



## MRCF submission to Strategic Review of Health and Medical Research in Australia

### Summary

Recently, Australia has experienced a dramatic restructuring of its economy, with the growth of the traditional income-generating states of NSW and Victoria slowing, while WA and QLD have grown rapidly, both in terms of income and expenditure, as a result of the mining boom. Whilst the mining boom represents a disproportionate amount of Australia's income, it represents less than 2% of all jobs in Australia. For many years Australia has been losing its manufacturing base and jobs to low cost, low salary countries. Perhaps more alarming has been the recent exporting of educated white collar jobs, in the banking and telecommunications industries, to low cost countries. To maintain our current standard of living, Australia cannot continue to try and compete with developing countries on cost. Furthermore, Australia needs to establish new industries that will help sustain the economy once the mining boom ends.

During a period of relative prosperity, Australia needs to support the development of industries that rely on a highly skilled labour force, intellectual property and constant innovation. On all independent international measures, Australia ranks highly in terms of research productivity and research innovation. However, Australia ranks very poorly in the translation of this innovation into products, jobs and income for the country. This is perhaps of little surprise when one considers that about 1.5% of the amount spent by the Government on research is spent on the commercialisation/ translation of this research.

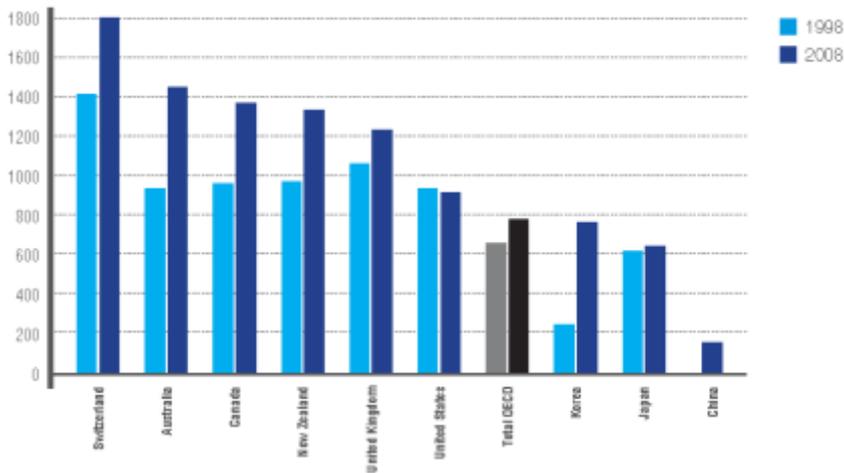
This document suggests that Australia needs to do more to support research commercialisation. It also suggests that an area of significant opportunity is the pharmaceutical/biotechnology sectors, where Australia has existing world class infrastructure and is a leader in terms of research innovation.

This document also recommends a new model of research commercialisation and presents the Medical Research Commercialisation Fund as a working example.

### Submission

It has been widely established in previous reviews that the Australian government's strong historical support of medical research continues to bear fruit in the research arena. On a global scale, Australia has shown consistent improvement in the last 10 years in terms of scientific publications per capita. In 2008, Australia ranked as number two in the world, as shown in Figure 1, confirming a sound scientific base underpinning the medical research sector.

This obvious strength in basic research, resulting from the government's historical investment into developing the Country's research infrastructure and a skilled and educated workforce in the medical research sector, has contributed to Australia being considered a leader in medical research innovation. **However, whilst Australia has a strong track record of generating new medical breakthroughs and treatments, the translation of these ideas into jobs and income in Australia has been historically poor.**



**Figure 1.** Scientific articles published (per million of population, 1998 and 2008)<sup>1</sup>

This is clearly illustrated by the 2011 Global Innovation Index<sup>2</sup>, produced by the prestigious French business school INSEAD. Australia ranked an impressive 12<sup>th</sup> on the Global Innovation Index in terms of Innovation Input (which is a measure of the ecosystem for innovation, taking into account such things as the Political, Regulatory and Business Environment as well as the infrastructure and Human Capital) and an equally impressive 31<sup>st</sup> in terms of Innovation Output (which is essentially the scientific and creative production of the country – the new inventions, ideas and products). However, in terms of Innovation Efficiency (which is the ratio of output over input – effectively the conversion of ideas into products) we rank poorly at 96<sup>th</sup> of the 125 developed countries assessed by the report. This means that Australia is great at coming up with good ideas, but is poor at translating them into new products, jobs and income. From a medical research perspective, Australia has proven to be a lucrative innovation mine, with many Australian medical inventions picked up by international corporations for little cost and no ongoing benefit to Australia.

Innovation Input		Innovation Output	
Rank	Country	Rank	Country
1	Singapore	1	Sweden
2	Hong Kong (SAR), China	2	Switzerland
3	Switzerland	3	Netherlands
4	Ireland	4	Germany
5	Sweden	5	United States of America
6	Finland	6	Finland
7	Denmark	7	Denmark
8	Canada	8	Israel
9	Luxembourg	9	United Kingdom
10	United Kingdom	10	Canada
11	United States of America	11	Korea (Republic of)
12	<b>Australia</b>	12	Hong Kong (SAR), China
13	Iceland	13	Iceland
14	Norway	14	China
15	New Zealand	15	New Zealand
16	Netherlands	16	Hungary
17	Korea (Republic of)	17	Singapore
18	Japan	18	Norway
19	Austria	19	Qatar
20	Israel	20	Estonia
21	Germany	21	France
22	Belgium	22	Ireland
23	France	23	Austria
24	Estonia	24	Czech Republic
25	United Arab Emirates	25	Luxembourg
31		31	<b>Australia</b>

**INSEAD Global Innovation Index  
(Analysis of 125 countries)**

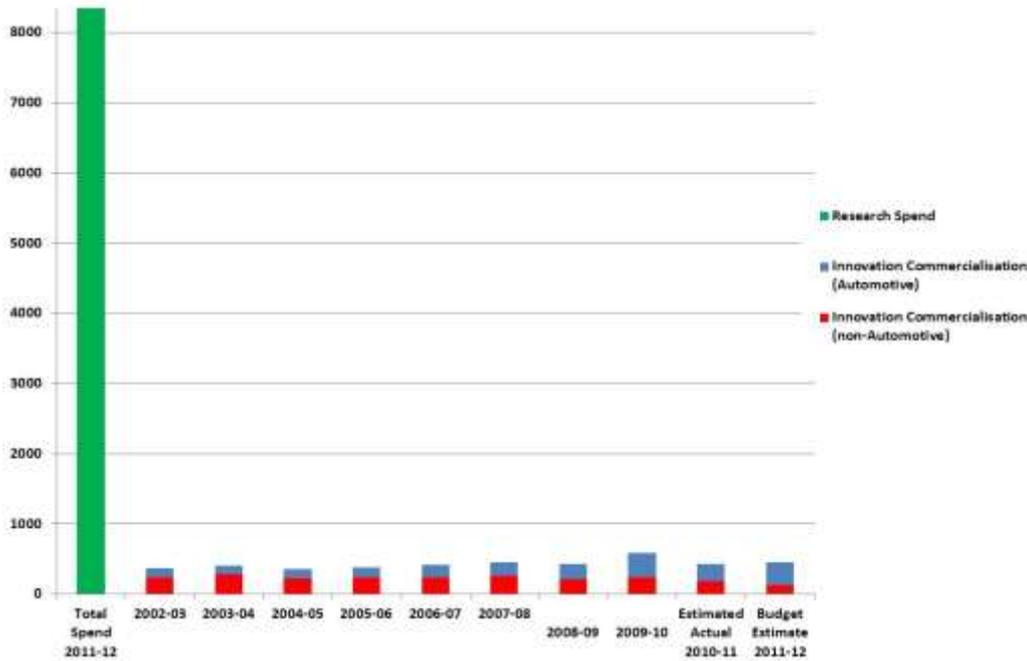
		Australia Ranking
Global Innovation Index	Simple average of the Input and Output Sub-Indices	21
Innovation Efficiency Index	Ratio of the Output Sub- Index over the Input Sub-Index	96

**Table 1** Australia’s Innovation Efficiency Rating

It is of little surprise that Australia performs poorly at technology commercialisation when you look at the level of government support dedicated to this activity, versus the amount provided to research. Figure 2 shows a comparison of the relative split of funding applied to research and commercialisation. This confirms that whilst over

<sup>1</sup> Source: OECD Science, Technology and Industry Outlook 2010 p. 155; (StatLink <http://dx.doi.org/10.1787/888932333082>)  
<sup>2</sup> Source: The Global Innovation Index 2011, [www.globalinnovationindex.org](http://www.globalinnovationindex.org)

\$8 billion is spent annually by Australians on research, the government support for research commercialisation represents less than 1.5% of this amount.



**Figure 2** Fed Government Expenditure on Research, and Innovation Commercialisation (\$m, Automotive/Non-Automotive, 2002-2012)<sup>3</sup>

A number of important government initiatives have been crucial in sustaining a small innovation sector (including Commercialisation Ready, Commercialisation Australia, NHMRC Development Grants, ARC Linkage Grants and the Innovation Investment Fund Scheme) these initiatives have been ‘drops in the ocean’ when compared to the annual research budget.

It is noteworthy that two of Australia’s most successful biotechnology companies, CSL and Cochlear, were created following substantial and sustained investment from the Australian Government, with both now employing many thousands of Australian’s and generating income for the country (CSL was government funded for 75 years before privatisation; Cochlear received substantial government funding and support through 2 CRC funding rounds and Channel 10 telethons over 21 years before it listed on the Australian stock exchange).

Other countries rely partly on support from large corporate entities to invest in their backyard and commercialise innovation, but the opportunity to do this with Australian companies is limited. Before this can begin to happen in a sustainable way, we need to create a critical mass of successful companies.

Engagement between the private sector and academia is not always straightforward, with poor communication, lack of visibility between the two parties and a wide variety and inconsistencies in approaches to academic commercialisation. Whilst partnerships with bigger companies, usually based overseas, has been a mechanism that Australian researchers have used to commercialise their innovations, the licensing of early-stage technologies will not in itself create a sustainable future that supports the generation of local jobs and a knowledge economy. Venture capital has a role to play in supporting the commercialisation of Australian innovations, but the traditional venture capital model hasn’t been successful in Australia.

<sup>3</sup> Australian Government 2011-12 Science, Research and Innovation Budget Tables (Commercialisation-related budget lines)

The Medical Research Commercialisation Fund (MRCF) represents a new and alternative model of innovation commercialisation. The approach involves aggregating the research capability of Australia's leading medical research institutes and research hospitals (the infrastructure and capability created by government funding), whilst providing access to capital and commercialisation expertise to support the translation of the innovation into real products. Early engagement with researchers within the member medical research institutes is promoted, to increase research activity visibility and commercial input at critical stages in the research process. The collaboration results in exposure to a large number of early-stage medical innovations across the various health sectors, with the process involving investment in a large number of assets followed by strict attrition, with most capital and support then allocated to the high performers.

The MRCF has received strong interest from medical research institutes and research hospitals across Australia, with membership now including 32 Institutes across Australia and strong demand from those that are not yet members. The group cumulatively had annual revenue of more than \$2.5 billion, employed more than 15,700 staff and published more than 5,300 peer-reviewed scientific papers. This collective resource represents an equivalent research and clinical capability to that contained within international pharmaceutical companies. This collaboration effectively harnesses the capability that has been created through many years of government and philanthropic support of the medical research institutes and is, for the first time, aggregating the capability in a coordinated fashion. Moreover, the MRCF is managed by a team with extensive experience in the commercialisation of medical research and far-reaching global networks of contacts within the industry to enable the commercialisation stage.

It is through the ongoing support of such globally-reaching initiatives and the acceptance of new, creative solutions to the challenge of research commercialisation that this deficit can be addressed. Leverage from similar reviews to address the 'valley of death', such as that by the Select Committee in the UK, can help to inform Australia's review of the challenges and potential solutions. Any review of the challenges in this space needs to acknowledge the lead time, human expertise and capital investment required for commercialisation that is specific to medical research. In reviewing the success of Cochlear, from the research phase of the invention in 1967, it took over two decades of significant philanthropic fund-raising and subsequent government investment until the company was listed on the ASX at a share price of \$2.50. Today the share price is approximately \$58.00, with a market cap of \$3.3 billion, over 2000 employees and the company exhibited about 10% revenue growth in 2011. This success story demonstrates the potential up-side to Australia from the translation of research into real products in the areas of health benefits, employment, revenue and support of the Australian economy. Unfortunately, this story is the exception rather than the rule.

There are a number of strong drivers for Australia to have an internationally competitive health and medical research sector, broadly including both impact on employment in a competitive knowledge-based sector and the ensuing health benefits derived from commercialisation of health and medical-based products. Despite the local impact of the current resources boom representing a strong contributor to the Australian economy, the mining industry contributes only about 2%<sup>4</sup> of all jobs within the economy, a percentage that has changed very little since the early 1960's. This meagre contribution to the employment rate has not changed significantly, even in the face of the recent prolonged mining boom. For Australia to continue to maintain its current salaries and standard of living, it needs to create a knowledge and skills based economy, which creates technical products and employs a highly skilled workforce.

Australia's long tradition with a strong manufacturing industry has suffered badly in the last 10 years at the hands of the boom in manufacturing capability within the developing economies. There has been a steady erosion of the traditional manufacturing base in Australia, with the advantage now sitting clearly with economies that can compete

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<sup>4</sup> Australian Labour Market Report – November 2011

primarily on the grounds of cost of goods as a result of low salaries. Analysis of the mix of exports from the Australian manufacturing industry shows a clear shift in the mix over the last few years. The traditional manufacturing sectors have contracted, whilst highly technical manufactured products, such as those in the scientific, pharmaceutical manufacturing and specialised machinery sectors, have grown significantly.

The capacity to develop innovative products that are supported by patent protection remains a critical aspect underpinning this capability. It is critical that the long-term value of patenting innovation and ensuring a strong and commercially viable patent position continues to be encouraged and supported. Emphasis needs to be placed on continuing to support patent applications through the early stages of the commercialisation process, rather than one where many are abandoned prior to national phase filing.

This trend of competing on cost of goods/ resource is now moving beyond the traditional manufacturing sector, to encompass the exporting of highly skilled and highly paid Australian jobs to countries with a lower cost, lower salary base. The off-shoring of these so called 'white collar jobs' has been recently exemplified within the banking sector, but has been entrenched in the telecommunications sector for some time. Whilst the short term benefit of this strategy to the company bottom line is evident, the longer-term effects within the Australian economy have yet to be fully determined. It is hard to build a sensible argument to support Australia trying to compete on costs within this environment.

Within the technical manufactured products sector, medical and scientific products represent a significant proportion of the exports. In fact, pharmaceutical manufacturing represents the second largest export industry and is an employer of more than 40,000 people. This is an opportunity that Australia's knowledge economy can provide continued leverage for future growth. One such example of this is the Cochlear story, demonstrating the impact that the successful translation of Australian research into real products can have.

There is little argument that the mining sector represents a finite resource. The strong reliance on this sector of the Australian economy cannot last forever. A review of the total ASX earnings shows that 61% of the ASX earnings are generated by two industry sectors – banking and mining. In fact, this represents the earnings of only ten companies, with four banks and two mining companies accounting for 49% of the total ASX earnings. This lack of diversity raises significant questions about the sustainability of the Australian economy within the status quo. The soundness of Australia's economic future requires urgent investment now to support the translation of research into the next generation of businesses that will underpin Australia's future economic stability.