

national priorities for innovation

As part of the Review Panel's Terms of Reference it was asked to *'develop a set of national innovation priorities to complement the national research priorities, ensuring the objectives of research programs and other innovation initiatives are complementary.'*

The need for National Priorities for Innovation

One only has to look at how technology and innovation has shaped and is re-shaping our economic and social lives today to appreciate that whether we can control it or not, innovation is a national priority for Australia. We can no more avoid the forces impacting upon our daily lives from the well-spring of knowledge becoming available than we could avoid the global pressures on Australia as a nation to play its role in the world-wide challenges of mitigating climate change, ensuring security, allowing the free flow of products and embracing ideas in a democracy.

How we choose to harness that power of innovation is the key immediate challenge facing our policy-makers today. We have to recognise that the way to drink from a fire hose is both to apply a filter and point it in the right direction. From an economic perspective, no country can aspire to technological leadership in all areas and fortunately, thanks to global integration, we do not have to do so. Instead, we must make a choice as to how to apply our limited resources to impact on the direction and the efficiency of our contribution to the global knowledge pool.

In many respects, pressures of the market determine our priorities for us. Opportunities arise and business innovation is pulled towards them. Resources soon follow.

However, there remains a set of resources at the discretion of our public institutions. On the one hand, there is a common philosophy that those resources should be applied where the private sector is not the main actor. Specifically, in those areas where government is already playing a large economic role, it is simply common sense that we expect it to play a large innovative role as well.

On the other hand, government action can act as a catalyst for private sector innovation. By thoughtfully enabling markets and by understanding the complementarity between innovation in government and the returns to innovative activity elsewhere, the impact of resource applications can be multiplied.

Both of these avenues require us to set priorities and also to communicate and commit to them. To take piecemeal approaches is to accept mediocrity. More importantly, there is no second place when it comes to using resources for innovation. That is a path to duplication. Instead, we need to target areas where we can lead the world and leverage the knowledge others are generating. These forces guide how we select our innovation priorities.

Concentrating on distinctly Australian National Priorities for Innovation

In identifying these priorities and classifying them, the Panel has been mindful of several distinctive features of Australia in comparison with peer economies elsewhere. These include:

- Tyranny of distance – Australia will always be a long way from the world’s major markets and it does not have a sufficiently large domestic market to compensate for this structural challenge;
- Low density (sparsity) – Australia is highly urbanised, but the major cities are concentrated around south-eastern Australia and, more generally, the seaboard. With its huge landmass, Australia is one of the main countries in the world which will always need to find solutions to distributed and small scale technology and service offerings;
- Natural endowments – Australia is endowed with valuable natural resources. This possess particular challenges in terms of economic diversification;
- Multicultural diversity (and reverse diasporas) – the country’s unique ethnic population diversity underpins that pluralism which is important to creativity and innovation and also creates global cultural connections that are, perhaps, not leveraged as much as they might be;

- Size – Australia’s 2 percent global challenge illustrates that there is little chance others will generate the knowledge to solve our unique problems.

Key Principles for determining National Innovation Priorities

The Review Panel has concluded that there are five broad principles for determining priorities to shape innovation policy and funding programs:

1. Leveraging Australia’s natural endowments or built strengths;
2. Areas where there is a distinctively Australian challenge or an advantage in developing solutions to globally relevant challenges or markets;
3. Areas where there is scope to transform or reinvent existing industries and service delivery, competitively;
4. Internationalising Australia’s innovation system through global integration; and
5. Investing in national capabilities, facilities and innovation infrastructure supporting these priorities.

The Panel notes that there are many areas of overlap and scope for mutual reinforcement between the nominated priority areas.

It is important to recognise that the Panel’s recommendations here on innovation priorities are distinct from the recommendations throughout this Review that target the whole innovation system and the underlying basis as to how we, as a country, marshal resources for innovative activities.

Instead the priorities identify the areas of activity that should be targeted for immediate attention. So whereas research priorities set the direction for the public support of scientific and technical advancement, innovation priorities are about ensuring that knowledge is leveraged. For this reason there will be a relationship between the two.

This leverage occurs in two ways. First, through the commercialisation of knowledge by industry and government. Second, by ensuring that knowledge is available to be built upon to drive the next generation of research and to future proof the Australian economy.

The Government needs to start with itself

The first set of innovation priorities, based on ensuring that existing knowledge is leveraged, arises from the fact that the government is a significant economic actor and for this reason needs to be a significant innovator as well.

The Review Panel has received a number of submissions proposing areas whereby the government itself can take a leadership role in innovation. The Panel in considering these has identified the following areas whereby there are untapped capabilities within Australia as well as strong demand to complement public policy initiatives. These twin drivers lead us to conclude that these areas should be immediate innovative priorities for the government.

They are:

- ***Agricultural and food security:*** Food security has become and will continue to be a global challenge. Australia has the opportunity to: continue to drive agricultural productivity and yields through research; develop globally significant leadership around the development of nutraceutical foods; establish a global brand reputation for food safety and certification; and become an Asia-Pacific-oriented location for significant global facilities for biological testing and certification (Association of Southeast Asian Nations countries already see facilities like the Australian Animal Health Laboratory as regionally significant assets).¹ The Review consultation process revealed a need for greater national strategic leadership in rural innovation. Annex 11 contains suggestions on how to achieve better co-ordination and prioritisation.
- ***Climate change mitigation and adaptation:*** Australia has a disproportionate global share of environmental challenges. These range across water and land management, salinity and threats to marine ecosystems such as our coral reefs, weather volatility, bushfires, and coastal degradation. Addressing these challenges in the years and decades ahead must remain one of our highest national priorities. As the Garnaut Report on climate change has highlighted, Australia needs to invest more heavily in innovation and technology-based solutions to address many of these challenges, and to build local capability and skills to deploy innovative solutions.² There will be significant global markets for Australian-generated solutions. In addition, Australia has distinctive biodiversity assets and biosecurity threats.
- ***Population health:*** The priorities here relate to significant national challenges like health costs, the need for cost-effective solutions for an ageing population and lifestyle-induced problems attributable to obesity and substance abuse. We must also close the health divides within our community, particularly in relation to indigenous communities. These issues call for innovative solutions in service delivery.

¹ This regional role was reinforced in discussions between the Review Chairman and the Prime Minister of Malaysia in May during the course of the Review.

² Garnaut Climate Change Review, Draft Report, June 2008

- **Tropical solutions:** Our region shares vast tropical resources. Consequently, regional development and innovation will require continual investment in technologies and solutions to overcome the particular difficulties of tropical climates. This involves issues of tropical diseases, education delivery, logistics and implementation of key infrastructure. This is critical for solving many issues facing indigenous Australia. Moreover, as Australia is a leader in the region, being a technological leader and providing a means of transferring key knowledge to our neighbours is a key innovative priority. Specific suggestions to maximise opportunities in this area are included in Annex 11.
- **Broadband applications:** With the National Broadband Network, Australia needs to ensure that the relevant applications – specific to local needs – are developed to leverage that infrastructure for the purpose of government policy. This includes applications in open democracy, database and privacy standards for health information, tools to facilitate educational use of broadband, traffic systems and standards, and national collections of information and knowledge.

Priorities to stimulate complementary private innovative activity

The second set of priorities involves the areas whereby government stimulus can increase the returns to private innovative activity; specifically, activity that will lead to globally tradeable goods and services.

The Panel has received a number of submissions as to areas whereby, because of lack of coordination and basic infrastructure, opportunities to develop global leadership are being missed. Those are not opportunities that are necessarily being taken up by other countries but are being left on the table. The Panel considers that the following areas deserve priority in innovation on this basis:

- **Resource industries:** Analysts often forget that technological innovation is especially important for resource-based economies. As Australia's foremost economic historian, Professor Geoffrey Blainey AC, has written:

Most of Australia's massive deposits of minerals were of no use until new technology liberated them. In the last two centuries Australia has depended as much on the rise of new technology as on its own soil, grasslands, minerals and other resources.¹

Significant world-scale service companies have developed around the resources sector, drawing on leading-edge developments in

¹ Blainey, G., *A Shorter History of Australia*, William Heinemann, 1994

information technology and biotechnology. Important capabilities have been built around logistics and project management. Major changes in the economics of resource industries tend to rely on generational, high-risk technology breakthroughs, and the resources sector has been strongly engaged with the CRC and ARC Linkage programs to advance such work in Australia.

- *Space and astronomy:* Space and astronomy are natural areas for Australian specialisation for three reasons: (i) Australia's geographical size and vast areas of extremely low population density mean that it is an ideal site for space research free of radio-interference. The success of Australia's bid to host the Square Kilometre Array (SKA) telescope would consolidate Australia's position as a key node in global research systems. (ii) Australia is already an important southern hemisphere node in global space surveillance systems.¹ (iii) Australia has an increasing interest in access to satellite facilities to support remote monitoring and sensing capabilities for climate monitoring, agricultural production management, security monitoring, and remote sensing networks (such as national water and weather observatories and emerging requirements around carbon monitoring).² Australia has little involvement in the satellite infrastructure to support these strategic areas of application deployments based on satellite facilities. This is a putative area for more significant international collaborations.
- *Finance and risk management:* Australia has critical mass in financial services and asset management, and has grown successful global enterprises. It currently has the fourth largest pool of private savings in the world (in absolute terms). Considerable strengths have been built from the introduction of compulsory superannuation, and around systems of prudential regulation. An underpinning capability – ironically, given the risk aversion of many Australian businesses – is superior risk management. Strengths in logistics and risk management leverage from the distinctive Australian challenges described in the second category of priority below.
- *Marine industries:* With the United Nations recently confirming Australia's entitlement to an extended continental shelf, our marine territory amounts to 13.6 million square kilometres. This resource supports major industries such as tourism, offshore oil and gas, shipping, fishing, aquaculture and maritime logistics, as well as a nascent seafloor mining industry. Marine research is also a crucial platform for climate forecasting and biodiversity

¹ In visits to the US Congress in the 1990s the Chairman noted the one thing Congressional Committee leaders registered in connection with Australia was our hosting of the US space surveillance station at Pine Gap in Central Australia. This was before Iraq put Australia front of mind for quite different reasons.

² 5 Inquiry into The Current State of Australia's Space Science & Industry Sector, http://www.aph.gov.au/senate/committee/economics_ctte/space_08/interim_report/index.htm

management. Submissions and roundtable discussions during this Review support an argument that Australia's investment in marine research and maritime industries is underweight.

Alignment with the National Research Priorities

There is considerable overlap between the National Innovation Priorities proposed here and the current National Research Priorities. Because the innovation priorities are aimed at leveraging the broader scope of infrastructure and basic knowledge in the research priorities, they are both more specific in each area of application as well as broad in covering a range of innovative areas.

For this reason, there needs to be on-going management and coordination to ensure that priorities are being followed by different government agencies in a synchronised way to ensure maximum ultimate impact on economic productivity.

Recommendation 11.1: National innovation priorities, as set out in this Review, be a focus of innovation policy and activities and the National Innovation Council be charged with ongoing evaluation of the alignment of public innovation policy with National Research and Innovation priorities.

