

Comments on “Boosting the commercial returns from research”

Comment on: “Boosting the commercial returns from research” released for discussion 24/10/14

Note: This Comment is specifically directed at public research generated by universities, in particular by academic researchers.

Summary:

There are major deficiencies in the structure and analysis in this discussion document, and, hence, conclusions on which the proposed solutions are based. This is the case even though some of pertinent contrary facts are cited. These deficiencies lead to failure to identify and focus on the core problems and, thus, offer effective solutions to address them.

We identify the main underlying problems in realising the goals of the document title are a risk-averse and short-term focussed business and investment culture, a highly distorted government funding structure of universities that places low value on translation of research, and lack of understanding of the likely technological revolutions coming ****soon**** by all three power groups (business, government and university managements) that will render obsolete most of the unimaginative tinkering solutions proposed. In short, the current proposals reinforce the second-best Australian loser culture and rob the Clever Country – and its taxpayers – of the opportunity to be clever.

We identify the core problem as structural and attitudinal impediments that hamper researchers in translating their research, particularly for findings with the highest novelty and potential to create high quanta of economic and social value in development of new industries and unique new products and services. A number of mechanisms to directly support and encourage researchers in translating their research – many adapted from effective mechanisms already in place in countries with a strong record of successfully translating high-impact research - are proposed. The major asset that needs to be identified and cultivated is the researcher, not merely the research.

This Comment is structured by, first, providing a Critique of the deficiencies, inconsistencies, inaccuracies and omissions in the document, as a means to driving analysis to the core problems. Suggested Solutions are then offered.

Critique:

1. *The structure of the document is piece-meal. It lacks integration of the various factors outlined into a coherent, self-consistent, view. It's a camel. Such integration would have exposed its multiple inconsistencies and shown that the proposed solutions are unnecessarily complex, often incompatible, and self-serving to current vested interests.*
2. *Although the risk-averse culture of Australian business and industry is acknowledged on p.4 ["Australia ranks second last of 17 OECD countries on new-to-the-world innovation, which is partly attributed to Australian businesses' preferences to instead adopt or modify existing innovations".] its emphasis on universities (via its researchers) building better links with industry and business ignores this fact and its implications for whether this pathway is the most effective to capture the value of the best innovative publicly-funded Australian research.*
3. *Despite the fact that overseas experience demonstrates that the most effective way to translate university-generated research with the most potential to create new industries with large quanta of new value is via start-ups driven by the commitment and enthusiasm of small groups of researchers who have invented and developed it [cf. p.7 "Countries such as the US, the UK and Sweden have more supportive environments for start-ups and entrepreneurial risk-taking..."], mechanisms to encourage and support start-ups and founder inventors are completely missing in the discussion document and its proposals. [Except for a minor note on p.17. of changes to tax rules for employees' share options for eligible start-ups under The Industry Innovation and Competitiveness Agenda.]*
4. *The general gist of the document is in attempting to negotiate the vested interests of the three power groups who have been consulted in framing it – government, business and industry, and universities and other publicly-funded institutions – by variations of push-pull and tax-payer funded incentive mechanisms tried before with limited success. None of these groups generate the innovative research that it is aimed to access for "Boosting the commercial returns from research" – researchers do.*
5. *The statement and conclusion on p.9 that "In 2012, seventy six per cent of publicly funded higher education research was on strategic basic, applied and experimental research versus 24 per cent on pure basic research. This is a result of the conscious investment choices of government, as well as the cumulative results of competitive grant outcomes." are misleading; the statistics are based on self-reporting by*

researcher authors encouraged to respond to questions in such a skewed fashion – and by the limited options of the questions - as part of mandatory annual reporting by universities to ABS.

6. *Statements on p.11 under “Opportunities to assure Australia’s research focus” about developing “research priorities” and “corresponding practical challenges”, “detail(ing) specific research priorities”, “address(ed) [gaps] through targeted investment” implies that these bureaucratic processes have the prescience to reliably envision the future. This approach of merely identifying current “obvious” needs (some extrapolated to predicted higher needs in the future) and prioritising increasingly expensive research to fix them perpetuates the loser mentality noted in 2. above. It also assumes that the future will be broadly similar to today and, thus, proposes mistaken focus on innovation within a narrow spectrum of current industries by largely implementing incremental refinements, i.e. more of the same but merely better. The result is inevitably technical stagnation and eventual oblivion.*

7. *Statements on p.11 also ignore the fact that technological revolutions of the last 150, 50, 30 or even 10 years were not predicted! Disruptive technologies never are. Many of the identified “needs” in 6. simply disappear in a technological revolution, as do whole long-established industries. Other countries that – rightly so – reap the value and economic return of their efforts currently drive this dynamic. The Clever Country can never be clever if it is risk averse and controlled by bureaucrats – in government, universities or business. A compelling and readable explication of this has recently been published (“ZERO TO ONE: NOTES ON START-UPS OR HOW TO BUILD THE FUTURE” by Peter Thiel and Blake Masters).*

8. *The document notes on p.14 instances of university responsiveness to changes of Government policy. Indeed, university managements are currently almost totally focussed on revenue generation. In discussing the ERA the document notes that “Australian universities are highly responsive to incentives, including non-pecuniary ones like institutional prestige. This is illustrated by the large structural changes many Australian universities made in response to the ERA, which influences a small proportion of funding.” This statement is misleading: institutional prestige is highly monetised, being a major factor in recruitment of international students, a large and increasing revenue component of university budgets far outweighing ERA funds. Of greater significance for the current discussion document, however, is that the exclusive focus of measures of research excellence in the ERA process on publication output, especially (contentious measures of) quality, has had predictable negative effects on the value universities place on research translation and commercialization and the staff who do it. Although it is noted elsewhere on p.14 that “Industry experience and past success*

in solving industry problems are not generally part of the metrics of academic excellence.” this link to the impact of the ERA is curiously absent, although it has been widely discussed publicly.

9. *On p.19 statements are offered on apparent reluctance of researchers to translate or commercialize their research. It is suggested that there is a “lack of entrepreneurial culture within research organisations. To encourage Australian researchers to drive and be involved in the commercialisation of their ideas, rewards must be both sufficiently likely and sufficiently lucrative. However, academic career progression is linked to citation/publication rates and grants success. Researchers face an opportunity cost if they spend more time on entrepreneurial activities such as business consulting or developing spin-off companies based on their IP.” This statement is a reasonable assessment of institutional costs to the careers of academic researchers if they attempt to translate or commercialize their research findings but it is arguably an inaccurate statement of researcher’s motivation, which is more often a wish to see social benefit; researchers are rarely motivated by personal financial advantage. It also ignores many other impediments. **For the purposes of achieving the outcomes this discussion document seeks, lack of understanding of researcher motivation and practical impediments are THE major factor limiting translation and commercialization of university research.***

Suggested solutions:

1. *A major focus is required on providing direct support for the Australian university researcher inventor in translating or commercializing their research, especially for findings with the highest novelty and potential to create high quanta of economic and social value in development of new industries and unique new products and services. It is universally recognized that the continued commitment and input from the researcher who generated the ideas and initial results is necessary for successful translation.*
2. *Appropriate support mechanisms and incentives for researchers need to be defined by **direct** consultation with researcher inventors, and should be flexible.* Government does a poor job of consulting with individuals, preferring to deal with “bodies” that were originally set up to represent them but usually morph into lobbying organizations congruent with the political process. University managers see them as potential means for revenue raising. Pre-conceived ideas of what motivates researcher inventors to devote time and effort to translating research need to be set aside; there is no “one-size-fits-all” solution.
3. *Appropriate people and bodies to assist in developing and running new support and funding schemes need to be those with real-life experience in translating research (successfully and unsuccessfully), not bureaucrats with vicarious experience. Preferably, they should include people who have created innovative*

findings themselves to maximize understanding of motivations and needs of truly innovative researcher inventors, as well as international people with appropriate experience. Bodies that might be able to provide appropriate support are ATSE (not directly mentioned but a relevant publication cited on p. 3), CRCs (mentioned on p.12) and RDCs (mentioned on p. 12), in particular the largest, GRDC, which manages ~\$200 million pa.

4. *Needs for researcher support is of several types. The first needs are for up skilling and mentoring. There is a steep learning curve for researcher inventors. A partial list of new skills to be acquired are:*
- (i) dealing with IP and patenting formalities, and publication, as well as appropriate managing of staff and students in a university environment during early-stage/proof-of-concept stages of the research;
 - (ii) writing and delivering proposals, pitches, and presentations for a variety of non-academic audiences;
 - (iii) obtaining independent evaluations of the potential impact and markets for the research, and developing strategy options for how translation and commercialization could best be progressed;
 - (iv) developing networks of academic peers and more experienced researcher-inventor entrepreneurs for support and advice;
 - (v) developing business plans and identifying prospective funders or investors and;
 - (vi) developing other necessary entrepreneurship skills.

In this context it is noted that the capacity, skills and usefulness of relevant university offices (tech transfer; commercialization etc.) are very uneven and for the researcher suffer the disadvantage that they are mandated firstly to serve the interests of the university. It is further noted that the relatively undeveloped status of innovation in Australian industries (i.e. the issue addressed in the document) other than in some biomedical or other biotech applications' area (cited numerous times in the document) means there is a major gap for such support for researchers in many emerging technical fields of high value for the future, including for applications in industries targeted for Australia in this document and in the over-arching **THE INDUSTRY INNOVATION AND COMPETITIVENESS AGENDA** (released 14/10/14).

Also in this context it is noted that this support for skills building and advice needs to be provided in a flexible timely, just-in-time, manner. Researchers don't want or need courses that provide a qualification; they don't have time to take out for lengthy theoretical courses, while maintaining a lab and existing funding, supervising students and fulfilling normal academic duties.

Some of these needs could be met by low-cost Government-funded initiatives for short courses and “*scholarships*” for individual mentoring, administered by a body such as ATSE. It is noted that ATSE administers the highly successful Crawford Fund (<http://www.crawfordfund.org/about/>).

5. *The second major need for researcher support is for translation of findings with the highest novelty and potential to create high quanta of economic and social value. This requires a new, researcher-friendly, government or government-industry (cf. GRDC) scheme for funding early-stage proof-of-concept research to attract the necessary investment to kick-start start-ups. Until this is available many researchers will not bother to attempt translation of this type, i.e. with greater inherent risk but high potential pay-off, as they know they would be doing it “with their hands tied behind their backs” compared with their international colleagues and, thus, have a very high risk of failure.*

No specific suggestions for design of this scheme are made here; there are more than enough international models, and analyses of their success rate and appropriateness for different types and scales of research, freely available. However, it is noted that any such Government-funded grants scheme would need to be properly set up and managed to achieve its aims. Otherwise it will simply be gamed, as for previous schemes, by universities and researchers, who will use see it as just-another revenue-generating pot or supplementary research funding.