

# ACADEMIA & INDUSTRY

## NEGOTIATING THE CULTURAL DIVIDE

by Chelsea Wallis

In a perfect world, the innovations of Australia would translate seamlessly from insightful ideas to economic success. The expectation, as one EA member put it is that: the research device works, the company makes a fortune, the student gets a job, the academic gets promoted and the university can bask in the glory of it all. Unfortunately, reality

has a way of complicating the alchemy of commercialising ideas – especially when academic and industry stakeholders are inherently incentivised toward different goals.

University culture depends on attracting the brightest students and academics to produce headlining research. Whether it is services-based or product-based, company culture relies on innovations to take

it above the competition and remain relevant in its market. Practitioners are rewarded for delivering commercial success, while academics are promoted on publishing clout. With these fundamentally separate goals come widely different viewpoints and perceptions about how best to work together and what the constraining issues arise from.

Differing perceptions of roles and

“COLLABORATION WITH HIGHER EDUCATION INSTITUTIONS IS AN IMPORTANT SOURCE OF KNOWLEDGE TRANSFER FOR LARGE FIRMS.”

responsibility has enabled a very real cultural barrier. Research has shown academia and industry both see the lack of interaction as an issue while complacently accepting the divide between academia and industry as inevitable. Individuals who transition from a career in one sector to the other reported the move to be difficult and permanent. It appears that neither side holds itself

accountable for breaking down the cultural divide and the Australian government lags far behind other OECD countries in incentivising exchange across the divide.

In an address to the National Press Club in March, chief scientist Prof Ian Chubb pointed to the latest OECD statistics on the level of business collaboration with higher education or public research

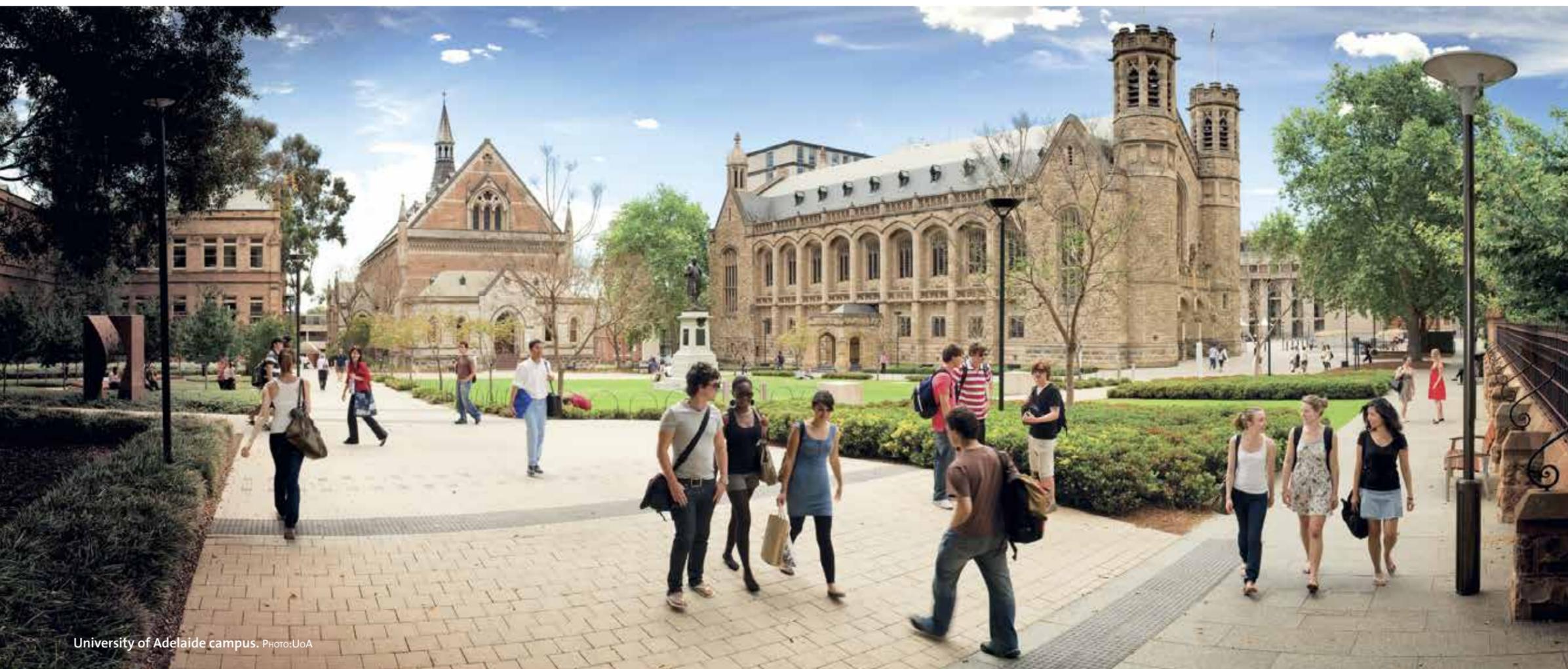
agencies (see p.40). Australia was last of 33 countries. The OECD Science, Technology and Industry Scoreboard 2013 said “collaboration with higher education or public research institutions is mainly an important source of knowledge transfer for large firms. More than half of all innovating large firms in Finland, Slovenia, Austria and Hungary collaborate with these institutions but less than one in 10 in Mexico and Australia do so”.

While the *Australian Innovation System Report 2013* shows the total research sector expenditure on applied research and experimental development has increased five-fold since the early 1990s, the same report said there was “low demand for employing researchers and collaboration with researchers in Australian industry, despite decades of government policies at state and federal levels to encourage more industry-research collaboration”.

Engineers Australia past national president Dr Marlene Kanga AM, who now chairs the federal government’s R&D Incentives Committee, points out that two-thirds of European doctorate students do their thesis in industry, working on problems and issues of interest to the practice of the discipline.

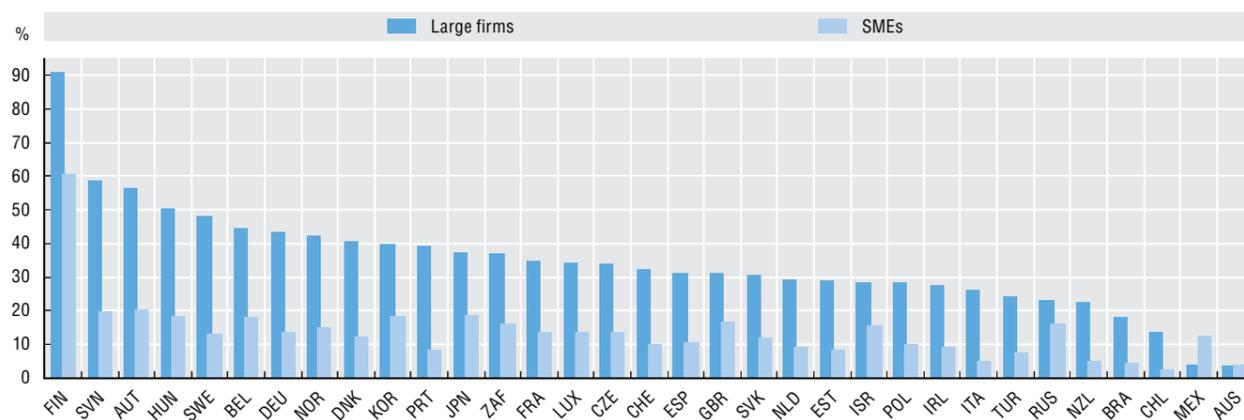
“The commercialisation is almost immediate, so you have a larger number of patents per capita in Europe compared with Australia,” she said.

The conspicuous success of Cochlear and Resmed notwithstanding, Kanga said university spinoff companies, which have used their R&D to form



University of Adelaide campus. Photo:UoA

INDUSTRY BELIEVES TOO MANY ACADEMICS ARE HIGHLY FOCUSED ON PUBLISHING AT THE EXPENSE OF COLLABORATION WITH INDUSTRY.



Countries collaborating on innovation with higher education or public research institutions, by firm size, 2008-2010 (as a percentage of produce and/or process innovative firms in each size category). SOURCE: OECD

commercial enterprises are few and far between – and they never seem to grow big enough.

The issue of poor collaboration between industry and academia has been recognised for a long time, for example in the 2008 *Review of the National Innovation System* by the Australian Department of Industry. However, the solutions adopted overseas do not necessarily apply in Australia because of the diversity of industry here. For example, manufacturing in Australia is dominated by small to medium enterprises (SMEs), which make up more than 90% of firms in the sector, and most do not operate on a global scale.

## VENTURE CAPITAL

The Australian Council of Learned Academies (ACLA) released a report in June, *The role of science, research and technology in lifting Australia's productivity*, which said barriers to growth include high risk and a lack of access to funds, infrastructure, processes and knowledge networks.

"The lack of venture capital in Australia in comparison to other leading OECD countries can cause some start-up companies with innovations to fail or to move overseas," it stated.

It's here that Kanga believes the government could do more. The federal R&D incentive is mainly used by companies in the early stages, she said, but the next

stage is to have some money to commercialise the ideas for the market.

"There is a huge shortage of funds of that kind in Australia. The banks won't give it to you and there are very few venture capital firms available in comparison with places like Silicon Valley," she said.

Government assistance for firms falls in the middle compared with other OECD countries in terms of venture capital investment in 2012, according to the ACLA report.

"The US in comparison provides eight times the level of support that Australia does in terms of percent of gross domestic product (GDP)," the report said.

2011 OECD data showed

Australia came 15th out of 23 countries for venture capital investments as a percentage of GDP. It came 16th of 17 countries for direct government investments in business R&D and for R&D tax incentives.

The federal government has made previous attempts to provide funding through the venture capital committee, which is part of the Innovation Industry Australia Board, but it has suffered cutbacks. Commercialisation Australia also provided small grants from \$500,000 to \$1 million, but it has been closed following the 2014 federal budget. Plans emerged in March for a partnership between the government and Austrade to develop collaborative approaches and attract foreign investment into certain sectors, including medical science and technology, but no further information about a timeframe is available.

## PUBLISH OR PERISH

A key issue is that many people in industry believe that too many academics are highly focused on publishing at the expense of collaboration with industry. Emeritus Professor Robin King has led several projects for the Australian Council of Engineering Deans (ACED) as executive officer. King said that academic promotion in engineering



Emeritus Prof Robin King. PHOTO: UNISA

faculties is still heavily dependent on research capability.

"So long as unis are seeking to move up research-oriented ranking tables, research is bound to be seen by many academics as being the prime focus," he said.

A study in 2005 by The University of Queensland, on the effect of the industry-academia divide on information systems research, saw the

current system of academic reward and career progression as a "serious barrier to research relevance and one which exacerbates the academic-practitioner divide".

The Australasian Society for Engineering Education (A<sup>2</sup>E<sup>2</sup>) president, Assoc Prof Colin Kestell, said the incentive model based upon complicated research performance metrics, the Excellence in Research



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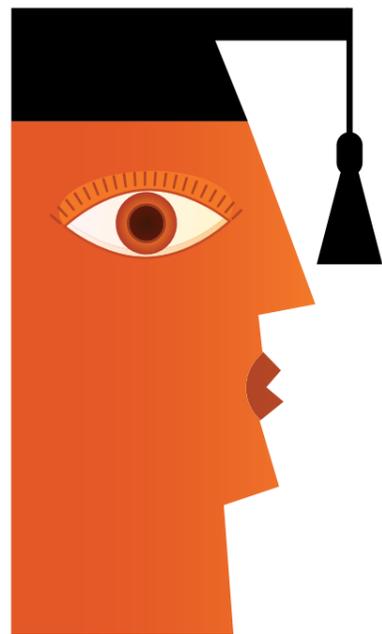


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for Australia (ERA) Initiative, is creating a frenzied response to improving research output. He said this has severe consequences for the university that underperforms in this single aspect of its multi-faceted business.

“The only solution is for the government to completely scrap the ERA and to go back to the drawing board. The replacement needs to be far more holistic, encouraging passion, creativity and world-leading quality in all of the aspects of academia – including research and teaching, as well as industry and community engagement. Success in any one of these areas cannot afford to be at the expense of another, as it currently stands,” he said.



The national president of Engineers Australia, Alex Baitch supports these concerns as there has been a decline in participation of academics in industry based conferences and standards activities as industry linked publications do not receive recognition. Significant change is required.

## INTELLECTUAL PROPERTY

Companies’ expectations around exclusivity to intellectual property (IP) can also complicate academia-industry relationships.

A global case study on successful academia-industry relationships by the European Science-Business Innovation Board found that IP is important, but should not be viewed by either stakeholder as the centrepiece of its relationship.

Instead of the short sighted view of IP as an income source, the study found that universities in particular should be in the business of providing solutions for the economy, which would in turn produce a greater income stream with wider benefits to society.

“The role of IP is over-emphasised. The true value in R&D is often the tacit knowledge it produces,” it stated.

The director of UNSW’s Centre for Sustainable Materials Research and Technology, Veena Sahajwalla, said when industry partners or the university believe something is worthy of patent protection the centre often takes the steps of



Director of UNSW’s Centre for Sustainable Materials Research and Technology Centre, Veena Sahajwalla. Photo: UNSW

lodging a provisional patent with the Patent Cooperation Treaty on behalf of its partners.

“That doesn’t stop us from publishing,” she said. “You just have to make sure you get the order right.”

More importantly, Sahajwalla said, university partners need to have a clear strategy from the onset.

By soliciting the input of partners at regular meetings, they are less likely to get a year into the project and find out it is not producing anything of value to them.

“In the early days, when you’re contemplating industry partners, you need to explicitly say up front that you will need to publish some of the scientific aspects of the work and bring students onto the team,” she said.

But University of Adelaide engineering dean John Beynon said he’s “not precious” about IP because the financial income derived, particularly in the engineering field, is not significant.

“I find companies are not so worried about having exclusive IP as having it now, while other companies get it later,” he explained.

The research is rarely with one company in isolation, he said. For example, a company might be partnered with its supplier, which will also provide the product to competing companies and making it near impossible to police the distribution of IP.

“I don’t propose it to be universal, but there are plenty of circumstances

where the IP issue is overplayed. People get excited sometimes imagining it’s the roots to a fortune,” Beynon said.

## PREPARING STUDENTS

Another perceived issue is that universities do not produce industry-ready candidates. The national president of Engineers Australia, Alex Baitch, said last month that it is not the role of universities to do so. Industry has a responsibility to cooperate with universities to provide academics and the students the opportunities to have practical exposure such that academic has a practical perspective. Rather, it is only through early career stage experiences that an engineer develops from stage one to the stage two competencies required for being Chartered, that the graduate is industry ready.

A recent report by The Australian Council of Engineering Deans (ACED), *Best Practice Guidelines for Effective Industry Engagement in Australian Engineering Degrees*, noted that early exposure of engineering students to industry practice was necessary to increase graduation rates and employability.

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According to the report, “engineering practice is poorly understood by both students and their academic teachers. At many Australian universities there are few academics with recent industry experience. Despite the efforts of many educators, engineering education is largely shaped by a focus on engineering science, rather than applications and practice.

“Consequently, before any substantial exposure to practice, students are expected to learn theory without context or relevance. Many students find this difficult and not highly motivating to their learning. Furthermore this approach does not reinforce the breadth of capabilities necessary for engineering practice, particularly its critical socio-technical dimensions. As a result, students are likely to have misperceptions about engineering practice, and develop professional identities that are inconsistent with practice.”

Not all the onus rests on professors. A number of system stresses were revealed by the study: increasing student to staff ratios, difficulties in making academic appointments at all levels; lower incentives within the system for improving teaching than for developing research; inadequacies in the provision of laboratories; and variable connectivity with industry.

To meet the universities halfway, the study encourages employers to create incentives for employees to engage with higher learning institutions, including inviting academics to visit sites or to provide support to develop teaching materials.

effort. If the results are simply kept by the company, we’re not fulfilling our wider role of advancing the field,” Beynon said.

Today’s universities largely embrace a model of higher education developed more than 100 years ago. According to the European Science-Business Innovation Board, a new vision of universities should include producing a highly skilled workforce for a globally competitive economy.

To accomplish this, the board called on government to ensure a stable environment for funding and regulation for long term partnerships; give universities the autonomy to decide their own strategy for partnerships; and reward proactive collaborations and encourage more to do the same. This allows a platform for universities to increase funding streams, allows industry to have an impact on teaching and learning, and promotes the rethinking of the role of a research university.

Beynon said that the thousands of people universities graduate every year have a far bigger economic impact than the innovations a university turns out in a year. The ideas they bring to their companies are part of that impact.

## HAVE YOUR SAY

The issues associated with this topic are complex and this article only touches on a number of the key points. If you have a strong point of view, please submit a letter to the editor at <letters@engineersmedia.com.au> (200 words maximum) or contact us to suggest a longer Viewpoint article. ■