Seven Trends and One Big Myth

IN MOST ADVANCED ECONOMIES OF THE WORLD, ENTREPRENEURS, SMALL BUSINESSES, AND INVENTORS ARE IMPORTANT SOURCES OF INNOVATION. UNIVERSITIES CONTRIBUTE TO TECHNOLOGICAL INNOVATION TOO, PLAYING A KEY ROLE IN THE INNOVATION SYSTEM THROUGH KNOWLEDGE PRODUCTION AND KNOWLEDGE TRANSFER TO THE PRIVATE SECTOR.

Inevitably, except for the largest of vertically integrated companies, an essential step in the innovation process – delivering value to a market – requires collaboration for the transfer of knowledge and creation of value.

It has been eight years since the Australian Institute for Commercialisation (AIC) first began its work as a collaboration facilitator and an innovation coach. One core activity has been assisting Australia's smallest companies to benefit from publicly-funded knowledge and research, many for the first time. We have experienced a mixed reception from governments, with only a few visionary political leaders prepared to tackle the market and system failures that have prevented strong commercialisation outcomes from being achieved. Some governments have not even tried, or worse, actively discouraged such commercialisation through their "passive-aggressive" behaviour. Many have looked in the wrong places, lost interest, or have gone back to square one in a vain attempt to reinvent the wheel for themselves, so it is their wheel.

What's happened to innovation over that period? Has commercialisation, the innovation step that results in new business activity, changed? This article looks at the new trends and changes we have observed, and one big myth that continues to persist.

Trend 1 –The VC model of investment in pre-revenue start-up companies is fractured

Consider the official AVCAL statistics. In 2010

Venture capital funds raised a total of $168M of investment capital – this was 10% of total private equity funds raised, and only about 1/3 of its 2007 peak. If a typical start up investment requires (say) $10M in committed funds, this spreads across only a comparatively small number of firms.

Even so, government Innovation Investment Fund (IIF) funding constituted 82% of the total investment capital raised.

Only 9 investments were made in (pre-revenue) seed stage companies ($1.9M)

131 investments were made ($116M) in start-up and early stage companies (those firms that are already selling products, but with negative earnings)

Only the top quartile of VC funds made a positive return over the past two decades, and that return was less than the cost of capital.

Lest one think that Commercialisation Australia, the government's new entity to replace the Commercial Ready program might fill the gap, at the last count there were over 2000 applications for assistance, but only 88 offers of funding (averaging less than $400k each) – a rejection rate of over 95%, similar to that of venture capital.

A result of this trend is that angel investors have become much more important in funding start-up companies, and much better organised at doing so. Small companies need capital to grow, and most consider venture capital a necessary evil. However, alternative models for commercialisation, such as by partnering with a larger organisation that can grow innovations organically, have become more important.

Trend 2 – Transfer of knowledge into existing businesses has become recognised as a 'better' pathway to commercialisation

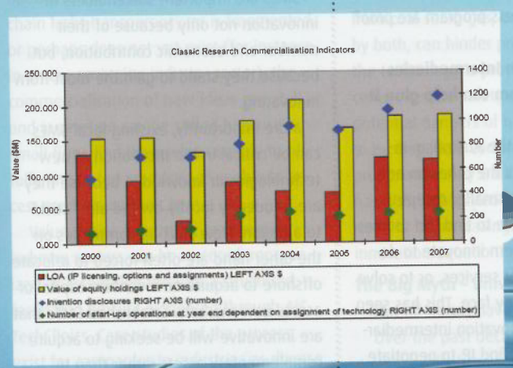
Commercialisation has now become more about knowledge (technology) transfer into existing companies, than it has about creating new ones.

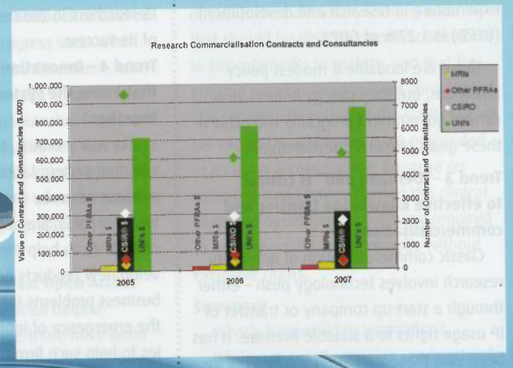
Quite apart from its difficulties in obtaining finance, a start-up company needs to create its delivery capability and its channels to market from scratch. If an existing firm is already successful in its markets, knowledge or technology transfer complements capabilities that already exist, reducing the barriers to commercialisation.

Consider the figure below that shows "classic" research commercialisation performance from universities, either through company start up performance or classic licensing activity:

Invention disclosures have doubled over the period, commensurate with the increase in government funding for research. However, the number of start-up companies from all research institutions has remained relatively static over the period, as has the value of equity holdings, and gross income from licensing, options, and assignments of IP (LOAs). In 2007, LOA income was over $200M. However, there are two "king hits" in here, the first to UQ for Gardasil, the cervical cancer vaccine, and the second to CSIRO for its Wi-Fi standard (CSIRO is already estimated to have netted $250M).

However, this pales into insignificance when the value and number of research contracts and consultancies are considered, shown in the next figure. The income received by all publicly funded research organisations in 2007 was $1.23B across nearly ten thousand consultancies – clearly a far more significant form of knowledge exchange and innovation than the creation of new start-up companies.





The Federal government, recognising this, has a policy ambition to:

double the level of collaboration between Australian businesses, universities, and publicly funded research agencies. Australia languishes near the bottom of the OECD league table on this, currently only 1.6% of SMEs collaborate with universities, and only 3.1% of SMEs collaborate with any higher education institution at all.

achieve a 25% increase in the proportion of businesses engaging in innovation (currently 44.9%)

achieve continued improvement in the number of businesses investing in R&D. In the past year, 7,750 businesses registered for R&D Tax Concession and business expenditure in research and development (BERD) is 1.27% of GDP1.

These are laudable if modest policy ambitions, but the strategy behind how current government programs will achieve these goals remains questionable.

Trend 3 –"Demand pull" is critical to effective knowledge transfer and commercialisation

Classic commercialisation of university research involves technology push – either through a start-up company or transfer of IP usage rights to a suitable licensee. It has been said that "Marketing a university invention is a process of finding the discrete business problem that fits the discrete university solution while overcoming the barriers of:

- limited market knowledge,
- limited contacts,
- early stage of development,
- no patent protection,
- high expectation of inventors, and
- perceived risk of new business ventures"

On the other hand, by starting with firms that either have a problem to solve, or a market opportunity to seize, the research sector, and indeed the entire innovation system (including other SMEs) offers a knowledge source that can be tapped for solutions. While university commercialisation offices attempt to find "buyers" for their own intellectual property (IP), the system really needs to accommodate the wishes of buyers to help them find IP "sellers". The AIC was the first to formalise such collaborative demand-driven knowledge and technology transfer with its TechFast program in 2004. The recent emergence of innovation voucher schemes around Australia, and the Researchers in Business program are proof of its success.

Trend 4 – Innovation Intermediaries that know the system can help glue it together

Like many others, the Australian innovation system lacks the cohesion and markets whereby the smaller receptors, typically SMEs, are able to find the sources of IP that can help them innovate to develop new products or services, or to solve business problems they face. This has seen the emergence of innovation intermediaries to help such firms find IP, to negotiate its transfer, and to absorb and transfer the skills and knowledge into the company's own infrastructure.

In essence, such intermediaries facilitate open innovation and knowledge transfer between industry and the research sector. The AIC's TechFast Model and the InnovationXChange Intermediary Model are both based on this function.

Unfortunately, the model has not proven financially sustainable on its own, because SMEs are generally unwilling to pay to find, access and negotiate knowledge that may not have an economic return (innovation is after all inherently risky). An alternative approach based on taking a success fee, would effectively make the intermediary a banker and payroll the system only for successful innovation. Early government support for both the AIC and IXC intermediary activity has since been displaced by government employees attempting similar activities.

Trend 5 – The SME is now integral to the innovation equation

SMEs had long been overlooked as a direct target for government programs encouraging innovation, with such programs focussing instead on improving the overall business environment. Even now, a number of programs ostensibly devoted to encouraging SME innovation have had to focus on improving operational capability, rather than on innovation.

SMEs are important stakeholders in innovation not only because of their number and economic contribution, but because they stand to gain the most from innovating.

More importantly, existing local SMEs can be critical in the incubation of new technologies or knowledge because they are frequently locally owned and "stick" to a region. New start-up companies on the other hand are often forced to relocate offshore to acquire new venture capital or access new markets. Established SMEs that are innovative will be seeking to acquire complementary assets rather than to establish operations from scratch, and are increasingly becoming an important driver of national innovation.

Dr. Rowan Gilmore
CEO, Australian Institute for Commercialisation

Trend 6 – Value Chains are coming to the fore in innovation policy

The value chain, first popularized by Michael Porter in 1985, refers to a network of activities, connected by linkages that are performed by an organization to design, produce, market, deliver and support its products and services. As corporations have become less vertically integrated, adopted open innovation, and embraced globalization, most value chains today cross organizational boundaries and consist of many firms, loosely linked but interdependent on each other.

Value chains are a useful model to describe how a product or service is developed and ultimately utilized. When a value chain lacks transparency, or is fragmented, or perhaps does not yet exist (for instance, in a new emerging industry sector), the commercialisation of new ideas can stall and innovation can be stifled because small firms find themselves unable to offer fully integrated products, or unable to access markets on their own.

Value chains in existing or emerging industry sectors can be restored, reorganized or assembled through a structured, facilitated process pioneered through AIC TechClinics. Case studies of the process exist for companies in industries as diverse as energy, mining, tourism, and agriculture.

Value chains have long been overlooked by government innovation programs, which usually focus only on the "firm", rather than on where and how the firm fits within a more extended value chain. However, all firms need "complementary assets" to achieve successful market penetration. The AIC expects the value chain to feature more prominently in future innovation policy. If innovation is all about "serendipitous connections" and subsequent collaboration, then TechClinics can help to engineer these.

Trend 7 –The Social Sciences are becoming involved

Innovative solutions are needed to address pressing national problems. Although such solutions will inevitably involve a technological component, the barriers that prevent the innovation reaching the market are frequently non-technological in nature e.g. regulatory delays, lack of standards, ethics, or community acceptance.

Solutions to such national challenges will increasingly involve social scientists rather than just technological scientists and engineers. For example, community concerns over sequestration of CO2 into ground wells, or the disposal of water from coal seam gas, or subsidence caused by both, can hinder progress even when the technology is proven. Elsewhere, concerns over the safety of GM crops, or the potential dangers of nanotechnology need to be dispelled. Community reaction to the proposed Murray Darling River Basin Plan has also highlighted how social scientists need to be increasingly involved in the innovation equation.

The Big Myth – Universal Open Access

Not all trends have been helpful.

Over the past decade there have been growing calls from some quarters to open up to the public all research or intellectual property (IP) developed using public funds. The argument implies that it is lack of access to information and new knowledge, and particularly valuable IP, which holds back greater innovation and prevents many of society's problems from being solved. After all, if Australian taxpayer money has been used to fund research, the public should have free access to the results of this research, right?

Wrong! Apart from the quite erroneous assumption that public value will always be maximised simply by providing easy access at no cost to this research, it also assumes that the "public" in other countries will not use that information for their own commercial gain and end up charging back the Australian public to appreciate the benefits.

So-called "open access" often uses the mantle of "open innovation" as a Trojan horse to don a cloak of respectability. However, open access can block commercialisation as a path to market, because new IP is no longer protected. Commercialisation, like open innovation, involves many complex issues and needs careful unpacking. Most publicly funded research already exists in the public domain by virtue of the fact that most scientists both want to and need to publish. That is the right thing to do, so the frontiers of knowledge continue to advance. But let us not throw the baby out with the bathwater. There is much IP that should be directly commercialised to bring benefits to society, and that frequently requires IP to be kept confidential. The commercialisation of the Gardasil cancer vaccine would never have proceeded in an open access regime, because no company could have afforded the clinical trials and development pathway required to bring the drug to the masses without exclusive rights.

Summary

What's happened to innovation?

While not exactly thriving, and certainly still lacking high level support, industry is taking innovation seriously. SMEs are collaborating, the market is determining the right projects, and value chains to market are being thought through. With others, the AIC is proud to have pioneered these changes. However, the matching of IP to market needs is no longer being served by skilled intermediaries. Can the momentum continue? Time will tell.