

Boosting the Commercial Returns from Research

The University of Queensland Response

The Government welcomes the input of the research sector and industry on the aforementioned policy and programme changes, the approach and mechanisms for implementation, and interdependencies where change in one area could affect another.

It is important at the outset to stress that the definition of industry should be broad and inclusive. Universities undertake research across a broad range of disciplines: health & biomedical science; biosciences; engineering and material science; humanities, arts and social & behavioural sciences (HASS); agricultural and food sciences; environmental science; and physical sciences. Technologies and services produced across this diverse range of disciplines are of benefit and commercial value to industry. UniQuest Pty Limited's large scale and global commercialisation of The University of Queensland (UQ)'s Triple P - Positive Parenting Program through Triple P International is an exemplar of the value that social science research can bring to industry for community benefit.

Creating stronger incentives for research-industry collaboration

The Government will identify opportunities to adjust funding mechanisms to provide greater incentives for collaboration between researchers and industry.

To achieve this outcome the Government is seeking input from the research and end-user community on opportunities to:

- *modify rules for competitive research grants to appropriately recognise industry-relevant experience;*

Currently industry partner organisation cash associated with ARC Linkage Projects and Rural Industry Research Council schemes are counted as Category 1 in the Higher Education Research Data Collection (HERDC). UQ strongly recommends that this reporting of research income is extended to CRC project income, and the research income that will be derived from the proposed Industry Growth Centres (IGCs). Both these latter schemes can be categorised as nationally competitive (the primary criteria for Category 1). This initiative will be budget neutral for the Commonwealth, and it will only cause some minor adjustments for the distribution of Block Grants that include the Category 1 income in their formula. There will not be any requirement to change the pool of funding available for the Block Grants. The major benefit of incorporating these schemes into Category 1 will be to

dramatically expand the range of directly industry related research projects that academic staff are more strongly incentivised to become involved with.

- *develop research block grant arrangements that retain a focus on quality and excellence while supporting greater industry and end-user engagement;*

The current Joint Research Engagement (JRE) block grant formula is only slightly modified from the previous formula by removal of Category 1, and only counting Category 2 and 3.

UQ strongly endorses the concept that has been proposed by ATSE, whereby the Excellence in Research for Australia (ERA) assessment includes overtly industry and end-user focused metrics that feed into institutional assessment. As the ATSE proposal points out, this can be achieved by utilising data that is already collected as part of the ERA collection (Category 3 income, and commercialisation income). JRE could then be expanded to incorporate ERA outcomes in allocation of Block funding that is more deliberately aligned with industry engagement performance and research excellence.

- *leverage greater collaboration between publicly funded research agencies and industry;*

It is critical to build bridges and strong partnerships between researchers/entrepreneurs/investors and industry particularly through collaboration with global companies increasingly through their Asia Pacific branches outside Australia. The R&D Tax Incentive and regulatory frameworks in Australia make it attractive to do research and early stage development in Australia. As we can't build indigenous global industries from scratch, this element is the most critical to solve by alternate means (i.e. you can't focus on improved collaboration with local industry if there isn't one and it is difficult to collaborate internationally without help). Promoting and supporting collaborations which address the National research priorities and bring critical mass to a sector is vital. Support for major research consortiums to address initiatives such as the Institute for Dementia Research are welcomed. However, there is a lack of emphasis on such initiatives on the need to collaborate with industry; identify protect and commercialise IP; and the measurement of translation into effective clinical practice. In addition it is critical that any initiatives that are put in place persist over multiple political cycles. The timelines associated with moving innovation from invention to product in the market are very variable but can be as long as 15 years. Constant changes impede innovation and impose a very high administrative and compliance burden, particularly on SMEs.

- *consolidate existing programmes that focus on collaboration with industry to increase their scale and effectiveness;*

The IGCs and the Cooperative Research Centres (CRCs) should operate in a complimentary and over-arching manner alongside the package of incentives available through the Entrepreneurs Infrastructure Program (EIP) and address National research priorities

through collaboration with industry. Industry Growth Centres are earmarked to be self-funding within 4 years and yet the comparable scheme in the UK, the Catapult scheme is funded longitudinally without the need for them to be self-funding. Experience with CRCs demonstrates that an over-emphasis on developing funding streams for a legacy entity detracts from the focus on achieving excellent research outcomes of relevance for industry. This requirement for IGCs will engender significant structural risk from the outset.

Venture capital has been successively funded by the Federal Government with little or no flow-on effect to productivity. Good university-derived technologies are able to find access to global capital when there is an alignment of a protectable IP position, an unmet market need and a willing payer as an end user, executive talent to drive the opportunity, the passion and focus of the inventor coupled with a competent and experienced commercialisation office. Entities such as the Medical Research Commercialisation Fund managed by Brandon Capital have demonstrated the advantages of aggregating a critical mass of quality research outcomes with a highly collaborative and inclusive participation model that is well managed with a culture of success. This model could be extended across other areas of National research priority aligned with the IGCs, CRC's and the EIP.

The US Small Business Innovation Research (SBIR) scheme and the equivalent UK Small Business Research Initiative (SBRI) are exemplars of best practice of incentivising industry-research collaborations which can be commercialised, stimulating innovation and fostering entrepreneurship. *"The Small Business Innovation Research (SBIR) program <http://www.sbir.gov/about/about-sbir> is a highly competitive program that encourages domestic small businesses to engage in Federal Research/Research and Development (R/R&D) that has the potential for commercialization. Through a competitive awards-based program, SBIR enables small businesses to explore their technological potential and provides the incentive to profit from its commercialization. By including qualified small businesses in the nation's R&D arena, high-tech innovation is stimulated and the United States gains entrepreneurial spirit as it meets its specific research and development needs".*

"The UK SBRI <https://sbri.innovateuk.org/> is a well-established process to connect public sector challenges with innovative ideas from industry, supporting companies to generate economic growth and enabling improvement in achieving government objectives. SBRI provides innovative solutions to challenges faced by the public sector, leading to better public services and improved efficiency and effectiveness. It generates new business opportunities for companies, provides small and medium-sized enterprises (SMEs) a route to market for their ideas and bridges the seed funding gap experienced by many early stage companies. It supports economic growth and enables the development of innovative products and services through the public procurement of research and development (R&D)".

Australia should actively pursue adopting a similar scheme. It is critical that any scheme becomes embedded in the innovation process and persists over long timelines.

- *consider whether the R&D Tax Incentive sufficiently encourages collaboration between industry and researchers.*

The R&D Tax Incentive is attractive to potential investors and highly beneficial to those SMEs who take advantage of it but many do not engage with public sector research organisations and rely on internal R&D. SME's who engage with public sector research organisations should be incentivised with a premium rate of the R&D Tax Incentive. A way to encourage industry-research collaboration is to combine this with a voucher system as has been shown to be beneficial albeit at small scale in Victoria and New South Wales. The voucher scheme could provide SME problem-solving funding in a tri-contributory manner between public sector research, industry and Government. The use of the voucher by SME's would then be linked to eligibility for the premium rate of R&D Tax Incentive. The scheme needs to be maintained as a longitudinal program by successive Governments. The overall sum invested in the R&D Tax Incentive (\$2bn) should be maintained but the premium rate for SME's engaging with public sector research could be offset by a reduction in the general rate for R&D Tax Incentive for R&D activities not involving such collaborations.

There should also be more active promotion of the scheme to SMEs such that they target eligible R&D collaborations with public sector researchers.

The recent changes made to the Employee Share Option Scheme in Australia are welcomed. An effective employee tax concession scheme provides an incentive for entrepreneurs investing in start-up companies through the ability to retain work force talent in Australia. Employee's salaries can be made globally competitive when paid in equity rather than just capital.

The patent box initiative will be a welcome addition to the incentives available to encourage R&D collaboration between industry and public sector researchers in Australia.

The UK Enterprise Investment Scheme <http://www.hmrc.gov.uk/eis/> "is designed to help smaller higher-risk trading companies to raise finance by offering a range of tax reliefs to investors who purchase new shares in those companies." Australia could look to emulate such a scheme as it actively encourages angel investing and allows this asset class to be more readily available to support entrepreneurial activity and create jobs.

One of the most critical elements in commercially translating research outcomes to industry is the determining of commercial proof-of-concept. The R&D Tax Incentive is not generally applicable for incentivising proof-of-concept investment by SME's as proof-of-concept is within the domain of public sector research. The only effective funding for this stage of commercial translation is internal funding from the public sector research bodies particularly the larger universities or from the Accelerating Commercialisation part of the EIP. The maximum grant amount is \$250,000 for Commercialisation Offices and Eligible

Partner Entities, and \$1 million for all other applicants. The Accelerating Commercialisation maximum EIP proof-of-concept funding allocation per project – whether the applicant is a Commercialisation Office or not – should be increased from \$1 million to \$2 million as a priority.

Often the Commercialisation Offices and Eligible Partner Entities bring together existing companies and university research but all three parties are unable to find the amount of funding necessary to reduce the risk to the point that the corporate would license or fully fund the R&D going forward. This is a real and frequent need for funding from industry, and should be eligible via the Commercialisation Offices and Eligible Partner Entities rather than needing to form a start-up company as the applicant. This will increasingly be the case with the greater emphasis on university R&D collaborations with industry.

While Accelerating Commercialisation is greatly welcomed by the research sector, the rules should be adjusted to make sure that the technology transfer entities and commercialisation companies of publicly funded research organisation are not disadvantaged because of the criteria to have less than \$20million net revenue to be eligible. Under the current rules, a wholly owned subsidiaries of such a Commercialisation Office is eligible.

An apparent work around to both scenarios above exists but should not be encouraged as a consequence of the programme rules. The work around is to form a start-up company as the applicant for funding from Accelerating Commercialisation. This has downsides including the time and cost burden of corporate administration for what would have otherwise been a project.

Supporting research infrastructure

The Government will take steps to ensure that research infrastructure facilitates increased collaboration between researchers and industry. To achieve this outcome the Government is seeking to:

- *strengthen the existing focus of the NCRIS on outreach to researchers and industry;*

The NCRIS facilities have provided vital research infrastructure that has underpinned research excellence, resulting in world rankings that show many Australian universities punching well above their weight, relative to population and economic resources. UQ applauds the Government's stated intention to develop a roadmap for long term research infrastructure investment, in consultation with the research sector and industry - we look forward to participating in this consultation and ensuring optimal engagement with industry to ensure full utilisation of benefits from the cutting edge research outcomes that are facilitated by this infrastructure.

- *undertake a reassessment of existing research infrastructure provision and requirements, in line with the recommendations of the National Commission of Audit; and*

Welcomed.

- *develop a roadmap for long-term research infrastructure investment, in consultation with the research sector and industry.*

Welcomed.

Providing better access to research

The Government will put in place arrangements to provide industry and other end-users with better access to research. To achieve this outcome the Government is seeking to:

- *strengthen IP guidelines for researchers;*

An investment in IP awareness and commercialisation training across all under-graduate and post-graduate STEM and HASS education would be of significant benefit in developing an earlier recognition amongst researchers as to the value of IP, its protection and its commercial exploitation. The IP and Commercialisation module developed by UniQuest for the Future Research Leaders Program of the Group of Eight universities could readily be adapted for broad under-graduate and post-graduate education.

Uniform guidelines for IP ownership, protection, management and exploitation could be developed initially by the Group of Eight universities for wider dissemination. Industry requests flexibility in IP negotiations. An understanding of different pathways are important when negotiating IP, eg. licencing vs ownership. However, it is also important for industry to understand that in most cases different levels of ownership of IP requires different investment from industry. Therefore any strengthening of IP guidelines should consider this and build the awareness of these principles with industry.

The US has regulated through the Bayh-Dole Act that Federally-funded research should be made readily available to industry from universities through a change in ownership provision away from the Federal Government and favouring universities, non-profit institutions and small businesses.

- *examine the potential to link research funding to the dissemination of IP;*

Impact measures of IP dissemination and reduction to practice by industry could be readily developed and included in the ERA assessment. The UK higher education sector has adopted such a measure based upon commercialisation case studies as part of the Research Excellence Framework (REF) scheme. IP dissemination in the REF scheme constitutes up to 25% of the competitive funding for universities.

Public sector research entities should be rewarded for best-practice IP identification, management and commercialisation and this should be included in the outcome measures used to determine block funding particularly of universities. There is currently no incentive for a university to invest in the relative excellence of its knowledge transfer/commercialisation entity. The UK Government addressed this by Third Stream funding to up-skill the knowledge transfer offices of UK universities.

Poor IP management and the difficulty of negotiating its ownership and commercial exploitation in research-industry collaborations is reinforced when there is no incentive to research entities to adopt best practice IP management and commercialisation.

The emphasis on IP dissemination is often addressed through looking at start-up company formation from research entities. Greater emphasis needs to be placed on the benefits of R&D collaborations with industry where there is an option to licence arrangement in place so that both parties are fully aware of the future arrangements regarding IP ownership, management and exploitation. Such arrangements are routine at UQ in ARC Linkage grants between research and industry. There should be greater use of exemplar case studies of successful IP dissemination through licencing as was the case with UQ's HPV vaccine Gardasil through its commercialisation by UniQuest as an R&D collaboration and licencing option.

It is also worthy to draw attention to IP dissemination through exploitation of university expertise that is accessed by industry through consulting activity. As an exemplar of expertise commercialisation the Business/Higher Education Round Table (B/HERT) Best Collaboration Award for 2014 was for the Sewer Corrosion and Odour Research (SCORE) project of the Australian Water Management Centre at UQ with industry partners: Barwon Water Corp., CH2MHILL, City of the Gold Coast, Curtin University of Technology, Hunter Water Corp., South Australian Water Corp., South East Water Ltd., Sydney Water Corp., The University of New South Wales, The University of Newcastle, The University of Sydney, Veolia Water Australia and New Zealand, Western Australia Water Corporation, Water Research Australia and Melbourne Water Corp. Created from ARC Linkage funding the SCORE project is being commercialised as SeweX, a package of sewer management modelling expertise made available to additional water utilities through a consultancy contract. The SCORE project has led to savings of over \$400m to the international water industry.

The UK experience with Easy Access IP (that has being promoted in Australia) has not been positive as there is no supporting evidence that giving away IP benefits SMEs (John O'Dowd, University of Glasgow, Scottish Tech Transfer Rules are unfit for Independence, Research Fortnight, 3 September 2014). The scheme has been strongly criticised as merely a marketing ploy by a leading UK commercialisation entity, Isis Innovations at the University of Oxford <http://isis-innovation.com/wp-content/uploads/2014/10/Easy-Access-IP.pdf>.

There is no such scheme in the US who are looked upon as best practice with regards to IP dissemination. Recipients of US public research funds are forbidden from giving away resulting IP. Adoption of the scheme may damage a universities prospects of receiving US funding and working with US institutions. Incentivising and rewarding best practice IP dissemination in Australia is a more effective means of ensuring a better outcome for industry, researchers and the broader community.

- *establish an online point of access to commercially-relevant research for business; and*

The EIP Accelerating Commercialisation website will readily serve as a National online point of access to commercially-relevant research for business. Similar online points of access should be promoted within the research sector as satellites of the National online point of access.

Many university relationships with business are opportunistic rather than strategic in nature, and generally relatively small-scale. Their negotiation, governance and conduct are often dispersed across various Faculties and administrative portfolios.

This fragmented approach restricts opportunities for broader engagement and adds administrative costs.

Leading UK universities, such as Imperial College and University College London, are appointing senior officers to provide a strategic and integrated approach to their increasingly important innovation and engagement agenda. Imperial College, for example, has a Vice-President, Innovation and Development as one its 6-person top leadership team. The VP I&D provides oversight and inputs into Imperial College's engagements with global businesses and universities, including its commercialisation arm, consulting company, corporate partnerships program, incubators and research translation campus.

The role is designed to encourage and facilitate Faculty and School entrepreneurialism, and to introduce systems for cohesive customer relationship management that enrich and deepen corporate relationships for the University.

There is much merit in these leading universities' approaches so it is recommended that Australian universities be encouraged to consider a strategic executive role to co-ordinate and manage the breadth of innovation, commercialisation and industry engagement activities.

- *develop a whole-of-government policy to open up access for business and the community to publicly funded research.*

There are three areas that need to be addressed to open up access to business and these are:

1. Awareness

There is a need to improve Universities' ability to build industry's awareness of the research being conducted at each university. Additionally, universities need to build a value proposition and make industry aware of why industry should invest in research provided by universities. Often universities are not considered by industry as the place to source improvements and innovation for their businesses because of their lack of awareness of Universities' value and capabilities. It is often left to commercial organisations such as the Big 4 accounting firms, engineering and management consultants. This is more pronounced in SMEs where often, they have had no contact with universities and have not even thought to do so.

The iconic report by Richard Lambert (2003) outlines in great detail what the core of the problem is: The Lambert Review concluded that the biggest single challenge for knowledge transfer is in boosting the demand for research from non-academic communities, rather in increasing the supply of ideas and services from universities [HM Treasury 2003, p10].

2. Relevance and commerciality

University research and capabilities need to be couched and supported by commercial mechanisms. Industry requires that research is conducted within commercial framework where project management is as important as the research being conducted. This type or mechanism ensures that research is firstly scoped accurately for industry but then is delivered in a commercial manner, eg. within timelines and with an industry's needs in mind.

3. Adoption of the research in industry

Unfortunately, often research outcomes are not utilised by industry after it has paid and received University reports and assistance. This is often as the industry partner does not have the capability to translate the research into their own industry operations. Often the researcher from the university needs to work with industry partner to hasten the adoption within the industry partners' operations but funding for this translation is not available.

Universities require funding, support and training to assist them to respond to these areas of need.

These proposals will be supported by the release of an IP toolkit which will provide guidance to simplify discussions relating to IP between researchers and industry.

The introduction, promotion and provision of training in the use of an IP toolkit would be welcomed.

Increasing industry relevant research training

The Government will take steps to ensure that the research workforce is equipped to work with industry and bring their ideas to market. To achieve this outcome the Government is looking to provide greater opportunities for industry relevant research training, provision of industry and business relevant skills, and recognition of PhD candidates with existing industry experience. These issues will be a focus of a review of research training arrangements which will be informed by consultation with the research sector and industry.

Australian SME's employ very few PhDs and generally do not possess a culture where they seek to solve technology problems through collaborating with academic researchers. A potential solution is to increase support for research-industry internship programs which are problem-solving based. Industry-internship programs should have greater flexibility of duration and should span under-graduate, post-graduate and post-doctoral candidature and look to broaden the experience base of participants. The cost to industry of PhD internships should be eligible expenditure for the R&D Tax Incentive.

At UQ this has been captured under the UQ Advantage program for the development of transferable and professional skills for Higher Degree Research (HDR) students the UQ Career Development Framework aims to provide PhD graduates with relevant skills for a broad range of end-users. During 2014 topics/training included research integrity, communication skills, writing skills, inter-cultural communication. In collaboration with UniQuest, the HDR students were also able to undertake training in critical areas such as intellectual property management and commercialisation. Students also participated in networking events with industry and government representatives. In 2015 the UQ Graduate School will increase its offerings and will include entrepreneurship using the edX MOOC 'Entrepreneurship 101: Who is your customer?'

<http://www.edx.org/course/entrepreneurship-101-customer-mitx-15-390-1x#.VHLEvcY2spE>

The UQ Graduate School position is that development of transferable and professional skills is relevant to students in ALL DISCIPLINES. Although the focus of the Department of Education/Department of Industry paper are disciplines that are commonly associated with manufacturing and other industrial sectors it needs to be recognised that all areas of research have the potential to contribute to business. The UniQuest arrangement of four 'channels to market' illustrates this point and in addition to 'Science', 'Health' and 'Engineering and ICT' clusters there is a 'Social Enterprise' cluster that draws research expertise and innovations from HASS as well as Business and Economics.

Currently, most PhD programmes place limited focus on the skills and training—such as IP and commercialisation awareness, business management and entrepreneurship—that would facilitate later industry employment for researchers with no prior industry

experience. While not appropriate for all PhD students, there is room to do significantly more in this area for those who may not remain in academia.

The Government has an opportunity to reform research training arrangements, including scholarships, to ensure that, in relevant disciplines, universities are producing graduates with business, management, and entrepreneurial skills.

The University of Queensland shares the enthusiasm for internships that is developing across the sector. The UQ Graduate School characterises internships into two types: cognate, in which a student works on an area related to their disciplinary skill, and non-cognate, where a student brings the variety of transferable and professional skills that they have accrued during their PhD to an organisation. During 2013/14 UQ concluded an agreement with 3M to provide internships for PhD students to work in their laboratories overseas. This is an example of a 'cognate' internship since 3M is interested to recruit talent in the areas of Chemistry and Chemical Engineering. UQ also worked with the Queensland State Government to provide 'non-cognate' internships for students work in government departments and agencies on a wide variety of topics. For both of these agreements there was a huge amount of regulations and compliance to be dealt with and it took up a considerable amount of time for staff in the Graduate School, UQ Legal and our private and public sector partners. If internships are to be expanded then the DoE needs to simplify terms and conditions for postgraduate awards and other regulations in order to allow engagement with industry and other partners. The 3M links were initiated by contacts developed by UniQuest and UQ Research Partnerships. This highlights another important consideration in the development of university-industry links – this is best achieved via universities that operate on a large scale and have the capacity and capability to engage. Furthermore, it is important that a key objective is to overcome reservations that industry may have about hiring researchers and PhD trained graduates. However, the interaction needs to be much more sophisticated than merely appointing students to solve problems identified by industry.

The challenges faced by the Universities seeking to develop industry skills for HDR students are the lack of time in the PhD program and a lack of funding for these activities. The UQ Graduate School has been fortunate to receive support and investment from the University but there are limitations. The current aim of its program is to develop transferable and professional skills for all HDR students. An additional aim is to develop more in depth skills for a smaller number of committed students. This will only be possible if the Government again supports fees for specific courses such as the Graduate Certificate in Commercialisation and Technology Transfer. Support for a small number of courses of this type would be helpful.

Fitting the additional skills training into a 3.5 year PhD is an exceptional challenge and it would be extremely helpful if the government were to extend the scholarship to at least 4

years. This would be in line with the UK Doctoral Training Centres that are also incorporating skills development and internships into their programs. Centres of this type in Australia are exemplified by the ARC Industrial Training Centres. It is notable that in the UK Doctoral Training Centres are supported by all research councils that cover the full gamut of research activity (BBSRC & EPSRC, NERC, AHRC and ESSRC) not just the STEM areas. If industry focussed training centres were to be developed it ought to be under the auspices of the ARC and possibly the NHMRC, for Health Sciences.

Increasing the length of time for a PhD and to accommodate development of transferable and professional skills as well as the opportunity for internships may result in fewer scholarships if the RTS/JRE is not increased. It is critical that the Government recognises that high quality translational research and industry interactions goes hand in hand with excellence in basic and strategic research. This means that there is a need to target resources towards a smaller number of high quality providers of research & research training. In the ERA 2012 round there were 12 Universities where a majority of research (at the 2-digit FoR code level) was rated below world-class and these same Universities only had a very small number of research areas that were above world-class (see below) It is questionable whether such universities are suitable places for research training since they are highly unlikely to provide a quality research environment that is so dependent on research excellence. A consideration of distinctive missions for our Universities will be important in this context.

There is a need for greater executive education programs within industry particularly SMEs so that the skill base of R&D is maintained and enhanced. Executive education programs could be provided by the research sector universities to build multi-faceted engagement and collaboration with industry. This would also assist SMEs with access to business model innovation.

The UK's Knowledge Transfer Partnership (KTP) Programme

<http://www.ktp.innovateuk.org/> is an exemplar of research-industry engagement through problem-solving internships.

KTP was launched in 2003, is funded by some 17 public sector organisations, and led by the Technology Strategy Board (TSB), an executive Non-Departmental Public Body reporting to the Department for Business, Innovation and Skills. The KTP programme is managed by the Technology Strategy Board.

Each KTP involves three 'partners':

- a company (this may be a private enterprise, public body or voluntary agency),
- a knowledge base (this may be a university or other higher education institution, research organisation or further education college), and

- an associate (a recently qualified graduate).

The aims of each KTP programme are to facilitate the transfer of knowledge and technology and the spread of technical and business skills to the company, stimulate and enhance business-relevant research and training undertaken by the knowledge base, and enhance the business and specialist skills of a recently qualified graduate.

As a part-government funded programme, a company entering into a KTP programme contributes between 33 and 50 percent of the project cost, with the government contributing the remainder. Average annual project costs are approximately £60,000. This package includes the associate's salary, as well as a travel budget, personal development budget, academic input and expertise, and administrative support.

Measurement of outcomes

The Government will work with the research sector and industry to improve assessment of the research system, including improved metrics on engagement and knowledge transfer with industry, as well as research outcomes and impact.

As stated above, UQ strongly endorses the concept that has been proposed by ATSE, whereby the ERA assessment includes overtly industry and end-user focused metrics that feed into institutional assessment. We also argue that a strong measure of the effectiveness and utility of research undertaken for industry is repeat business. Sustained collaboration with the same company through multiple projects over time is a clear demonstration of relevance and successful industry engagement, and can be easily measured.

UQ recommends a fundamental change being made to the ways by which research academics who engage with industry are rewarded and recognised. Industry engagement should be included as an important criterion for academic research promotion.

Industry engagement could be measured by:

- Generation of protectable intellectual property valued by industry and field-weighted
- Amount of industry-funded research
- Consulting revenue and activity with industry
- Feedback mechanisms from industry partners that validate that the outcomes of the commercial research and consulting provided what industry required
- Supervision of industry-sponsored research-higher degree students
- Participation and promotion of industry internship program
- Joint publications with industry

- Publications in industry relevant trade journals
- Business development activity with industry through presentations and meetings
- Demonstrable improvement in teaching quality informed by industry engagement
- Evidence of research direction and experimental design addressing the proof of concept needs expressed by industry from business development meetings and industry engagement.

Capitalising on the Medical Research Future Fund

The Government will ensure that the new Medical Research Future Fund supports collaboration between researchers and industry and drives the uptake of Australian medical research.

A greater emphasis needs to be made on supporting the efficient translation of medical research into effective clinical practice. The current proportion of support for the NHMRC Development and Partnership Projects grant schemes should be increased with greater emphasis on addressing the stated proof-of-concept needs from industry and tailored to reflect National unmet clinical need research priorities. They should be of longer duration and have greater flexibility in respect of the ability to change milestones. Applications should be assessed by industry and individuals with commercial experience and acumen and not be research academics.

An international exemplar is the UK's over-arching funding approach from the TSB, Wellcome Trust and Medical Research Council of pre-clinical and clinical drug discovery: the Seeding Drug Discovery Initiative. This funds pre-competitive drug discovery and spans the valley of death and creates a pipeline of commercially-attractive drug molecules that can give rise to significant collaborative research activity with industry with greater value-creation and retention. Such a scheme should be adopted within the Medical Research Future Fund. Current schemes within Australia such as the Therapeutics Innovation Australia focus on networking drug discovery and development infrastructure and provide insufficient project funding to take discovery projects forward.