIVERSITY OF SOUTH AUSTRALIA RESPONSE TO 'BOOSTING THE COMMERCIAL RETURNS FROM RESEARCH' REPORT

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November 2014

The University of South Australia (UniSA) is pleased to provide a response to the consultation paper titled '*Boosting the Commercial Returns from Research*' and commends the Department of Industry and Education for focusing on this key area which is vital to improving the economy and competitiveness of Australia.

## About the University of South Australia

UniSA is the largest of the three universities in South Australia and operates across five campuses. In 2014 the University's operating budget is more than \$600 million – currently, the University has 34,500 students, including over 4,000 students who study overseas. With over 3,000 staff, the University is a major employer within South Australia. The University offers approximately 400 undergraduate and postgraduate programs, both on and off campus. There are four academic Divisions: Business; Education, Arts and Social Sciences; Information Technology, Engineering and the Environment; and Health Sciences.

UniSA is Australia's University of Enterprise – our focus is on end-user inspired research and industry-informed teaching and learning. *This is evidenced through our strong engagement with the Cooperative Research Centre (CRC) program. UniSA currently participates in 11 CRCs and is fourth in Australia for Commonwealth funding to CRCs.* Importantly, the intellectual capital we create, the professionals we educate, and the research we conduct is integral, and contributes, to the economic and social wellbeing of the state and the nation.

At UniSA we are working with ITEK Ventures Pty Ltd, our technology commercialisation company, to deliver and support an enterprise-wide business development and industry engagement strategy for the University.

Our unique and responsive approach to engagement has resulted in the development of distinctive programs and partnerships with external partners, locally, nationally and internationally. Current examples include:

- Partnerships with local governments to transform regional economic profiles – connecting UniSA knowledge, research and skills with individual companies and collections of organisations in the region.

- Co-investment models focused on developing new research relationships between UniSA and industry.
- Corporate partnerships between UniSA and individual companies that focus on leveraging a wide range of UniSA assets for the benefit of the partner, including student placements, research programs and projects, and knowledge partnerships – creating a fluid exchange of people between UniSA and the partner organisation.
- Community and stakeholder engagement programs that connect UniSA with priority issues of social and community importance in contemporary areas.
- Establishing consortiums with Small-and-Medium sized Enterprises (SMEs) to establish technology start-ups, and taking an equity position within these consortiums as to make the capabilities of UniSA available to local business.

### **Boosting the Commercial Returns from Research**

The Australian Government is to be commended for addressing this important contributor to economic growth. Specific comments on the key issues and options raised in the discussion paper are provided as follows.

### **Improving Australia’s economic performance through better translation of research into commercial outcomes**

The report seeks views on how to better translate research into commercial outcomes. UniSA suggest that a greater emphasis should be placed on facilitating and producing end-user-led research proposals from the outset. Enabling the input of end-users from the start of a research program can ensure that research is industry-driven and industry-relevant and focused from the early stages of development, i.e. the likelihood that mature research will necessarily align with market-need is low. In tandem, we also need to identify areas of research excellence with critical mass that compete in both the national and international context, and build robust business development and industry engagement capacity around those priority activities.

The report notes that Australia ranks second to last out of the 17 OECD countries on ‘new to the world’ innovation, which is partly attributed to Australian businesses’ preferences to invest or modify existing innovations. This may be perceived as a reluctance for businesses to support and invest in innovation, however, our experience from working with industry suggests that in most cases businesses are focused on minimising financial risks and are, therefore, more willing to invest in a research program that clearly articulates milestones and timelines that align with industry decision points and opportunities. Australia is predominantly an SME economy - often there is a need to develop a broader appreciation for what innovation, and Research and Development (R&D), can do to improve or enhance a business’ operations, or to provide a competitive advantage and/or new products. This is especially true for the traditional manufacturing industry which may view investment in innovation as high risk.

Currently in Australia, the development of many novel technologies often starts by aiming for smaller-scale results, as the cost associated with larger programs are prohibitive in an industry context. This results in programs frequently taking a long time to demonstrate credible progress or sufficient technological maturity to interest potential investors or

sponsors – particularly against the backdrop of a strong and innovative international competition. Furthermore, ‘disruptive innovation’, which can include transformational technologies, are often derived from research occurring at the boundaries of individual disciplines. This can create tension between the existing structures of a company or university, which reflect current core-market or discipline-specific capabilities, and the future investment and resource priorities required to realise the full commercial outcomes of a transformational idea/product.

To facilitate and build scale, depth and focus of its multi-disciplinary capacity UniSA is currently leading the amalgamation of some of its existing research structures, including the formation of a new Future Industry flagship institute which will incorporate research strands from minerals and resources, environmental remediation engineering, bioengineering and nanomedicine, and advanced manufacturing.

The development of a productive research relationship needs to be based on trust and with the appropriate levels of maturity and willingness to engage from both sides. End-users of research must see inherent value in the interaction, and incentives and rewards for researchers much recognise and promote successful end-user engagement.

## **Factors that support the translation of public research into commercial outcomes**

### **A. Research excellence**

UniSA is supportive of a focus on research excellence – high quality research across all disciplines is the primary driver of innovation, end user engagement and tangible outcomes. Excellence is, and must remain, an expected feature of both fundamental and applied research, and should not be comprised in the pursuit of industry-relevant outcomes. It should be noted, however, that different disciplines utilise varying definitions for the assessment of research excellence, i.e. mean citation rates in quality journals may be suitable in the assessment of science-based research, but will not necessarily reflect the quality of creative work. Driving research excellence is critical for the continued growth of Australia’s international reputation in higher education, which in turn, drives the ongoing attraction of a sustainable international student market.

### **B. Targeting research effort**

UniSA supports the targeting of research effort around the emerging areas of national importance. The notion of supporting research priorities which will endeavour to provide solutions for ‘National Grand Challenges’ should be explored.

UniSA is committed to this approach by supporting a thematic based research environment to drive internal cross- and trans-disciplinary collaboration. Whole-of-institution structural changes are currently being implemented to make it easier for researchers to work across boundaries and traditional disciplinary silos. In this context, it is important that the humanities are not alienated from the consultation – there are many opportunities for this discipline to interface with industry. The intersection of the humanities and sciences facilitates a conduit to effectively address ‘Grand Challenges’ and this approach is embraced by UniSA.

The fostering of a collaborative culture, as well as the alignment of reward and incentives, are additional planks to success in this strategy – it is pleasing to see that the Government is

considering how to better align incentives, in particular, with research that leads to industry impact and benefit.

### C. Cooperation between researchers and industry

Many countries have adopted schemes which support programs for intermediaries to facilitate the connections between research and business. The report recognises that these services may be provided by universities, publicly funded research agencies, research infrastructure providers or third parties. UniSA supports the view that these programs are best placed to be delivered by universities, which have the in-depth understanding of their research capability and capacity across areas of industry need.

It is acknowledged in Australia that one of the contributing factors to poor collaboration between universities and industry is the higher proportion of academics working outside of business when compared with other countries. For example sixty per cent of Australian researchers are currently employed by the Higher Education sector, compared with approximately thirty per cent in Germany, Canada and Sweden. While the UK has a similar mix to Australia, it achieves far better results on measures of collaboration and innovation. A contributing factor to this disparity could be the successful operation of the *Knowledge Transfer Partnerships* program in the UK, which is supported by the Technology Transfer Board; a body consisting of an amalgamation of an independent industry board and a government agency. Consideration should be given to exploring the delivery of a similar program in Australia, which allows industry to employ a research graduate in varied scenarios and to gain access to the expertise of the student's supervisor. There is a knowledge gap amongst Australian companies about how a PhD qualified workforce can add value to a business, so it is as important to construct pathways for PhD students to work within an industrial context, as well as encouraging and making it easier for industry to engage more directly with universities.

In examining ways in which research could work better with industry, discussion has often centred on the development of relationships between research organisations with individual SMEs. This is often difficult, because research is a high risk activity that requires often an investment of cash – competing with other calls on company resources. Careful consideration should be given to how universities are currently supported to work with industry sectors as a whole, as opposed to individual, smaller organisation. While the focus of this consultation is centred on the integration of university research activities into industry the reversal of this connectivity is just as imperative - Government incentives/schemes/enablers must also incentivise industry to work with universities.

Currently, the Australian Research Council Linkage Project scheme is an excellent vehicle with which to bolster the commercial return on research – and is one area where the Government might consider increasing funding in support of industry-university collaboration. A successful Linkage project establishes trust between researchers and end-users, and encourages future, non-government sponsored industry engagement in university research, and develops the interest of academic researchers in the challenges faced by industry. The flow-on effects can include PhD supervision and the establishment of a conduit through which PhD graduates can transition from academics to industry, and vice versa. National success rates in the Linkage Project scheme have dropped dramatically from 47.4% in 2009 to 35.9% in 2014. Across the same period, applications to this scheme have remained high (963 in 2009 (two applications rounds were offered in 2009), 785 in 2013 and 698 in 2014) –

two conclusions can be drawn from these figures. Firstly, Australian industries continue to consider this vehicle to be a viable and successful way of engaging with academics to advance industry performance. Secondly, a significant number of opportunities for improving the performance of Australian industries, and realising the full potential of university research to drive this activity, have been lost.

#### **D. Entrepreneurship**

The report outlines the incentives provided in countries such as the US, UK and Sweden, which support start-ups and entrepreneurial risk-taking, including taxation arrangements. UniSA is supportive of providing taxation benefits to encourage more investment in start-up and spin-off companies which emanate from research outcomes. The Government's recent amendments to the Employee Share Option Scheme (ESOP) is commended, however, these incentives could go further to retain our technical talent and expertise in Australia, rather than losing them to companies abroad.

In recognition of the gap in programs which provide capital for start-up initiatives, the Government of South Australia has partnered with UniSA to deliver a new program supporting student start-up activities. The Venture Catalyst program is the only funded program for start-up initiatives in South Australia, and enables students to fast track their venture by providing a much needed cash injection at the early stages, as well as support through mentoring, introductions to key industry partners and temporary office space. Recent strategic partnerships and alliances between UniSA and key industry players such as Hills Limited and Hewlett Packard, have been instrumental in developing students which have industry relevance and increasing user-driven research projects, e.g. prototyping new products for market.

### **Comments on the strategy to increase the translation of research into commercial outcomes**

#### **Creating stronger incentives for research-industry collaboration**

UniSA is supportive of creating stronger incentives for research-industry collaboration. Investment in programs and resources which identify industry requirements and are matched with the appropriate expertise is key to ensuring that the research undertaken is in response to end-user needs. Support for researchers to invest time in building relationships with industry and understanding their needs is vital. It is equally vital that research funding be made available for employing high quality researchers/engineers from the private sector into academia to lead industry engaged projects. Skilled individuals with expertise in project management are an essential ingredient for successful industry engagement – a factor often overlooked when project teams are established. Industry recognises and appreciates such skill sets. Furthermore, diversifying the academic workforce provides an excellent way of introducing new industry relevant expertise within the academic environment, exposing academics to alternative thinking and cultures such as those that exist within the private sector. If implemented, these factors can only lead to enhanced research-industry collaboration

Specific comments regarding each proposed initiative:

- 1) UniSA agrees with this suggestion – there needs to be appropriate recognition for industry experience. It is vital there is a system that encourages and provides pathways for the exchange of individuals between the academy and industry. This will provide greater facilitation of knowledge transfer and innovation. With regards to measures, weightings that demonstrate a track record in the generation of tangible research outcomes for end-users (including a range of metrics beyond number of patents, etc. or the dollar value of an IP license) should be considered.
- 2) Block grant income is pivotal for universities to build and maintain capacity and capability, which in turn contributes to an institution's ability to engage with industry partners. Until the full costs of research are met, block grant income will remain vital in ensuring research priorities can be supported.
- 3) Leveraging collaboration between publically funded research agencies and industry is important, but often industry partners are reluctant to commit large sums of capital in the early stages of a collaborative relationship. One option that might be considered is to provide a series of smaller grants that can be leveraged to create stepping stones towards the development and submissions of larger grants.

Equally as important is the time taken to achieve funding outcomes. A common frustration with industry-linked grant programs is the assessment process itself. The time taken from the initial project scoping and submission of an application, to learning if the application has been successful can be between 12-18 months – a timeline that is not a complementary fit with the timeframes and business imperatives of many potential industry partners.

Many companies that are serious about innovation cannot afford to wait for this length of time as the window of competitive opportunity will pass. Innovation moves quickly and on a global scale. Government support and leverage lowers the barrier to entry for companies to engage with innovation and R&D, however, lengthy timeframes can diminish this opportunity, particularly for the Australian SME-rich economy. It is acknowledged that with tax-payer funds being invested in initiatives, a level of assessment and due diligence needs to be undertaken to ensure funding is being appropriately allocated. However, if Australia wishes to seriously engage in the innovation process and develop our competitiveness in the global arena to start and grow companies, decisions and outcomes need to be made in a timely fashion and with a commitment for funds to flow with a minimum of bureaucracy, wherever possible.

## Supporting research infrastructure

UniSA agrees with the comments in the paper – investment in research infrastructure must align with national priorities. The National Collaborative Research Infrastructure Scheme (NCRIS) supports facilities that are now critical infrastructure for major national research projects that will generate tangible societal improvements. UniSA is a partner in a number of NCRIS programs, including the Australian National Fabrication Facility (ANFF), the Australian National Data Service (ANDS), and the Population Health Research Network, which will generate improvements and efficiencies in our health systems and services. UniSA advocates the Governments continued support of NCRIS, which provides the foundation for the infrastructure required to facilitate the translation of research outcomes. In



addition, areas where infrastructure investments have been made need to be in alignment with the distribution of expertise and capability of the region. A fitting example is the Government's funding provided to Victoria and South Australia to support the realignment of the car manufacturing industry.

### Providing better access to research

UniSA strongly supports the proposal to provide better access to research. Consideration should also be given to include access to 'expertise' within research organisations, rather than just research outcomes.

While UniSA, supports the introduction of incentives for increased rates of commercialisation, consideration should be made not to regulate or mandate university dealings around IP. A one-size-fits-all approach is not recommended and from our experience there needs to be a degree of flexibility afforded to institutions to engage with companies in a manner appropriate for specific negotiations. Metrics applied to measuring success should focus on the number of IP licenses and other agreements (contracts, partnerships and consultancies etc.) with research end-users as a means to demonstrate efficiency and productivity in this endeavor and should not simply be limited to the dollar value of individual IP license agreements or the total value of commercialisation income, which may be skewed as a result of one or two single transactions.

Many universities in their own right are undertaking exercises to map and outline their expertise and capability. Government could play a key role in supporting these exercises and draw from this information. It may be that an online point of access for commercially relevant research for business could be established with the key relevant areas of information captured, including detail regarding the expertise, capability and existing IP. The portal could also be used to market and promote success stories nationally and internationally. Further, Government can play a key role in increasing the linkages across government agencies to facilitate greater engagement with international partners between research and industry.

UniSA supports the release of an IP toolkit to support the above initiatives.

### Increasing industry relevant research training

It is encouraging to see research training prioritised in the discussion paper. As identified, the Australian system provides a sound researcher training experience, but is less effective at systematically developing career and industry skills. And, with just over 3 researchers in business per 1000 workers in Australia, there is also cultural resistance to employing PhD graduates.

UniSA has identified a transformation of the PhD in its strategic action plan, *Crossing the Horizon 2013-2018*. The philosophy behind the Transformed PhD is centred on increasing graduate researchers' capabilities to work collaboratively and productively with end-users, and in multidisciplinary and multi-sectoral research ventures. The Transformed PhD incorporates a coordinated suite of activities and exposures to achieve the:

- integration of end-users into the PhD machinery to assist with scoping research projects, supervision and mentoring;

- development of relevant transferable skills to our knowledge-based enterprise economy;
- particular focus, in science, technology and engineering, on entrepreneurship and innovation; and
- deliberate aggregation of research students into research themes which align to national priorities and global challenges.

The proposed review of research training arrangements should focus on national and sector-based mechanisms that will achieve these outcomes. These mechanisms must optimise and extend targeted national schemes, including Industrial Transformation Training Centres, as well as existing university initiatives. Examples of the latter at UniSA include: embedding Hewlett Packard on-campus to increase the industry capability of undergraduate students (the pipeline to research students); the Industry Partnership Initiative Scheme, designed to support industry employees undertaking PhDs; and the Venture Catalyst Initiative with State Government, aimed at building students' practical entrepreneurship.

### Measurement of outcomes

UniSA welcomes measures to improve the measurement of research outcomes and impact. In developing improvements to the current process, consideration should be given to the following:

- Ensuring that any process leverages information already collected from universities through various government departments, including the Australian Bureau of Statistics;
- It is important to acknowledge that difficulty exists when measuring outcomes and that this further enforces why it is important that existing data collections are used alongside clear objectives and purposeful measures;
- 'Research impact' should be an indicator of success with significant consideration given to how 'research impact' will be measured so as to avoid perception-based measures; 'research impact' should be measured by factual/tangible metrics, as per the current ATSE trial; and
- Case studies are important to highlight achievements, but should not be used as part of a formal assessment process. Rather, they should be used for promotional purposes, both nationally and internationally.

Through refining the measurement of outcomes Australia will experience a fundamental shift away from an outdated outputs model to one that is balanced and focused on relevant outcomes. Academics of the 21<sup>st</sup> century need to live by the mantra of 'patents, publications and products', and view these activities as standard practice within the profession. Such a culture will produce high impact, industry relevant outcomes.

The measures associated with licenses and IP are appropriate, however, it is important to recognise that other measures exist which highlight beneficial collaborations that deliver impact. For example, business innovation is a key area of strength in the Australian economy. This innovation is often triggered through exposure to universities who have distinct expertise which are not necessarily available to industry on a regular basis. Through



these partnerships, organisations are able to increase the viability of their technologies via a unique knowledge exchange.

### Capitalising on the Medical Research Future Fund (MRFF)

UniSA supports the establishment of the Medical Research Future Fund and sees it as an important initiative.

With increasing demand on the health system, it is important that the fund is structured in such a way that it does not become a subsidy for the current NHMRC budget. Consideration should also be given to how funding is allocated from the MRFF, which could be spread across the full spectrum of activity to support research and its translation. For example, funding could be allocated to support:

- Research and development activities in non-medical disciplines with the potential to create new tools for medical research;
- Clinical trials;
- Commercialisation (new spinouts, executive skills); and
- Risk capital to leverage venture capital, angel, and high net worth investment;

in such a way to ensure alignment between basic/fundamental research and its clinical application and path to market.

Value should also be placed upon supporting allied and preventative medical research in addition to patient care, where success in these fields can have a tremendous impact on reducing the number of patients in the health care system and/or significant reductions in the time that patients are in care, and hence generating cost savings in health budgets nationally.