‘In Pursuit of an Innovation Renaissance’

*by*

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*for*

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**Introduction**

We are faced with a major conundrum in Australia. Recent surveys show a strong recognition of the importance of innovation and collaboration:

* More than 80% of Australian business leaders believe innovation is key to a competitive economy and improved productivity;
* 92% of these business leaders also believe their firm would be more successful at innovation through engaging in collaboration;
* Furthermore, Australian businesses that engage in collaborative innovation with research organisations report a 2.5 fold increase in productivity.

But, despite the apparent strength of these views, ABS data shows that only 4.5% of innovative Australian companies (ie those companies that self-identify themselves as innovative) collaborate with research organisations.

How can this apparent enormous distance between awareness and action be explained?

**The State of the Australian Innovation System**

A review of a range of indicators of the health of the national innovation system provides few indications of substantial improvement.

Gross Expenditure on R&D, as a proportion of GDP, is in steady decline, as is the Government Budget Appropriation for R&D:

GERD as a % of GDP

Government Budget Appropriation for R&D

A metric of particular concern is the proportion of R&D performed in universities that is funded by industry. These data show that the contribution of Australian industry is only 4.73% is only 2/3 of the OECD average (6.87%) , and almost four times lower than that for the top 5 OECD nations (16.80%). This ranks Australia as 16th out of 30 countries.

When it comes to business performance, a series of indices reveal that Australia is very much a ‘second division’ country, struggling to stay in the ‘top twenty’:

Key Indicators of Business Performance

|  |  |
| --- | --- |
| **Index** | **Ranking** |
| Global Innovation Index | 17th |
| Global Competitiveness Index (WEF) | 22nd |
| Overall Competitiveness (IMD) | 18th |
| Capacity for Innovation | 27th |
| Technology Readiness | 19th |
| Business Sophistication | 27th |
| Global Connectedness Ranking | 32nd |
| Doing Business (World Bank) | 13th |

Of particular concern is the performance of the Professional, Scientific and Technical Sector, which might be expected to be based on a great deal of technological innovation, and which is the second largest industry sector performer of R&D, at 4% of industry gross value added. In the year 2014-15, this GVA declined by 4.8%, and the multi-factor productivity declined by 5%. These are signs of an industry sector in serious decline.

**Initiatives to Address the Weaknesses in our Innovation System**

Much has been written about the inadequacies of our research organisations in commercialising their ideas and engaging with industry, particularly in Government inquiries and submissions to them. The familiar list of issues includes over-valuation of IP, slowness in decision-making, and lack of understanding of business challenges and processes. The concerns are undoubtedly justified. However there is evidence of significant shifts in at least some universities to radically enhance their industry engagement. [[1]](#footnote-1)

But we can make only limited progress by pushing string up hill. The missing ingredient is demand from industry for the knowledge that researchers produce. The structure of our economy, dominated as it is by an oligopoly of banks, miners and supermarkets does not produce the drive for innovation found in smart manufacturing, biomedicine and information technology. The appropriate companies for researchers in Australia to collaborate with ar , more often than not, overseas based.

In this context, what can be done?

***Bring scale to the Innovation infrastructure***

There is a fundamental problem of achieving necessary scale in the Australian Innovation Infrastructure. Despite our proud record of economic and population growth, we remain a relatively small country in terms of GDP and in particular population.

What is the record of small countries achieving global economic competitiveness? The economy of Switzerland, ranked 20th by GDP and with a population of 8 million, but with a very high national income per person, is concentrated in pharmaceuticals, chemicals, watches, precision instruments, tourism, and banking and insurance.

Luxembourg, an even smaller country with a population of less than 1 million and 100th by GDP size, has a remarkable leading position in banking and financial services, information technology, telecommunications, cargo transportation, food processing, chemicals, metal products and engineering. It has positioned itself as a leading player in a future space mining industry.

[In contrast, the Australian economy, ranked 12th by GDP is spread across the ‘old’ industrial sectors of mining](https://en.wikipedia.org/wiki/Mining), industrial and transportation equipment, [food processing](https://en.wikipedia.org/wiki/Food_processing), [chemicals](https://en.wikipedia.org/wiki/Chemicals), and [steel](https://en.wikipedia.org/wiki/Steel). More profoundly, we have succumbed to the narrow economist’s belief of an effectively operating market, with its requirements of freely available information, on which basis companies will make appropriate investments to pursue opportunities. The limitations of small economies render these assumptions heroic. But any consideration of a focus of our limited resources is met with a shrill accusation of ‘picking winners’.[[2]](#footnote-2)

The historical consequence has been a growth in mining and agriculture, where comparative advantage is strong. But apart from the all too familiar handful of high performing companies, we have grown remarkably few new industry sectors based on the creation of local competitive advantage.

This inadequacy of scale is reflected in patterns of limited, in both value and length of time, government investment in key innovation infrastructure. Consider just three examples:

* The Cooperative Research Centre Program - twenty years of investment in and almost continuous review of the CRC Program has shown a very strong flow of resulting benefits, estimated at a 300% rate of return to the nation from the government investment. But funding to the program has been repeatedly cut to a level of just $146.7 M for 2015-16. To have the required impact in enhancing research-industry engagement, the investment needs to be increased by a factor of three.
* The National Innovation and Science Agenda includes, among its many components, includes an initiative to establish a Business Research and Innovation Initiative. This follows a decade-long series of reports that the US Small Business Innovation Research Program provided an excellent model for ensuring that government programs provided a catalyst for broad-ranging innovation. But the tentative Australian scheme is funded only to the tune of $19m – an extremely tentative toe in the water almost certainly designed to fail.
* The University system continues to operate largely in 38 distinct silos, each university pursuing its objectives in competition with al others. In contrast, the European innovation infrastructure has been developed on a strongly cross-institutional and –national basis. Could we see initiatives whereby the metropolitan universities united to provide a common interface to industry? Or could the existing coalitions of universities, such as Go8 or ATN, provide a standard engagement process?

***Invest in Collaboration and Engagement***

In the context of the deliberations of the Academy of Technology and Engineering’s Industry and Innovation Forum, I have noted:

“Australia has evolved entrenched structures, systems and practices that confine businesses and research organisations to largely separate camps with limited interaction. This separation is sustained by largely negative reinforcements:

Firms  perceive  universities  and  research  organisations  as  unworldly,  preoccupied  with  publications,  out  of  touch  with  business  reality,  unwilling  to  understand  commercial  pressures, too slow and bureaucratic in executing commercial contracts, and expecting too great a return from their specialist knowledge;  researchers perceive firms as excessively focussed on the short‐term, unwilling to shift their  focus  from  current  problems  to  future  opportunities,  limited  in their understanding  of  technical language and difficult to negotiate with for a fair price.

However, there are exceptions  - major companies that invest seriously in innovation and research, SMEs that are driven by exploiting technology‐based opportunities, newer industry sectors that rely  on close interaction with research (e.g. medical devices), and researchers who are closely connected with companies. What is missing is not good practice, but scale.”

 As a contributor to the ACOLA SAF09 project on ‘Translating Research for Economic and Social Benefit’, I identified, on the basis of a detailed survey of European policies, the key features of best practice for promoting collaborative innovation:

**“**The European Innovation Leaders (Sweden, Denmark, Germany, Finland), through substantially comparable approaches, but each with a reflection of the particular socio-economic and political structure, and history of their nation, provide a clear and powerful exemplar of STI ecosystems that effectively support the translation of research into economic and social benefits.

The common features would appear to be:

* A widespread understanding of and commitment to, throughout all layers of the society and the economy, the knowledge economy as the central framework in which competitiveness, future wealth and employment will be generated; material and energy resources are important, but they do not provide a sustainable basis for a competitive national economy in this global era;
* A recognition that building competitive strengths in the global knowledge economy requires a sustained, long term commitment, with space and appetite for substantial evolution as new lessons are learned and new conditions encountered;
* A consequent bi- or multi-partisan approach on the part of successive governments; these matters are far too important to be the subject of political conflict;
* A commitment to high levels of investment in R&D and innovation, with stretch targets being continuously applied;
* A comprehension of the notion of innovation systems, where interactions between the elements are more important and produce far more value than do the individual components, as important as they are;
* As a consequence, these European Innovation Leaders show a high performance across **all** key dimensions of their innovation system - the enablers (or framework conditions), firm activities and innovation output;
* Explicit targeting of most of their research towards competitiveness and environmental and social challenges, while basic research is required to operate within a highly selective excellence framework;
* A substantial, at times equivalent, commitment to the long-term facilitation, through multiple mechanisms, of deep linkages between knowledge generation and knowledge application; this includes mechanisms to influence the attitudes, practices and competences of research institutions and industry, and the development of powerful and effective intermediary organisations;
* Investment in strategic public-private partnerships for innovation designed to harvest broader economic and social benefits from investments in public research, and to connect science to innovation in order to address Grand Global Challenges;
* A perspective that positioning to address major social challenges, will not only be a means of safeguarding their society but also will generate a capacity upon which future economic advantage can be constructed.
* A significant investment in the development of appropriate metrics and evaluation processes, so that performance can be assessed, and to provide an appropriate basis for the application of continuous learning and improvement to the innovation system architecture and instruments.”

**Conclusion**

The focus and objectives of the National Innovation and Science Agenda are to be commended. Moreover there appears to be a steady but progressive roll-out of many of the sub-programs. But, at a time when billions of dollars are being invested in new physical infrastructure in the traditional categories of roads, railways and ports, and also in the National Broadband Network, the commitment to our innovation infrastructure is modest at best. The vision of an innovative nation cannot be pursued at the margins – it needs to become the centrepiece of economic policy.

1. This is the subject of another forthcoming paper. [↑](#footnote-ref-1)
2. It is more than 30 years since I demonstrated the limitations of this concept (R.A. Joseph and R. Johnston, ‘Market Failure and Government Finding of Science and Technology: Economic Theory versus Political Practice’, *Prometheus,* Vol 3, 1985, pp. 138-155. [↑](#footnote-ref-2)