

Australia's mixed commercialisation report card

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At the end of last month (August 2007) the Minister for Education, Science, and Training, the Hon Julie Bishop released the National Survey of Research Commercialisation Report covering research commercialisation performance for the years 2003 and 2004. This is the third such report since data collection commenced in 2000.

The AIC applauds this exercise and the data it contains. As Lord Kelvin famously remarked, you cannot improve what you do not measure. The Australian Government deserves congratulations for funding such a measurement of research outcomes, particularly when there is no broad agreement on the types of data that should be collected.

The headline results look good. Over five years:

- invention disclosures increased by 77%
- patents and plant breeder rights issued worldwide increased by 79%
- licences, options and assignments yielding income per year increased by 36%
- start-up companies operational at the end of each year nearly tripled, with the value of institutional equity in start ups increasing by 41%
- commercialisation staff increased by 74%.

We all know about lies, damned lies, and statistics. What are the real trends behind this particular set of statistics?


Timeliness

The AIC understands only too well that collecting and analysing this data is a non trivial exercise, as we were tasked with the job ourselves for the previous report covering the years 2001 and 2002. We learned that it was difficult, costly, and painstaking, and involved reporting into a management committee. Collecting data from the research sector can be like herding cats, and in this case, there was not even a milk bowl to entice them. Just one late addition or correction to data can require hundreds of tables and charts to be recompiled. We were embarrassed when we completed the project with a delay of two months. The usual delays in government process saw *that* official report not released until many months later, in October 2004.

However, it seems that our experiences with the difficulty of the exercise were not passed on, because in spite of decoupling the data collection and data analysis sub-projects to simplify things, and an increased budget, the current report was not released until a full *three years* after the survey year. Even the Australian Bureau of Statistics can do better than that! A three year old data set measuring an innovation system is simply too old to fine tune policy. If we were embarrassed at the time, then we can imagine that those behind this report can only be wondering why they didn't listen to us a little bit more closely.

The metrics

Until now, commercialisation metrics have focussed primarily on duplicating those collected by AUTM (the US-based Association of University Technology Managers), enabling longitudinal international comparisons to be made on commercialisation performance. Those metrics relate principally to formal IP transfer, either into start up companies or through licences to existing business. This year, the inclusion of new metrics encompassing broad collaboration between research organisations (universities, medical research institutes, CRCs, and CSIRO) and the private sector is a welcome advance. The inclusion of data on




research contracts and consultancies can cover knowledge transfer not captured by more formal definitions of intellectual property (IP) such as patents and licensing, and helps correctly reposition commercialisation so it also includes research translation and diffusion. The value of such contracts – approaching \$1 billion - is more than an order of magnitude higher than income from licences, options, and assignments (LOAs), a terrific result, and more representative of the true value chain created by the commercialisation sector.


Including an estimation of sales from technologies licensed adds another broad economic measure that helps capture the real outcomes being delivered by the research community to the economy. Estimates of around \$3-4 billion in annual company revenues, even if it is off the mark, are indicative of the creative power of the research community. While still nowhere near the sales value created by an MIT or Stanford, it is now approximately equal to the annual government research expenditures within the organisations surveyed. The value of equity holdings in start up companies is also approaching \$200 million, indicative of a total market capitalisation of perhaps \$1 billion, also a non trivial result.

Treasury should be happy.

Conclusions




The headline data looks impressive – significant increases in patents, start ups still operational, and licences yielding income. This is testimony to the increasing longevity of commercialisation offices at many research organisations. In our mind, the highlight of these is actually an input measure – the rise in number of invention disclosures from 532 in 2000 to 961 in 2004. The first step in achieving an outcome from research is to recognise the potential of the IP, and that involves completing an invention disclosure form. Perhaps the AIC's Commercialisation Bootcamps are finally achieving enough critical mass to make researchers across Australia aware of the importance of the IP that they create. If a researcher does not take that first step prior to publication, value creation will most likely leak elsewhere and could then be exploited by other parties, probably offshore.



Although the results from the headline data are promising, the inflation-adjusted income received from licenses, options, and assignments halved from \$112 million in 2000 to \$58 million in 2004. Although licence income is important, it is only a fraction of total university income. What is important is that it represents a measure of the value – thus relevance – of research to local industry and so is a measure of industry engagement. The reduction in its value would be less discouraging if research organisations had decided to licence their IP for free (indicating there was still knowledge transfer and industry engagement). However, this is not the case, for the volume of LOAs executed per year also decreased slightly over the same period from 403 to 380.

Less concerning is the drop in the number of start up companies formed, from 46 in 2000 to 24 in 2004, because company formation is always an artificial measure. University commercialisation offices will often 'park' IP in shell companies that are cheap to establish and are simply used to provide an incorporated entity through which they can apply for grant funds.


However, the real concern with the headline numbers is that over the five-year period the investment in public research rose significantly (a good thing!) so that the output per research dollar in LOAs executed each year and start up companies formed each year dropped by half. Even worse, the LOA income per research dollar dropped by a factor of three to stand around 1%, compared with 3.3% for the US. One might argue that this is because US research organisations have been licensing for much longer, except that Australia's ratio stood at 3.5% in 2000! This is a bit misleading because the 2000 result is abnormally high because of the blockbuster result from Melbourne IT in the heady days of 2000. Nonetheless, income per LOAs is very much an output measure and its low level should be of concern, particularly since the resourcing for commercialisation in terms of staff has almost doubled over the same period.



However the cause of low licensing activity should not necessarily be laid at the feet of research organisations. A licence requires an industry partner, and the overall low level of R&D by business in Australia is more the likely culprit. However, because business expenditure on R&D recently exceeded 1% of GDP for the first time, the AIC is hopeful that with continued policy encouragement, LOA income will begin to rise in the future

There is activity among many research organisations to try to improve their interaction with small to medium enterprises in an attempt to increase business levels of innovation. These interactions will now begin to be captured through the much broader measures of research contracts and consultancies discussed earlier, but because these were not included in data prior to 2003, a long term assessment of whether industry engagement is increasing cannot yet be made. Certainly resourcing of the activity has increased.

The fact that patenting activity, licensing income, and invention disclosures are all at less than half of US levels (when measured against research expenditure) is due to a number of factors from which Australia still suffers:

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- Research Culture – a view still exists among a small subset of researchers that engagement with industry and commercialisation is abhorrent, and that free and open knowledge transfer results in the best public good. The problem with this approach is that public good is often served most efficiently by private enterprise. Compounding this, small companies continue to complain that they find many research organisations frustrating, slow, and inefficient to deal with.
 - Industry attention to technological innovation –if there is no local industry, then there are no receptors for licencing. Potential local partners are often not interested in partnering for technological innovation, or fail to see its relevance. Creating start up companies locally is one solution for the research organisation, and of course, industry partners can still be found offshore.
 - Limited funding for proof of concept development – although industry is prepared to pay to develop products or new processes that it can use, there is a funding gap between the research stage (that governments are prepared to fund) and prototype stage (that industry will pay for), called the ‘commercialisation chasm’. Governments are attempting to address this gap with innovation schemes, but there is still a need for a fund which enables research organisations to prove the concept of their research before industry will invest. Such a proof of concept fund has proven its worth in the UK. In the US, government R&D procurement helps to bridge this gap – agencies like NASA, DOD, and DOE pay for development.

The latest report into research commercialisation shows that the right preconditions exist for Australia to reap much better value from its research investment. Skills development remains central, but working with local industry to sustain innovation must be one of the critical roles research organisations play. Continued positive government policy action, increased focus on innovation by industry, use of government procurement to pull through research, and funding for innovation intermediaries and proof of concept development are the necessary prescriptions for greater success. Intermediary organisations like the AIC will be able to play an increasingly important role in improving access and simplifying deal structure for industry receptors, provided sufficient funding is available to bridge the ‘commercialisation chasm’.