

The Australian innovation challenge

AVCAL luncheon address, Melbourne, 24 August 2007¹

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I observe four deeply embedded problems with innovation in Australia. These problems are four challenges we must address if Australia is to have a future. The four challenges go to the heart of the work of everyone in this room. These four problems – or challenges – matter. They matter a lot. In short:

1. Australia has no clear national policy framework for innovation;
2. We suffer from a cargo cult mentality around technology commercialisation;
3. Being delusional (because of [2]), we neglect basic reality checks; and because of all these three problems ...
4. We cannot forge sensible innovation strategies – that is, clever action plans for how we can be successful as a 21st century Australia; the 6th largest national land mass in the world and the only nation continent, but a country that is a marginal national economy in a globalised economy, and shrinking.

1. Australia has no clear national policy framework for innovation.

We have no clear story line about the role of innovation in our contemporary Australian society. This is perhaps not surprising because we have become afraid, very afraid, of talking about industry policy in Australia. The reality is that Australia's approach to innovation is fragmented and partial, and dominated by a science-based paradigm of economic change².

Innovation policy is industry policy. I emphasise that this tag line comes from a crusade I began last year to refresh our thinking about innovation in conjunction with a colleague from the University of Queensland, Mark Dodgson, who earlier this week won the Australia Museum's Eureka Prize for leadership in business innovation. I am very happy that this tag line has been taken up in Kevin Rudd's *Innovation Statement*³, but simply want to point out that I am not merely plagiarising Labor Party thinking, but stressing a point which I have long advocated and which should be part of a bipartisan, *national* consensus on the importance of innovation and industry policy to the future of Australia. ***Innovation policy is industry policy.***

It is deeply ironic that it has become totally unfashionable, or even suspect, to talk about industry policy these days. We are very happy to talk about foreign policy, affordable housing, sound fiscal policy, health policy and so on, but we cringe when the subject of industry policy is raised. This is bizarre. The Reserve Bank functions around reified targets for sustainable levels of inflation – we set a target ceiling of 3% for inflation, we anxiously monitor employment statistics, but we seldom home in on the trade intensity of Australian industry or the R&D and innovation intensity of the Australian economy. Reality check: Australia remains one of the least trade exposed countries in the world (along with the US and Japan, but each of these has a huge domestic market, something Australia does not have). Whilst I have real problems with the focus on OECD comparative metrics measuring country investment in R&D, it is unarguable that Australia's aggregate investment in innovation lags well below that of other OECD countries.

¹ This is an expanded version of my speech notes at an Australian Venture Capital Association function.

² For a perceptive account of Australia's failure to explore or adopt new policy paradigms around innovation see Ian Marsh and Lindy Edwards, *The development of Australia's innovation strategy: can the public sector system assess new policy frameworks?*, Unpublished paper, University of Sydney, August 2006.

³ Australian Labor Party, *New Directions for Innovation, Competitiveness and Productivity*, April 2007

When I state that Australia does not have a coherent policy framework around innovation I am not suggesting that we don't have a lot of activity. There are literally hundreds of industry assistance programmes. But the truth is that we have let a thousand flowers bloom, and unleashed a flood of 'snout in the trough' business welfare schemes, precisely because we have no clear focus on what we really want to achieve. What we lack, unlike smart countries like Ireland, Finland or Chile, is a national consensus on our innovation challenge. We lack an agreed manifesto that could mobilise an effective coalition of government, industry and business, the workforce, and the community. We lack any mobilising consensus around the innovation challenge that could align all our efforts round the pursuit of a sustainable, long term, economic future for Australia and all Australians. The pursuit of good and sustainable outcomes is the enemy of wedge and partisan politics and pork barrelling.

The good news is that I see signs on both sides of politics that we need to have a good stock take. Not surprisingly, this need is perhaps most clearly articulated by the Opposition, and I think we all need to agitate to make sure that innovation policy is not the orphan issue in the current election campaign. It is encouraging that all sides of politics commit to responsible economic policies; it is equally important that all sides of politics should compete on their commitment to innovation and sustainable industry policies.

We accept as unexceptional the role of government in periodically producing White Papers on defence policy and national security, but we lack the equivalent for industry futures and innovation challenges. This is one area where we do not go all the way with the USA. In early 2006 the Augustine report to the US President and Congress - *Rising above the gathering storm* - warned that the US was in danger of losing its competitiveness⁴.

It is the unanimous view of our committee that America today faces a serious and intensifying challenge with regard to its future competitiveness and standard of living. Further, we appear to be on a losing path. We are here today hoping both to elevate the nation's awareness of this developing situation and to propose constructive solutions⁵.

In 2006 the distinguished US think tank, The Brookings Institution, launched its Hamilton Project⁶, invoking the mantle of Alexander Hamilton "who laid the foundation for the modern American economy". The heavy-hitting initiators of this project believe "America's promise is in jeopardy because our nation is neither paying its way nor investing adequately in its future". Most importantly, these frank reality checks are leading to concrete actions.

If the US is alarmed, we should be very frightened. If the US maintains active government support for early stage technology ventures (covering both venture capital and selective government procurement), we should be very attentive to the message they are signalling about systemic market failures⁷. So two modest proposals. I propose that we need:

- (i) A White Paper on the health of Australia's national innovation system
- (ii) A National Reform COAG agenda for innovation within our Federal system, optimising the Commonwealth and State roles in supporting Australian innovation prospects and outcomes within the context of global competition. This is something

⁴ Norman R. Augustine, *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, Washington, 2006. Augustine is the former Chairman and CEO of Lockheed Martin.

⁵ Norman Augustine, Statement to Committee on Science, U.S. House of Representatives, October 20, 2005

⁶ Roger Altman, Peter Orszag, Jason Bordoff and Robert Rubin, *The Hamilton Project: An economic strategy to advance opportunity, prosperity, and growth*, The Brookings Institution, April 2006

⁷ More correctly, this is about the failure for sustainable markets to develop. In general, the problem is that market forces are working and private equity like other investment classes, shows a preference for the lowest risk, highest return, options available. National Science Foundation data from the US shows a consistent downwards trend over several decades for the share of private equity being directed to early stage ventures.

that is being strongly advocated by the Premier of Victoria and it is an agenda that AVCAL and all of us, I believe, should get behind.

2. We have a cargo cult mentality around technology commercialisation.

With innovation we appear to be little better than Pacific Islanders with their cargo cults.

Cargo cults have a long history in the Melanesian islands but they became particularly prevalent in the period after the Second World War. The essence of the cargo cult was that, having observed large quantities of cargo arriving in the Islands on American planes and British planes, and having observed the huge differences in living standards between the indigenous islanders and that implied by the arrival of cargo on these planes, a set of cults developed around the notion that if you simply mimicked or reproduced the objects that were associated with the arrival of the cargo then you could get the cargo delivered. If you Google "cargo cults" you will find images of very finely constructed raffia aeroplanes, but the cult went to much greater lengths than that. There were raffia air runways, carved head sets, control towers and so on. Of course the cargo never arrived⁸.

I owe this reminder about cargo cults to Professor Alan Hughes, the Margaret Thatcher Professor of Innovation at Cambridge University. When Professor Hughes was in Australia last year he talked about the danger of cargo cultism in the way we concentrate on a science-push model of innovation and the commercialisation of technology. In particular, he challenged the way a lot of Australian innovation policy is based on a misleading reading of a 'US' model of superior productivity and GDP growth based on:

- High-tech producing sectors as key drivers (ICT, biotechnology etc)
- New firm entry, especially spin-offs and new firm commercialisation from the science base
- Universities as key drivers of growth and productivity
- Private sector venture capital funding for new firm start ups and spin-offs based on greater private sector willingness to take risks

Professor Hughes points out that all of these presumptions are overstated or incorrect. The realities in the US are that:

1. US productivity and growth performance is not based on high tech production *per se*; it's based on the diffusion of technology throughout the system and the transformation of what people would regard as low tech sectors by general purpose high technology. It's about WalMart, not Microsoft.
2. Productivity gains are in general driven by what you do with existing firms, so thinking about existing firms and their innovation performance is critically important in the innovation process, rather than just looking at start ups.
3. Public sector procurement has a very powerful part to play, particularly in supporting innovative start-up firms.
4. Universities have to be seen as part of a complex system - there's no one single or simple role they play and it's a very complex system in which their direct contribution is relatively small compared to other components in the innovation

⁸ Alan Hughes, "Optimal innovation systems: Lesson from the UK and the USA", in T. Cutler and M. Dodgson (eds), "Innovation Leadership Forum: Meeting the Challenges - Developing an Innovation Action Agenda, Summary of Proceedings from the Melbourne Forum, 6 December 2006 ", *Innovation: Management, policy and practice*, Vol. 8, 2006

system. What businesses really value is the universities' role in providing public spaces for knowledge exchange.

5. Diversity in the university sector is important and should be promoted.

For far too long we have been obsessed in Australia with a technology push model of R&D and technology commercialisation. We have overemphasised the role of spin out companies formed around raw intellectual property, and largely ignored demand-side pull through.

We also need to remind ourselves that successful ventures – new or existing – are those firms that address real world problems, solving problems that end-users experience. What are the firms that survived the technology crash after 2000? The survivors and today's iconic firms are those that really resonate with consumers, such as:

- Google: addressing information search and discovery needs;
- eBay: addressing the long tail of niche markets for disposable second hand goods;
- Amazon: addressing the long tail of niche markets for first, books, and then general consumables; and
- Microsoft: for addressing the basic user need for user-friendly work tools (for writing, presentation, and data manipulation).

3. We need some basic reality checks.

Questioning the cargo cult around technology commercialisation is, as I have argued, one important reality check. Another is to remind ourselves that Australia is a small, marginal economy in a huge, globalised economy dominated by the triad axis of North America, North Asia and the European Union.

I chair a Co-operative Research Centre. Our CRC's international Scientific Advisory Group provides us with a good reality check on where we fit in the international scene. The question they keep asking us is "What are the distinctive research questions posed in the Australian environment?" This is a good question to ask more generally. What can Australia be really good at?

As a nation we have structural challenges and disadvantages, compared to competing economies globally. We are a minnows compared with the dominant global players of North America, North Asia and Europe. This is reflected in our industry landscape that is largely populated by SMEs. It is ironic that SMEs as well as the services sector – representing some 80% of the economy – are largely unrepresented in national forums about innovation⁹.

It is useful to keep reminding ourselves that we are a 2% country, a SME-like economy¹⁰ engaged in a David and Goliath like struggle for global market share. In such a situation I am always reminded of the ancient Chinese strategic wisdom that one's competitor's competitors are our friends and allies. Our natural allies in the global competition we face are the other 2% countries. The 2% club of small country economies share common challenges and threats around innovation and economic change. In my view this should become the thrust for a next generation Cairns Group¹¹ of countries. The common challenge is how to craft sensible innovation strategies and clever action plans for a small country economy in an unforgiving global economy where the dominant players will always try to shape the rules of

⁹ This point is well made in Marsh and Edwards' survey of consultative processes around innovation policy, *op cit*.

¹⁰ This suggestive and useful analogy is drawn from Sally Davenport and David Bibby, "Rethinking a national Innovation System: The Small Country as 'SME'", *Technology Analysis and Strategic Management*, Vol. 11, No 3, 1999

¹¹ The Cairns Group of nations represents the 'free trade' interests of agricultural producing nations disadvantaged by protectionist and subsidised country markets.

engagement. Common interests might include alternative intellectual property regimes, innovation exchanges, a united front in international forums like the WTO and WIPO, research collaborations, regulatory harmonisation and the preferential mutual recognition of credentials and qualifications.

4. We need sensible innovation strategies and clever action plans for how we can be successful in a 21st century Australia.

We might be the 6th largest national land mass in the world, but the reality is that we are a marginal 2% national economy in a globalised economy, and our market share and relevance is shrinking further as we sit on the sidelines and watch the emergence of the BRIC economies of Brazil, Russia, India and China. So what might be smart innovation strategies for Australia, and where would I be focusing my attention if I were a member of AVCAL?

My modest proposal is that it makes sense for a small country like Australia to play to established strengths or distinctive local circumstances. My recipe for Australian innovation priorities would focus on three areas: first, leveraging Australia's natural or built strengths; secondly, looking to areas where there might be a distinctively Australian angle around developing solutions to globally relevant challenges or markets; and, thirdly, a selective focus on those existing industries facing new import competition and where – *and only where* – innovative action or new technologies could reinvent these industries and promise sustainable competitiveness.

Natural or built strengths

My first category for focus is on areas of distinct Australian endowment off which we have captured, or could capture, significant global market share. Candidates include:

- ***Resources industries (especially minerals, including uranium)***
- ***Agriculture***

Both of these sectors rely on advanced technology, and have fuelled extensive technology based support services. These are markets where Australia has significant global market share. The biggest and most controversial debate for the future will be over how Australia benefits best from its huge uranium deposits.

- ***The environment***

Climate change has focussed new attention on environmental technologies and on innovation around remediation as well as adaptation to global warming. Global warming compounds other Australian challenges, like salinity, fire and water. Because of its size and the geographical diversity Australia represents an excellent development market for new technologies to address environmental challenges. Domestically these represent “public good” imperatives, but addressing these challenges in the national interest opens up significant global export possibilities.

- ***Health***

Every country has a natural interest in ensuring the availability of leading edge health capabilities and expertise for its citizens. For example, Australia established the Commonwealth Serum Laboratories in 1916 to assure the local and reliable supply of vaccines, but grew to support a major export capability. Today there are three new reasons why health and health services should be in the mainstream innovation spotlight:

1. An aging and longer living population is putting strains on the health system and government budgets;
2. The rise of chronic problems like obesity and diabetes; and
3. The growing internationalisation of health services.

- **Education**

Like health, education is now an internationally traded service, and one where Australia has captured significant market share in undergraduate higher education. As developing countries, however, invest more and more in educational infrastructure, this market will become much more competitive. The challenge will be how to differentiate and focus Australian offerings, and to invest in increasing the standing of the Australian product.

- **Sport**

Sport is one of the key activities that puts Australia on the global map. It is something deeply engrained in our culture¹² but, unlike tourism, there have been few moves to think about sport as an industry and to leverage the high levels of innovation in event management, sports science, or sports media into marketable exports.

- **Space and radio physics**

Australia is a major global player in space research, based on the simple natural advantage of lots of empty spaces with little radio interference, and our location in the southern hemisphere. History has shown that Australia's expertise in radio physics has major downstream benefits. A classic example is the technology transfer to terrestrial telecommunications, the source of Australia's generic patents in the standards for wireless technology which CSIRO is currently asserting vigorously in the US courts.

- **Marine industries**

Australia is surrounded by oceans, and has unique marine environments which make Australia a location of choice for marine researchers. Australia has become a world leader in ocean forecasting, and there is huge opportunity for Australia from potential marine industries.

- **Antarctica**

Antarctica, like oceans, is one of the last research frontiers. Australia has both proximity to this landmass, and ownership claims over significant territory.

Innovation with a distinctively Australian flavour

My second proposed point of focus is about looking to areas where there might be a distinctively Australian angle around the development of solutions to globally relevant challenges or markets. Candidate areas for examination might include:

- Solutions for low density and sparsity challenges.

¹² See Geoffrey Blainey, *A Shorter History of Australia*, William Heinemann, Melbourne, 1994, Chapter 9.

Australia is one of the lowest density countries in the world, and this gives rise to opportunities from problems where isolation focuses the mind on distinctive local solutions with potential global applicability. Historical examples include the Flying Doctor service, school of the air, solar power for powering remote services, and innovative land management systems and the use of spatial data.

- Solutions for the tyranny of distance (shaping sectors like transport, logistics, and communications)
- Suburbanisation as a distinct civic model in a rapidly urbanising world. Apart from Los Angeles, Australian cities represent the leading examples of suburbanisation. This has implications for our competitiveness in architecture, urban planning, platforms for social networking, and construction technologies.
- Distributed activity environments and effective team work in multi-player environments. Australia could represent an attractive environment for the development of new collaboration platforms and tools.
- Systems integration and the management of complex systems. Today's business systems are complex systems, and Australia has a track record in the smart systems integration of technology components for innovative applications and the adaptation of imported technologies for local uses.
- Trade in inward innovation investment. This is the challenge of how best to drive value off the 98% of offshore innovation and R&D from the rest of the world.

Reinventing the competitiveness of threatened existing industries.

A third category of innovation priorities would be the scanning of world-wide developments for their potential to be applied within local industries and the potential for new technology developments to reinvigorate and restore competitiveness to existing industries which might otherwise be under threat.

A good example is nanotechnology. Australia is unlikely to be a global leader in nanotechnology development, except in some niche areas, but could pioneer applications within challenged areas of our manufacturing sector, and in health and environmental services. A high potential area for focus is the deployment of sensor networks (which would leverage and entrench capabilities in systems integration).

Some will say that these three suggested areas of priority for innovation policy ignore the opportunity for innovation across the board through incremental improvements. This should be a natural predisposition in all spheres of activity but, some would contend, should be seen as a by-product of innovation strategies and action initiatives rather than a point of policy focus in its own right. Nonetheless, the diffusion of technology and innovation is probably the most neglected aspect in reviews of Australia's national innovation system. The take up and adaptation of innovation within user environments is where and how innovation establishes its impact on competitiveness and economic development.

In conclusion, let me reiterate my three main messages about Australia's innovation challenge:

1. A well-thought out government White Paper on innovation priorities would help focus and mobilise our collective Australian effort;
2. We should abandon our cargo cultism about innovation and take regular reality checks; and

3. Let's focus on strategies for sustainable global competitiveness, bearing in mind that a bit player like Australia can't win at everything. But we can win big in a few areas where we have natural advantages. We ignore these to our peril. And, competing within an unforgiving global environment, we should think carefully about who are our natural allies. These are likely to be similarly placed countries.