



# venturousaustralia

*building strength  
in innovation*

*an overview*

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in innovation*

*Venturing means enterprise and a major, bold and perhaps risky undertaking. It also connotes being forward looking and being prepared to seize opportunity. This is the innovative spirit we need to nurture in all Australians. An innovative Australia is a country that is enterprising and venturesome.*

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Senator the Hon Kim Carr  
Minister for Innovation, Industry, Science and Research  
Parliament House  
Canberra ACT 2600

Dear Minister,

On 22 January 2008 you commissioned a Review of the National Innovation System. I have pleasure in forwarding the Panel's report to you.

Innovation is not the problem; it is the answer. Innovation is not the opportunity; it is the imaginative response to opportunities. Our report identifies that the system requires renewal, refurbishment, recasting and where necessary re-imagining.

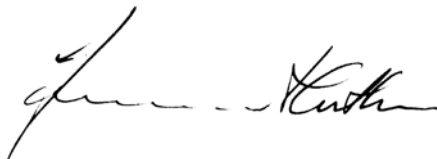
We are entering an era when the global economy is being transformed before our eyes, with huge local implications. Innovation is pre-eminent in this transformation. New players are emerging, and around the world small countries like our own, which have already grown rich on the spoils of innovation, are renewing their commitment and redoubling their efforts.

We need to take a long term view and respond with sound investments in terms of strategies for Australia.

I would like to express my gratitude to my colleagues on the Review Panel who have worked with me on the Review, as well as those who have provided support to us during the Review. As we note in the Report, this document needs to be seen as just the start of the continuing national dialogue on innovation, and the wealth of submissions and material assembled during this project will remain very helpful in this ongoing process.

I commend this report to you.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Terry Cutler', written in a cursive style.

Terry Cutler

29 August 2008



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# contents



# overview

We have known for several generations that innovation pre-eminently determines our prosperity. Yet innovation only began its prominence as a focus for Australian policy making in the 1980s. In addition to comprehensive policies to wean Australian industry off ad hoc production subsidies and trade protection, the Australian Government developed a range of policies to assist research and development and improve connections between researchers and business. These policies included the 150 percent R&D Tax Concession, Rural Research and Development Corporations and Cooperative Research Centres.

The backdrop for this study is provided by the confluence of four powerful circumstances.

Firstly, the architecture of Australia's existing national innovation system is now a generation old. It requires reappraisal and the policies it comprises require renewal, refurbishment, recasting and in some cases re-imagining.

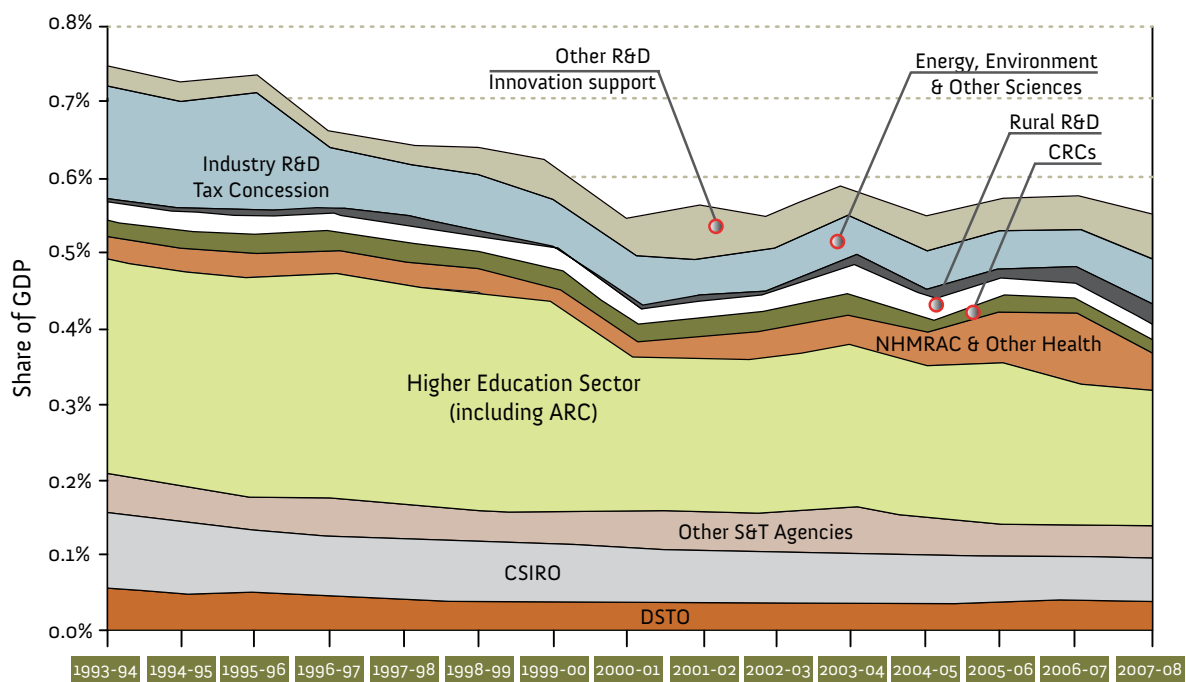
Secondly, the nature of innovation and our understanding of it is changing fast. In pursuit of a particular idea of innovation the 1980s policy framework sought to increase the supply and accelerate the commercialisation of research, scientific discovery and technological advances. Less attention was paid to improving the capacity of firms to apply the products of science and research, nor to understanding how boosting this capacity could better serve market and customer needs and secure productivity benefits for the Australian community. Commercialisation itself was generally understood to take place within a proprietary production chain largely closed to outsiders. Today innovation is understood to involve



much more than the transmission of knowledge down the pipeline of production from research to development to application. In the age of the internet, with the opportunities for collaboration which it opens up, open innovation is increasingly important.

Thirdly, Australia's focus on innovation policy intensified in the 1980s – after a prolonged decline in our innovation performance, and a commensurate fall in our relative prosperity. This policy focus bore fruit in sharply rising levels of R&D and other forms of innovation. However the rate of improvement has stalled over the last decade and some indicators suggest absolute decline. Furthermore, much of it appears to have been a response to our own policy decisions. As illustrated below, as a share of Gross Domestic Product (GDP), Australian Government support for science and innovation, has fallen by nearly a quarter. Also the number of researchers per thousand employees has declined substantially in the last decade, and US patents granted per 1,000 population have plunged from 0.06 to 0.01 (1999–2003). And yet during this time, the public revenue was fed by a torrent of cash from the mineral boom.

**Figure 1: Australian Government Expenditure on Science and Innovation, 1993–94 to 2007–08, as a proportion of GDP**



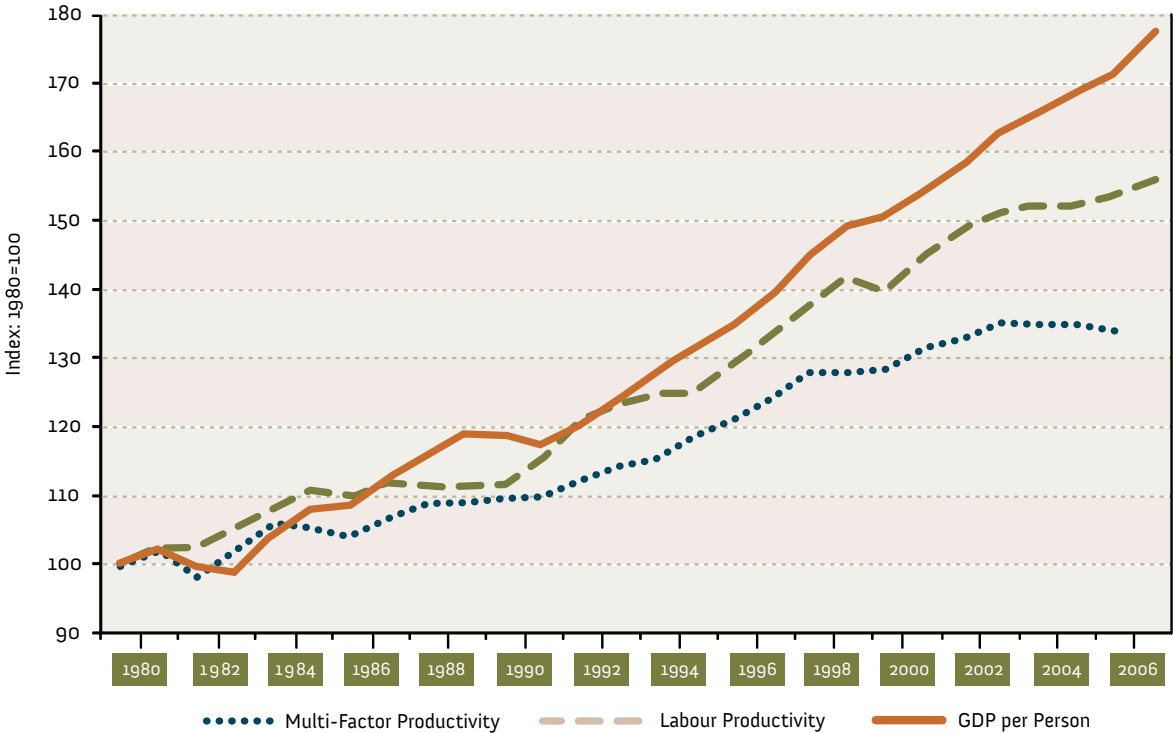
Source: Victorian Innovation Economy Advisory Board, 2006

Finally, the economic geography of global production is experiencing seismic shifts, with two great countries in our region – India and China – transforming themselves into economic giants. They are doing so by embracing openness and trade as we did in the 1980s. But we are observing far more than the phenomenon of economic ‘catch-up’. Innovation is pre-eminent in their self-transformation. Around the world small countries like our own which have already grown rich on the spoils of innovation are renewing their commitment and redoubling their efforts – countries like Finland or Singapore and Korea in the Asia Pacific.

The best summary statistic for our success in embracing new and better ways of doing things is productivity growth. Sometime around 2002 Australian productivity went from growing substantially faster to growing substantially slower than the Organisation for Economic Cooperation and Development (OECD) average. Though some of this may be an artefact of increased mining investment, it is unlikely to be the whole story. The conclusion is that, had it not been for the hunger the emerging giants of the developing world have had for our resources, we would have felt the effects of our complacency more directly as stalling living standards.

*This report stands for the proposition that we should arrest the slide in our performance and seize the opportunity that our recent prosperity gives us to begin building a more innovative and productive world in which our children will live, to which they will contribute, and which they will pass on in their turn.*

**Figure 2: Components of Growth in Australian Living Standards**



Source: The Conference Board and Groningen Growth and Development Centre, Total Economy Database, January 2008, [www.conference-board.org/economics/](http://www.conference-board.org/economics/). Via Steve Dowrick.

## An innovation action plan for Australia:

### Building the platforms; Exercising policy levers; Creating the connections

#### *Entrepreneurial firms and innovative workplaces*

Innovation is about far more than the funding of research and science, or even of that and commercialisation. Australia thrives only if a critical mass of business enterprises and workplaces are consistently innovating – not just with next generation products, inventions and technologies, but in their operations, organisation, relationships and business models.

Business innovation today is not an easy thing to do and to sustain. We live in a connected, global knowledge economy, where ideas, capital and even people can be accessed with the click of a mouse. So what makes a business novel, distinctive, valued by paying customers and hard to copy really counts. Competing on innovation and knowledge is decisive to successful business performance for firms and to sustainable prosperity for nations.

It is vital that Australia is well endowed with innovative firms and workplaces. The key to this is deftly enhancing the opportunities and environment for business enterprises to innovate.

To do this we must be alert to the hidden realities of business innovation and the changing face of innovation that is no longer the province of the lone inventor or adept technologist. Innovation in the first decades of the 21st century is more open and pervasive, characterised by skill in collaborating and making connections so that knowledge flows and grows, and so becomes available to meet customer and community needs.

In such a world innovation policy is a central aspect of economic policy. This requires a significant recasting of Australia's innovation policy to give priority to strengthening innovation at the point where business enterprises and workplaces engage with their markets and customers. Reflected in recommendations for new business innovation and collaboration programs designed for productivity benefits, the end goal is nothing less than innovation-led prosperity for Australia.

#### *Australia's talent pool: Human capital and social networks*

Knowledge and skill – in modern jargon human capital – is at the heart of the rise of humanity. Increasing our knowledge and improving our skills is not just a foundation of our economic prosperity. It is also central to broader human goals and to the pursuit of happiness and satisfaction in our lives.

High quality human capital is critical to innovation. Equipping our people with the skills to innovate is essential, not only for the generation and application of new knowledge, but also to use and adapt the knowledge produced elsewhere. Using the admittedly imperfect yardstick of the level of funds dedicated to public education, it is also an area in which our commitment has been waning, even absolutely as a share of our own economy, but far more emphatically so compared with other countries. For most of the post-war period Australia was one of the leading OECD countries in its commitment to education, as measured by the share of public expenditure. By 2003, however, Australian public expenditure on education had dipped to 4.7 percent of GDP, below the OECD average of 5 percent.

Building high quality human capital requires attention at all levels of education: from early childhood education and schooling, through vocational education and training and higher education, and into the workplace.

It is most assuredly the case that high quality education is about far more than funding, a point made vivid by the fact that we have doubled the resources spent on each child at school since the 1970s with scant improvement in measured outcomes. For this reason we acknowledge the substantial range of human capital reforms being progressed within our federation and, in this context, lend support to these reforms. Even so, it is imperative that our educational institutions do receive adequate funding and it is likely this will require a substantial increase in funding as a share of GDP.

We also recognise the importance of the human capital reforms currently in contemplation to the innovation reform agenda. These often span portfolios, jurisdictions, sectors and disciplines requiring carefully considered approaches and complex solutions.

Collaboration between all involved parties – something that cannot be delivered without a degree of bi-partisan consensus – will be essential if we are to adequately address the human capital challenges we face.

#### *Information flows, market design and freedoms to innovate*

Markets in which people compete for private gain can only come into existence against a backdrop of shared practices and expectations. Because these ‘rules of the game’ are a public good, governments are unsurprisingly involved in their provision and enforcement. Often the most efficient and innovative solution to an emerging problem is to develop a market – as Australia and other countries are doing with emissions trading.

We can also alter the rules of the game to improve market outcomes. Information is crucial to functioning markets and is not well provided in many markets, particularly for expert services. Governments can improve information flows and support innovation and economic efficiency by encouraging disclosure, assisting markets for reputation to develop, and by ensuring that the information and other ‘content’ that they fund is freely available to maximise its use and the value that others can add to it.

Intellectual property is also critical to the creation and successful use of new knowledge – particularly the ‘cumulative’ use of knowledge as an input to further, better knowledge. In this regard, particularly in new areas of patenting such as software and business methods, there is strong evidence that existing intellectual property arrangements are hampering innovation. To address this, the central design aspects of all intellectual property needs to be managed as an aspect of economic policy. Arguably, the current threshold of inventiveness for existing patents is also too low. The inventive steps required to qualify for patents should be considerable, and the resulting patents must be well defined, so as to minimise litigation and maximise the scope for subsequent innovators.

### *Research capability and platforms*

Australia’s ability to generate strong productivity gains requires that we perform nationally important research and that we successfully adopt and adapt 98 percent of innovative ideas that are generated in the rest of the world. This Review calls for an urgent restoration of public funding levels for research in universities and government research agencies. It calls for the adoption of full funding for the costs of research at universities and increased funding for universities and government research agencies such as the Commonwealth Scientific and Industrial Research Organisation, the Australian Institute of Marine Science, and the Australian Nuclear Science and Technology Organisation, so that by 2020 we match the top quartile of OECD countries in public expenditure on research and development. A strong and sustainable public research sector requires universities to be providers of research, not investors in research.

Currently research in universities is not fully funded under competitive grants programs such as the Australian Research Council (ARC) and performance-based block grants, and so it is typically subsidised from universities’ other revenue streams, most particularly from the teaching of full fee paying overseas students. This cross-subsidisation of research from teaching profoundly undermines both activities, the former by short-changing it, with the upshot of leaving it subject to the uncertainties of international markets, and the latter by undermining its international competitiveness.

We should accordingly move towards full funding of research. But this should not be at the expense of current success rates in ARC competitive grant schemes which are already under-funded. Neither should there be a contraction in the range or depth of research projects funded. Funding the full cost of research will accordingly require significant additional funding over time. However, because there has been a significant decline in the level of government support for research as a share of GDP over the past twelve years, the extra funding would do little more than allow 'catch up' with other OECD countries.

It remains the case that a significant portion of research funding should be aligned with national priorities as they emerge. Currently, carbon abatement and water conservation are good examples but priorities can change dramatically over relatively short periods of time, so flexible and proactive funding mechanisms are essential. We must also ensure that our most globally competitive industries, such as mining, agriculture, education and tourism, receive adequate research funding support to keep them at the cutting edge.

#### *Transforming and rationalising tax incentives*

Since its inception the R&D Tax Concession has been subject to several problems. Instead of being tackled directly in the design and funding of the central concession, those problems have typically been tackled by establishing additional programs.

While the Concession offers no benefits to firms until they are in tax profit, many of Australia's most innovative start up firms remain cash strapped and in tax loss for many years. The R&D Tax Offset was established to deal with this, effectively providing cash to tax loss companies, but it remains hemmed in by very tight targeting to small firms.

The assistance the Concession has provided has also varied with the tax rate. With the reduction in the rate of concession from 150 to 125 percent, the Concession provides relatively low levels of assistance and not surprisingly this strongly constrains the extent to which it induces additional business R&D. Further, the Concession is accounted for 'below the line' and so is often invisible in company financial decision making.

As one of the Review's roundtable participants put it, the concession is 'underpowered and overcomplicated'. We need to tackle these perversities.

The Review proposes the transformation and rationalisation of the suite of available tax concessions. The International and Premium schemes should be terminated and the basic concession increased and recast as a 40 percent tax credit.

For small firms we propose increasing the rate of assistance further, as well as lifting the turnover threshold which defines ‘small firm’ tenfold – from \$5 million to \$50 million – and removing the expenditure threshold on R&D altogether.

These changes would transform incentives for business investment in R&D.

### *Market facing innovation programs*

Firms and people are fundamental to successful innovation. Government has an important and strategic role to play in facilitating this innovation where it is confident, firstly, that there are structural impediments to markets doing the work and, secondly, that government involvement will generate more benefits in addressing these problems than it will generate in collateral costs.

One mechanism is the provision of direct market facing programs to support innovative firms. Program assistance should be coordinated and targeted to the various identifiable stages of an innovative firm’s life.

The current suite of government market facing program assistance should be designed to focus on:

- building the capacity of firms to absorb and incorporate new knowledge;
- facilitating collaboration – especially between firms and universities and publicly funded research agencies; and
- improving capital market development.

To help firms build capacity to absorb and incorporate new knowledge, a new program to assist innovative firms in the high-risk early stages of proof-of-concept and development is required, together with an expansion of the Enterprise Connect program to build innovation performance and capacity in firms, and to allow access by services firms.

The Cooperative Research Centres (CRC) review emphasised the value of collaboration for productivity and recommended the maintenance of a portfolio of collaboration and linkage programs and the reconfiguration of the CRC program with additional funding. In addition to the portfolio of collaboration programs, we recommend the introduction of an innovation voucher system to facilitate linkages between small and medium sized enterprises and the research community.

There is a global and systemic funding gap in the availability of capital for early stage ventures and thus the maintenance and extension of the Innovation Investment Fund and Pre-Seed Fund programs supporting capital raising by early stage companies is essential. To further strengthen the growth of high technology and innovative service-based firms, support should be given to organisations of angel investors to help increase networking and the Commercialising Emerging Technologies (COMET) program should be continued.

Any development of the venture capital market must proceed from a basis of full information. Such data has only recently been collected in a disaggregated level necessary for appropriate and reliable statistics to be available. To maintain the required level of data for the effective tracking of the venture capital market, the Australian Bureau of Statistics (ABS) needs to be appropriately resourced.

### *Innovation within Government*

One of the enduring advantages markets have over governments is that innovation can come from anywhere. CEOs of large companies and individuals running their own businesses are each free to improve what they do, and if they lower costs and/or better satisfy consumers, they have a good chance of being successful.

Government retains hierarchical authority structures. With many policy innovations to their credit, Australian governments have typically performed well at engineering top down innovation. But at the 'coal face' they have been less good at harnessing the insights of officials further down the chain of command and consumers of government services.



In the age of the internet, and indeed of Web 2.0<sup>1</sup>, there is less excuse than ever for governments not to do all in their power to cultivate innovation from the ‘bottom up’. Yet the very nature of what governments are seeking to achieve determines that their efforts must be experimental and exploratory. For this reason we recommend a suite of low cost measures to inculcate a culture of innovation in our public sector from the bottom up.

They include:

- A body to operate as;
  - an advocate for those within the public or private sectors who seek to innovate but who are stymied by government culture, practices, structures, or regulation.
  - a source of funds and skills for the development of innovative approaches to public policy and/or service delivery, the running of randomised policy trials and government tendering that maximises the scope for innovation in supply of goods and services to government.
- The use of the Council of Australian Governments (COAG) reform payments to make the most of our federation by encouraging a virtuous circle of innovation, experimentation and evaluation amongst the states and territories, which will help us learn what works and what does not.

### *National Innovation Priorities*

A key task for this Review was to identify a set of National Innovation Priorities to complement the broad National Research Priorities already in effect. To this end, the Panel engaged in widespread consultation with industry groups and other parties around the country. From this it classified areas for attention in terms of:

1. areas under the direct control of the public sector; and
2. areas whereby public innovation could spillover into complementary private sector innovative efforts.

The list of priorities identify specific areas that would leverage Australia’s distinctive geography, economy and capabilities.

In terms of the public sector priorities we identified the following areas: agricultural and food security, climate change mitigation and adaptation, population health, solutions in tropical environments, and applications to utilise broadband infrastructure (especially in health, education and public data access). In terms of stimulating

<sup>1</sup> Web 2.0 is a term describing changing trends in the use of World Wide Web technology and web design that aim to enhance creativity, information sharing, and collaboration among users. [http://en.wikipedia.org/wiki/Web\\_2.0](http://en.wikipedia.org/wiki/Web_2.0)

complementary private sector innovation, the following areas deserve attention: resource industries, space and astronomy, finance and risk management, and marine industries. To manage and coordinate these priorities with those for research in public innovation programs, it is recommended that the proposed new National Innovation Council (discussed below) be charged with ongoing evaluation and identification of synergies across programs.

### *Institutional alignment*

The Review process has demonstrated shortcomings in the institutional framework that underpins the innovation system. There is a lack of policy coherence reflected in a fragmentation of innovation resources across government and between state, territory and federal governments. There is a focus on the short term in resource allocation.

A new institutional framework is required to enhance leadership and improve coordination across the innovation system. Such a framework needs to span ministerial and jurisdictional boundaries and encompass a broad range of policy areas. It needs to focus on coordination without centralisation, due to the importance of maintaining specialised roles and functions across the system.

To achieve the coherence, flexibility and responsiveness necessary for effective innovation policy, the system requires a 'central brain'. To fulfil this role a new National Innovation Council (NIC) is proposed. The Council would be charged with taking a helicopter view of the innovation system and providing strategic leadership. It would oversee the broad innovation agenda recommended by this Review. Chaired by the Prime Minister, it would replace the current Prime Minister's Science, Engineering and Innovation Council (PMSEIC) and would be supported by a high level Office of Innovation Assessment.

Governments must also improve the execution and coordination of operational program delivery. To maximise the impact of public investment in innovation, governments must work in a complementary way. To achieve this, the Review has proposed a framework of principles for innovation interventions for adoption by States and Territories, as well as the Australian Government.

Finally, improved data collection and better monitoring and review are crucial. Innovation measurement and research capabilities need to be strengthened. Mechanisms to ensure rigorous and consistent evaluations of innovation programs must be developed. The capacity to do this would be enhanced by the establishment of a National Centre for Innovation Research to advance knowledge of the innovation system.

### Conclusion: *Venturous Australia*

Venturing means enterprise and a major, bold undertaking. It also connotes being forward looking and prepared to seize opportunity. This is the innovative spirit we need to nurture in all Australians.

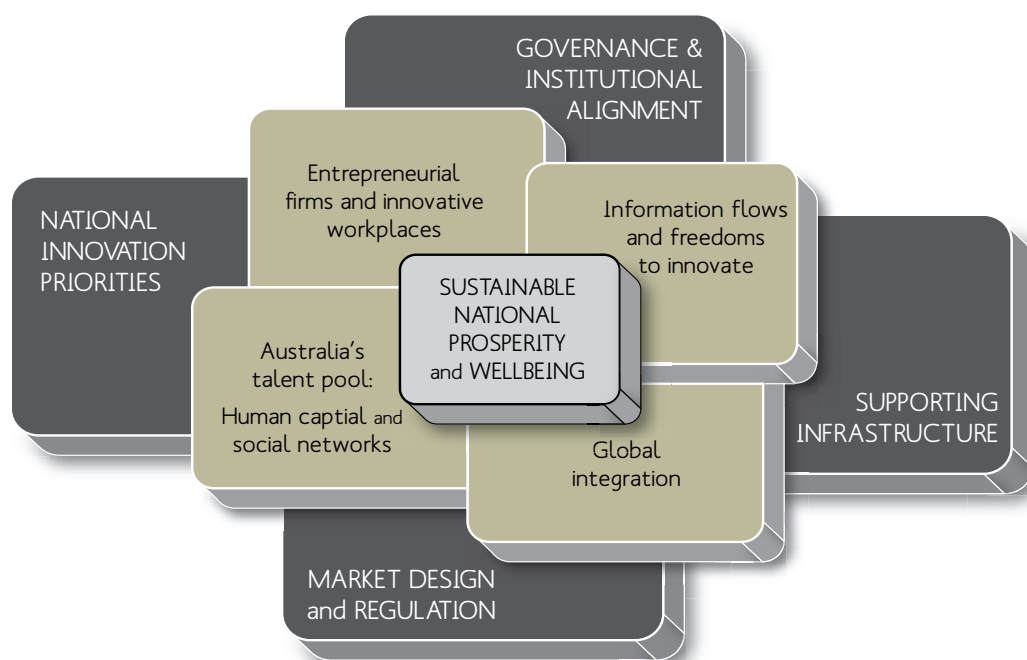
At a time when the importance of innovation to our prosperity is clear, this Review has provided the Australian community with a wonderful opportunity to shape the future innovation landscape.

The Panel has been impressed by the enthusiasm of participants in the Review process and delighted by both the quality and quantity of contributions made.

The breadth of the task of looking across the entire national innovation system was somewhat daunting. The Review received over 700 submissions, and conducted a series of roundtable seminars on specific issues. Pressures of time and space in the report have prevented us from fully reflecting all of the excellent material and input received. We have, however, attempted to capture most of it in a series of annexes that will be published on the internet. Some of these annexes include suggestions for further action in specific areas, which will be brought to the attention of relevant parties.

We have enjoyed the opportunity to hear and discuss the many and varied ideas on how the national innovation system could be improved in order to meet the challenges facing Australia, both now and into the future.

**Figure 3: The innovation landscape**



So now is the time to shape our national innovation system to ensure that it enables us to meet all the challenges we face. We will know we have succeeded when:

- Productivity is again growing above the average of high income countries;
- Our people and workplaces are well equipped with the skills to innovate;
- Increasing numbers of Australian businesses are investing in innovation to secure their competitive future;
- Consumers are sufficiently well informed to demand the highest standards with firms innovating to meet them;
- Those with new ideas feel they have the freedom to develop them.;
- Australian businesses and research organisations are actively involved in international collaboration;
- Australia's innovation system is properly coordinated and integrated with our national innovation priorities;
- The cost of research is fully funded in Australian tertiary institutions, which also face strong incentives to specialise in research excellence;
- Research and development tax incentives are rationalised and the basic concession increased;
- Markets are better enabled through the improved flow and transparency of information;
- A new culture of innovation is embedded within the public sector; and
- There is a single body effectively coordinating the innovation activities of public sector research agencies.



# recommendations

## Chapter 3

### **Recommendation 3.1**

Support business innovation as an explicit priority for Australia's innovation policy by incorporating the following objectives into programs aimed at building business innovation capacity:

- assist the generation and absorption of business knowledge by private firms;
- help private firms to secure returns and to appropriate value from undertaking inherently uncertain innovative business activities;
- foster the capacity for innovation at the company level in response to market and customer demands;
- facilitate economically useful connections between firms and other institutions for knowledge transfer and capability building;
- extend the global reach and market access of Australian firms; and
- increase the managerial, technical and collaboration skills and competencies of private firms.

### **Recommendation 3.2**

Extend the Enterprise Connect Program to include services firms and expand it to provide explicit business innovation services in conjunction with the existing business review and advisory services.

### **Recommendation 3.3**

Establish a new Knowledge Connections program within the Enterprise Connect Program, to work with Industry Innovation Councils in facilitating new connections and clusters crucial to the competitive advantage of firms in knowledge-based economies.

### **Recommendation 5.1**

On the basis that high quality human capital is critical to innovation, support:

- the human capital focus of the COAG national reform agenda;
- the broader national education reforms, and their central focus on raising teacher quality;
- innovation being considered as a key element of these and future substantial national reforms;
- a process to review currently inconsistent funding models for tertiary training in the creative arts, with the aim of producing a nationally consistent policy; and
- an examination of the most innovative educational reforms being pursued in other countries to benchmark our efforts.

### **Recommendation 5.2**

Innovation policy should be aligned with immigration policies to ensure that they facilitate Australia's access to the global talent pool. In particular, human capital should carry equal or more weight than economic capital in individual migration assessments.

### **Recommendation 5.3**

Establish a program to encourage and support professional bodies (working with educational institutions and State and Territory Governments as appropriate) to provide accelerated pathways to facilitate enriching professional transitions so as to make Australia a world leader in this area.

- The Advocate for Government Innovation (see Chapters 10 and 12) should develop priorities with the aim of developing some breakthroughs within eighteen months;
- An early priority should be further building pathways for key professions in which there are skill shortages. One such initiative would facilitate the entry of science and mathematics graduates into teaching; and
- The Minister for Education, Employment and Workplace Relations should make a statement on progress on this agenda within eighteen months.

## Chapter 6

### **Recommendation 6.1**

Adopt the principle of fully funding the costs of university research activities and implement through adjustments in funding to block and competitive grant schemes, without compromising grant success rates. Lessons from overseas and current government investigations should provide evidence for the full costs of university research and allow rapid transition to a full-cost funding model.

### **Recommendation 6.2**

Base the distribution of research block funding to universities on success in winning national competitive grants and on evidence of excellence in research, such as the research quality rankings to be produced by the Excellence in Research for Australia initiative.

### **Recommendation 6.3**

Develop a strategy to support the strengthening of publicly funded research agencies (PFRAs) within the National Innovation System over time, including urgent restoration of funding levels.

### **Recommendation 6.4**

In the short term, increase funding both for the PFRAs and the university research system to at least match the proportion of GDP that was allocated to them in the mid-1990s. In the longer term the goal should be to match investment levels of leading OECD economies.

### **Recommendation 6.5**

To build concentrations of excellence, encourage collaboration and achieve better dissemination of knowledge, introduce additional funding support for university and other research institutions to partner with each other and with other research organisations (national and international). Discussions about additional levels of support should occur during the projected round of compact negotiations.

### **Recommendation 6.6**

The implementation of new incentives around national challenges, including water, carbon emission reduction and related climate change and environmental initiatives needs to avoid further fragmentation of responsibilities and encourage consolidation.



### **Recommendation 6.7**

Australia should enhance its capacity to engage internationally by opening up current innovation granting programs to international partners and participants.

### **Recommendation 6.8**

The NHMRC should be resourced to deliver incentives designed to rationalise and consolidate Australia's health and medical research sector, including universities and independent medical research institutes, to achieve efficiency and effectiveness of the sector.

### **Recommendation 6.9**

Funds currently distributed under the Research Training Scheme and Australian Postgraduate Award (APA) schemes should be allocated to institutions on the basis of demonstrated excellence in research based on the research quality rankings that will be produced by the Excellence in Research for Australia Initiative.

### **Recommendation 6.10**

The research quality rankings from the Excellence in Research Australia initiative should be made publicly available to promote matching of the best research groups with the best doctoral students.

### **Recommendation 6.11**

The APA annual student stipend should be raised to at least match the current APA(I) stipend of around \$25,000 — and then indexed by average earnings; at the same time, the length of support provided under an APA should be increased to 4 years.

### **Recommendation 6.12**

Early career research fellowship schemes that incorporate up to two years of supported research experience in another country should be introduced.

### **Recommendation 6.13**

Establish a National Research Infrastructure Committee to advise on strategic directions in funding of national research infrastructure including landmark infrastructure.

## Chapter 7

### **Recommendation 6.14**

To ensure a sustainable research infrastructure strategy into the future, extend funding for a successor program to the National Collaborative Research Infrastructure Scheme (NCRIS) for 10 years including capital and operational support of \$150 to \$200 million per annum. The remit of such funding should explicitly include support for the humanities, social sciences and creative arts as well as the sciences.

### **Recommendation 7.1**

The Australian Government should experiment with the use of prizes to stimulate innovation. Funding should be modest – say \$5 million over two years with an external evaluation after three years.

### **Recommendation 7.2**

Patent law should be reviewed to ensure that the inventive steps required to qualify for patents are considerable, and that the resulting patents are well defined, so as to minimise litigation and maximise the scope for subsequent innovators.

### **Recommendation 7.3**

Professional practitioners and beneficiaries of the IP system should be closely involved in IP policy making. However, IP policy is economic policy. It should make the same transition as competition policy did in the 1980s and 90s to being managed as such.

### **Recommendation 7.4**

Firms asserting or defending intellectual property should have a right to opt out of ‘appellate double jeopardy’.

### **Recommendation 7.5**

Explore the potential of facilitating the emergence of auditable standards to encourage better comparative voluntary reporting of the quality of firm performance.

- Areas where substantial gains seem likely include:
- the quality of workplaces as proposed at the 2020 Summit;
- the quality of clinical units in hospitals that wish to participate; and,
- The performance of educational institutions at all levels in raising students’ academic scores.

### **Recommendation 7.6**

Facilitate favourable conditions for the development and use of new and emerging technologies by establishing appropriately funded enabling technologies strategies that:

- adapt or build regulatory frameworks to support the responsible and safe use of innovative services and products;
- support the science and metrology required to underpin effective regulation and capitalise on opportunities;
- foster public awareness and community engagement; and
- collect data and develop metrics to support evidence based policy development, monitoring and evaluation.

### **Recommendation 7.7**

Australia should establish a National Information Strategy to optimise the flow of information in the Australian economy.

The fundamental aim of a National Information Strategy should be to:

- utilise the principles of targeted transparency and the development of auditable standards to maximise the flow of information in private markets about product quality; and
- maximise the flow of government generated information, research, and content for the benefit of users (including private sector resellers of information).

### **Recommendation 7.8**

Australian governments should adopt international standards of open publishing as far as possible. Material released for public information by Australian governments should be released under a creative commons licence.

### **Recommendation 7.9**

Funding models and institutional mandates should recognise the research and innovation role and contributions of cultural agencies and institutions responsible for information repositories, physical collections or creative content and fund them accordingly.

### **Recommendation 7.10**

A specific strategy for ensuring the scientific knowledge produced in Australia is placed in machine searchable repositories be developed and implemented using public funding agencies and universities as drivers.

**Recommendation 7.11**

Action should be taken to establish an agreed framework for the designation, funding models, and access frameworks for key collections in recognition of the national and international significance of many State and Territory collections (similar to the frameworks and accords developed around Australia's Major Performing Arts Companies).

**Recommendation 7.12**

Funding agencies should consider eligibility for cultural and collecting agencies in gaining access to contestable research funding programs.

**Recommendation 7.13**

The role of institutions such as the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) should be broadened and strengthened in recognition of the special importance of preserving indigenous collections and the unique value of indigenous traditional knowledge and practices within Australia's innovation system.

**Recommendation 7.14**

To the maximum extent practicable, information, research and content funded by Australian governments – including national collections – should be made freely available over the internet as part of the global public commons. This should be done whilst the Australian Government encourages other countries to reciprocate by making their own contributions to the global digital public commons.

**Recommendation 7.15**

In a similar spirit the Australian Government should initiate a process whereby countries come together to fund prizes for innovations of international significance with a particular focus on the needs of the developing world.

### **Recommendation 8.1**

The set of taxation measures outlined below be considered as a package and the recommendations that may lead to cost-saving not be adopted in isolation from recommendations to restore the value of incentives to firms.

### **Recommendation 8.2**

The R&D Tax Concession be changed from a tax deduction to a tax credit.

### **Recommendation 8.3**

The existing R&D Tax Concession (the 125 percent R&D Tax Concession, the 175 percent Premium, the R&D Tax Offset and the International Premium) should be replaced with a Tax Credit in order to raise the level of business expenditure on research and development by providing a less complex and more predictable support mechanism. A 40 percent Tax Credit should be available to large firms with a refundable Tax Credit of 50 percent available to smaller firms with turnover under \$50 million.

### **Recommendation 8.4**

All R&D undertaken in Australia which meets relevant definitions be eligible for the tax credit.

### **Recommendation 8.5**

Risk management models be developed to maximise the extent to which the refundable tax credit can be paid more regularly – at least quarterly in arrears. Regard should be had to the likely benefit relative to administrative and compliance costs and the need to manage risk.

### **Recommendation 8.6**

R&D expenditure undertaken in Australia by foreign-owned firms be eligible for the 40 percent Tax Credit but excluded from the refundable Tax Credit.

## Chapter 9

### **Recommendation 8.7**

Refinements should be made to clarify the activities that should be supported by the Tax Concession or new Tax Credit. Further exploration may be warranted to see if there are practicable ways of expanding the definition of eligible activities to include some of the less technically risky activities involved in innovation in services. In the immediate term:

- R&D on open source programs should qualify for the multiple sale test;
- guidelines should be reviewed to clearly identify what is eligible activity; and
- appropriate measures be taken to heavily constrain ‘whole of mine’ and similar claims against the existing R&D Tax Concession program or proposed Tax Credit program.

### **Recommendation 9.1**

A *Competitive Innovation Grants Program* should be introduced to assist innovative firms, with limited access to capital, in the high risk, proof-of-concept and development stages. This program would be targeted at projects addressing identified national priorities for innovation. Successful firms would be required to repay grants from the royalties or earning streams accruing from commercial success. The program would seek to assist 200 innovative firms annually at a cost of \$150 million per year.

### **Recommendation 9.2**

The COMET program be expanded and continued for another five years, noting the scope for greater leverage arising from strong linkages to the Enterprise Connect initiative. A funding increase of at least 25 percent would maintain the levels of service and provide wider coverage across Australia. Further increases to extend the programme’s coverage should be considered in conjunction with the evolution of the Enterprise Connect network.

### **Recommendation 9.3**

A portfolio of collaboration and linkage programs be maintained to support productive partnerships in the National Innovation System and with partners globally.

#### **Recommendation 9.4**

The recommendations in the Review of the CRC Program *Collaborating to a Purpose* should be acted on immediately though Government should weigh carefully responses to the CRC Review drawing attention to serious anomalies arising from the recommendation encouraging cash and in-kind contributions from research providers.

#### **Recommendation 9.5**

A pilot linkage voucher scheme be introduced via the existing Enterprise Connect and COMET program to improve innovation linkages between small and medium sized enterprises and the research community. Each voucher would be worth up to \$15,000 and would be used to fund collaboration between small firms and public sector research organisations. The program would link 5,000 firms per year to public research agencies at a cost of \$50-\$75 million per year.

#### **Recommendation 9.6**

The Government consider strategies to attract international venture capital fund(s) to Australia as the base for investment in the Asia Pacific region, with the short term objectives of attracting a major US venture capital firm to Australia and strengthening Australian links into US capital markets.

#### **Recommendation 9.7**

The ABS be appropriately resourced to undertake annual collections of venture capital data to enable effective tracking of the market and the impact of government support.

### **Recommendation 9.8**

The Innovation Investment Fund program be maintained, with a fourth round implemented after 2012. The primary objectives of this fourth round be:

- (i) to invest in high growth potential firms;
- (ii) to expand the pool of skilled fund managers;
- (iii) to build downstream investor confidence in follow on investment; and
- (iv) to build institutional fund confidence in supporting early stage Funds.

To facilitate effective monitoring of the impact of government support to grow early stage ventures in Australia, adequate data on investee firms supported through the program should be collected to support robust longitudinal analysis. Ten new funds over five years to be established at a cost of \$300 million over 15 years.

### **Recommendation 9.9**

The Australian Government immediately establish a second round of Pre-Seed Funds. In further rounds the current absolute \$1 million cap per investee firm should be changed to a maximum \$1 million cap on the first tranche of investment, recognising the high risk nature of this early stage of investment where the availability and timing of alternative follow-on investment is uncertain. Four new funds should be established at a cost of \$100 million over 15 years.

### **Recommendation 9.10**

Modest facilitating grants to organisations of angel investors should be provided to support an increased profile, networking and an ability to mount investor-education programs.

### **Recommendation 10.1**

Consideration should be given to extending the platform created to enforce payments and administer income contingent loans through the tax system; for instance, by extending income contingent loans for tertiary education outside universities and for sole trader entrepreneurs seeking to fund innovative projects.

### **Recommendation 10.2**

An advisory committee of web 2.0 practitioners should be established to propose and help steer governments as they experiment with web 2.0 technologies and ideas. At least five substantial experiments should be established in different areas within two years to be evaluated within three. The Minister for Finance and Deregulation should have carriage of the initiative.



### **Recommendation 10.3**

An Advocate for Government Innovation should be established to promote innovation in the public sector.

The Advocate would:

- operate a scheme similar to Singapore's Enterprise Challenge;
- provide a source for funds and expertise for conducting randomised policy trials;
- manage a process by which agencies within government and also firms outside it were able to challenge established practices, administrative arrangements or regulation which obstructed beneficial innovation;
- provide specific 'project facilitation' assistance to firms seeking regulatory approvals in order to introduce worthwhile and innovative business practices;
- promote networks (including within federal, and state and territory governments) to maximise the dissemination of knowledge about worthwhile new approaches to issues faced by public agencies;
- operate as a repository of knowledge and resources to the Australian Government and participating State and Territory government agencies to promote tendering practices designed to maximise the scope for innovation in the supply of goods and services to government;
- establish a high profile national awards system to provide national awards for individuals, and public agencies at the Federal, State and Territory or local government level that make the greatest contribution to public sector innovation; and
- act in concert with an appropriate university partner(s) such as the Australia and New Zealand School of Government (ANZSOG), to hold an annual international conference on innovation in government, with the aim of it becoming the premier international conference on the subject – the Davos of public sector innovation.

### **Recommendation 10.4**

A rigorous policy of evaluating all Australian Government innovation programs – and other relevant programs – be established. In a way analogous to the requirement that new regulation cannot be implemented without adequate regulatory impact analysis, a policy should be adopted whereby new programs cannot be implemented without an adequate evaluation strategy and funding for evaluation including the collection of 'base data' to evaluate the effects of the program.

## Chapter 11

### **Recommendation 10.5**

Experimentation in innovative policy and administration should be a major theme of the current refashioning of federal relations. States and Territories should be able to bid for federal funds to pioneer innovative approaches and to have their innovations properly and independently evaluated. This could be taken up within the COAG National Partnership Rewards payments currently being negotiated.

### **Recommendation 10.6**

The Australian Government should recognise its role as an active participant in facilitating innovation through procurement practices. In this context, the Government should:

- actively manage its ability to enable and demand innovation in procured services and products given its significant presence as a major purchaser;
- in procurement, be open to participating in risk sharing in relation to innovation demanded;
- explore the use of forward purchase commitments as a means of fostering more innovative approaches to government procurement; and
- work with the State and Territories to implement a pilot Small Business Innovation Contracting program based on the US SBIR design principles, to strengthen the growth of highly innovative firms in Australia.

The Advocate for Government Innovation should operate as a source of expertise and seed funding for the resourcing of such approaches to procurement.

### **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.

### **Recommendation 12.1**

The Prime Minister's Science, Engineering and Innovation Council should be replaced by a new National Innovation Council, chaired by the Prime Minister, and supported by a small but high level Office of Innovation. An International Innovation Advisory Panel would be formed to provide advice to the Council on international engagement.

### **Recommendation 12.2**

To more effectively coordinate the innovation activities of public sector research agencies and to provide a source of co-ordinated advice to the National Innovation Council, a Research Coordination Council should be established.

### **Recommendation 12.3**

The Minister for Innovation should be a joint signatory to any Cabinet proposals from across government significantly bearing on the national innovation agenda, to ensure co-ordination.

### **Recommendation 12.4**

Innovation Australia should be the single major agency responsible for delivering innovation program support for firms. Such programs would be delivered through the AusIndustry network.

### **Recommendation 12.5**

The Australian Government and State and Territory governments should adopt a framework of principles for innovation interventions (as set out in this Review) to enhance consistency in approach across governments and improve the overall accessibility and efficiency of the suite of interventions.

### **Recommendation 12.6**

That governments review the existing suite of programs and develop any new programs in the light of these principles. All program proposals should contain clear *ex ante* evaluation criteria, and provide for the provision or collection of relevant base line data before program implementation. Design principles and rules should be applied consistently. (See proposed design principles in Chapter 4 and Annex 4)

### **Recommendation 12.7**

That senior government officials develop a collaborative mechanism to oversee the agreed approach and report periodically to relevant Australian Government and State and Territory ministers.

### **Recommendation 12.8**

That common metrics, performance indicators and mechanisms for collecting and sharing data be developed and adopted by all jurisdictions.

### **Recommendation 12.9**

That governments together develop a single mechanism (such as a web portal) for providing information to clients about access to the full range of Australian and State and Territory government innovation programs.

### **Recommendation 12.10**

The ABS should be resourced to ensure the longevity and international consistency of innovation data collections and their availability to facilitate effective policy development. The National Innovation Council should advise where additional data collection is required to produce its Annual Statement on Innovation.

### **Recommendation 12.11**

An Annual Statement on Innovation should be prepared by the National Innovation Council and incorporate a clear set of framework indicators. (An initial proposal for these indicators is set out in Annex 12).

### **Recommendation 12.12**

The Australian Government, with the guidance of the National Innovation Council, should establish rigorous and consistent evaluation processes for innovation programs in line with the principle that the function should be carried out on an arms-length and transparent basis.

### **Recommendation 12.13**

A National Centre for Innovation Research should be established to advance knowledge of the innovation system through high quality, independent research which is strongly relevant to policy and practice.



