

Submission responding Boosting the Commercial Returns from Research: Discussion Paper

Translation of research comes in many forms. There is no one size fits all for all sectors and all research. The aim is to disseminate research in a way that creates the greatest benefits for the community. For the majority of academic research, commercialisation is not an appropriate pathway. Publications are often the best way to disseminate information relating to:

- Basic research outcomes- stimulating innovation and creativity
- Changing public policy
- Influencing best practice guidelines

Even in the medical/ health sector, only a small proportion of research is appropriate for commercialisation. Contract research is another factor that, whilst still industry engagement, is usually about incremental improvements on another's intellectual property (IP) using the researcher's skills and capabilities rather than translating university research to the marketplace. The two areas require different focuses of industry engagement and should not be treated using the same policies.

Research Excellence

There is a wealth of excellent research emerging from the Universities of Australia. Consistent ARC and NHMRC project based funding has been instrumental to this occurrence. However, focusing on National interests may not always lead to a commercial opportunity.

It is important to note that academics compete nationally for funding but internationally for commercial opportunities. This is especially true for the biotech and medtech industries. When trying to sell the research at my institution I am competing with researchers in Israel and USA etc., not necessarily those from other States in Australia. Both places have access to seed funding for academic projects; developing the research to a later stage before requiring investment opportunities.

In my opinion, we will always be limited in having researchers work in the pharmaceutical industry by the lack of pharmaceutical industry R&D in Australia due to our small market size. Even in the Australian University sector there is a focus is on how to get our research to all markets. When the focus is to the benefit of Australian patients, that can still only occur by engaging international commercialisation partners.

However, this does not preclude a strong biotechnology industry being built here in Australia. The Victorian State Government has shown how many years of consistent funding and support for the biotechnology sector can build up and maintain a strong industry. If only this Victorian model could be achieved Australia-wide. However, policies/assistance need to be implemented and then sustained for longer than just one term of government. If basic research is about 5 years from

reaching a point of proof of scientific concept, where it could even be considered for commercialisation, we are not going to see results from government programs within one term.

Creating stronger incentives for research-industry collaboration

- Items to consider

In general the University system is not conducive to research-industry collaboration. There are a number of reasons for this that will need to be considered for creating stronger incentives for research-industry collaboration.

- Publishing is still, and will always be, an imperative for researchers for internal funding reward structures, grant funding opportunities and translation of research to the wider community.
- Most universities do not have reward structures in place for academic activity that are conducive to research-industry collaboration.
- Structural: Most universities do not have organisational structures in place that can facilitate short-term contracts with industry or tranche-driven research where further opportunities are not taken up by industry
 - e.g. How do you hire specialist staff for 3 months?; what happens if the industry partner decides not to continue- milestones can provide funding uncertainty even if the research is going well.
- Cultural: Academic freedom does not fit with the milestone driven and highly controlled approach of industry
- Time poor-Academics work in ~3 year cycles with no guarantee of further funding. There is an imperative to provide data for further funding opportunities. Salary support depends on grant funding leading to perpetual cycle of publication to increase likelihood of grants as in the absence of grant funding they will have no job. This is an opportunity cost argument.
- Resources: Most universities/MRIs do not have enough resources to provide the proactive aid required for commercialisation of academic research (including proper IP protection strategies).
- Some areas of academic endeavour are just not appropriate for research-industry collaboration.
- University infrastructure: Some universities are research-intensive and some universities are more applied in nature. For research intensive universities there seems to be a “push” of research to the industry partner rather than “pull” that is seen more in applied universities. Engagement with Industry is sometimes not available for academics to understand the problems of specific companies in that industry and rather they tend to work on the problems they think the industry has in general. Therefore end up producing research outcomes that are not relevant to industry.

Specific comments on the Proposals- Opportunities to:

1 Modify rules for competitive research grants to appropriately recognise industry-relevant experience

This is to be encouraged. It may be beneficial to incorporate into this rule change when recognising industry experience that contract research may lead to a lack of journal articles whereas commercialisation of research should only lead to a slight delay in publications. It is a mistake to think that industry does not want publications- they want the technology to be peer-reviewed and have uptake and publications are key to this. Timing is very important to this aspect though.

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

A key concept to think about when arriving at the best incentives in this area is the great difference in time-frames between research and the impact of that research. Often it takes many years to gain the wealth of data for industry to invest in research commercialisation and a decade to realise the impact of research. This will be covered later in the metrics section.

Whilst I am supportive of developing block-grant arrangements to support greater industry engagement, it is important to note that academics are trained to be innovative and cutting edge. Most commercial research is not innovative. The best translational labs have both basic research and translational research occurring side-by-side. The best situation is for an academic to have both basic research plus commercial research being undertaken within their lab but a large lab is required for this to work effectively without negatively impacting on either research program.

3 Leverage greater collaboration between publicly funded research agencies and industry.

Greater collaboration opportunities would be different between the two sections: contract research versus research commercialisation

Contract research:

- Collaboration could be encouraged using greater R&D tax incentives for using university research with slightly lesser R&D tax breaks for companies spending money internally on R&D.
- Greater access to Linkage type grants: NHMRC could provide its own matched linkage grant system. This would be distinct from the Development grant system which should be for University/MRI commercialisation only. That is, NHMRC linkage: facilitate University/MRI contract research with industry; NHMRC Development: facilitate university/MRI commercialisation to provide data to improve industry/investor interest.
- A National database for industry needs may facilitate researchers to focus on actual market needs (market pull) rather than needs they believe the industry has (market push) - although IP protection needs must still be considered.

Research commercialisation: requires access to investors as well as industry.

- Despite the existence of NHMRC development grants, a gap still exists between what is available from the researcher's bench to what data/information is required to encourage investment from industry/investors.
- Moreover, while Australian institutions have been able to access advice on commercialisation pathways there does not seem to be any funding opportunities to implement such advice. All the advice in the world will not help if you cannot implement it. Incentives and programmes that can facilitate gaining of the information/outcomes required (obtained from skilled advice) can lower risk for investors/industry and will help to translate research to the community and boosting commercial returns from research.
- A National early stage innovation fund can provide seed funding for items such as prototype development and preclinical efficacy and toxicity assessment for university/MRI research (without matching funding required).
- Incentive programmes could encourage blue-sky/ innovation investment into institutions by industry. Industry must be encouraged to think in a portfolio approach to research that may or may not pan out.
- A voucher system that is not only available from Australian but also from US/EU contract research organisations- if Australia does not have a model for that particular research area.

4 Consolidate existing programmes that focus on collaboration with industry to increase their scale and effectiveness

The Development grant scheme is a great programme and universities/MRIs can only benefit from more funding to be provided for this scheme- to aid research commercialisation. However, the medical field does also need a version of the ARC Linkage grants for facilitating contract research between institutions and industry. In my experience when researchers can show to industry that they achieve milestones more industry engagement tends to follow (without government co-funding).

The IIF helped many Venture Capital funding opportunities in Australia. However, VC's tend to invest in their areas of skill. Therefore there are only a small number of funds in the biotech/medtech sector. Of those, on average a portfolio of ~ 10 projects exist. Most funds are now closed. At this time there is only one relatively-early stage fund open that I know of, the MRCF that is managed by Brandon Capital. And the MRCF cannot be accessed by all researchers e.g UWA and UQ are not eligible. "Early-stage" is also open to interpretation. More pre-seed type funding is still required to get to the stage where VC's want to invest.

All attempts I have made of trying to get overseas VC's to invest in Australian technologies were balked by the distance. Therefore more VC's or greater funds under management by the current VC's are needed in Australia. This could be accomplished using more IIF incentives. Perhaps the government can provide incentives for overseas high net worth individuals to invest in Australian VC's?

5 Consider whether the R&D tax incentive sufficiently encourages collaboration between industry and researchers

Whilst it is clear that this incentive works for the internal R&D of companies, I do not believe that it encourages engagement with University/MRI research. Perhaps greater tax incentives can be for companies who engage academics for their R&D?

What opportunities does the federal government take to provide this information to overseas companies?

Specific comments on supporting research infrastructure: Develop a roadmap for long-term research infrastructure investment

Long-term research infrastructure investment needs to include a form of seed funding to help lower the risk between research and investment/industry engagement. Due to the lower hurdles and shorter time frames to market most venture capital firms with an interest in the biomedical industry have still continued to focus on the medical device sector; including Commercialisation Australia.

Pre-seed and seed-stage investment programmes (without the need for 1:1 funding from an industry partner) can facilitate risk mitigation and provide the advice and implementation financing to gain the data required to get investors/industry interested in the research. Even Commercialisation Australia required information/technology at a later stage than the university/MRIs can often afford to provide. They also have invested in few pharmaceutical/biotech opportunities.

These types of pre-seed programmes have worked in Israel and Scotland for example to facilitate commercial returns from academic research translation.

Specific comments on: Providing better access to research

1 Strengthening IP guidelines for researchers

I do not believe that this is required. The National Principles clearly outline the policy that publicly funded research should reach the public in the most appropriate way possible. Every opportunity is bespoke. Better dissemination of these Principles can only help but I do not believe decreasing IP flexibility will encourage better access to research/industry engagement.

2 Examine the potential to link research funding to the dissemination of IP

In the case of medical research the cost of funding a product to market is exorbitant. Therefore the only way to translate academic IP is via appropriate protection of IP (patenting) and following the commercialisation pathway. However, the time frames of impact and dissemination of IP are inconsistent with the time frame of provision of research funding. This will once again benefit publication of IP, as this happens much faster than publication via the patenting process or commercialisation, rather than commercialisation/industry contract research. Thereby decreasing commercialisation returns from publicly funded research.

3 Establish an online point of access to commercially-relevant research for business

This is a very difficult system to set up and maintain. Many IP repositories exist and the current consensus is that it has not aided industry engagement/ commercialisation. It is important to ensure that a loss of confidentiality and ability to protect IP in an effort to increase dissemination of research to business and industry does not occur. Otherwise commercialisation and returns from publicly funded research will decrease not increase.

4 Release of an IP toolkit to provide guidance to simplify discussion relating to IP between researchers and industry

I believe that flexibility is key when dealing with industry. The more obligations/restraints placed on industry/institution interactions the harder it will get to engage with industry.

Specific comments on: Increasing industry relevant research training

This will only work if incentives are in place for researchers to provide their time for this aspect rather than publicly funded research (grants). In a resource poor community (time and funding) there must be benefit to researchers for this to occur.

That is, an entrepreneurial culture can only be encouraged if there is no opportunity cost to the researcher. All incentives must integrate together. A lot of thought will need to go into ensuring unintended consequences do not occur – such as a loss of quality to increase quantity, or a loss of confidentiality and ability to protect IP in an effort to increase dissemination of research to business and industry.

Researchers are innovative and cutting edge and commercialisation is boring and routine in comparison. Researchers should be allowed to be researchers but this does not mean entrepreneurship stops because the researcher stays on the technical side of things. More resources to Tech Transfer Offices to provide the expertise to commercialise the academic research is required: to help researchers focus on what they do best. Any business would hire the expert in that area so why not in university/MRI commercialisation also.

Importantly the lack of University/MRI spin offs is not entirely due to a lack of entrepreneurial culture but a lack of pre-seed/seed funding to lower technical risk to a stage where investors/industry will invest/take it on board.

Specific comments on: Measurement of outcomes

Improvement on metrics on engagement and knowledge transfer with industry, research outcomes and impact.

The problem with this is that metrics can often lead to unintended consequences. Metrics need to measure quality interactions rather than quantity of interactions. In an effort to measure industry engagement the number of confidentiality agreements (institution commercialisation) with industry/investors and contract research dollars (contract research) with industry will be a better measure than patent applications or number of invention disclosures (technologies).

Impact can often take a decade to be realised and yet early prognosis of the likelihood of impact may help with determining knowledge transfer success.

It should not be forgotten that publications, public policy change and changes to clinical best practice are also worthwhile knowledge transfer/impact events from publicly funded research that should be counted/lauded.

It is important to discuss Patenting.

While patents are not to be considered the best indicator of industry engagement, in biotech, pharma and medtech they are vital for commercialisation and hence boosting returns from research.

If a patent is not in existence no commercialisation can occur. However, sometimes it takes years to get to the stage of getting industry/investor interest and patent prosecution can be an expensive undertaking. It is crucial that the technology be given the best chance for commercialisation. CSIRO made a lot of money because their patent that outlined the wifi technology was still being prosecuted. If they had let the patent prosecution lapse due to lack of interest at the time they would never have been able to recoup that money through infringement proceedings at a later date. There are many examples of research not making any commercial returns with industry interest coming just after the patent application prosecution had been lapsed. Having that IP available in the public domain will not make industry spend money on further developing it. They need the monopoly a patent provides in order to recoup their development losses. In particular the pharmaceutical industry is not interested in ideas that are not protected. There are also many examples of technologies not taking off until the patent had been granted in at least one jurisdiction (~8 years later).

Therefore, there must be a system in place for institutions to keep the research alive and available for industry interest with ongoing patent prosecution. As patent attorneys are a service provider- this could be one more voucher system that would be beneficial to boosting commercial returns from research. Or perhaps a national patent strategy fund –without requiring matching funding from industry- that assesses research protection (post PCT application), provides advice on jurisdiction strategy and then finances the later stage prosecution into the jurisdictions that have been determined to be necessary; thereby providing the greatest commercial returns from that research.