

INNOVATION KNOW

Powering Ideas

An Innovation Agenda
for the 21st Century

Executive Summary

© Commonwealth of Australia 2009

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FOREWORD



Tough times demand creative solutions. *Powering Ideas* will help us find those solutions. It will help us transform challenges into opportunities, risks into rewards.

This is a ten-year reform agenda to make Australia more productive and more competitive. Increasing our capacity to create new knowledge and find new ways of doing business is the key to building a modern economy based on advanced skills and technologies. It is the key to success in this, the global century.

Innovation is not an abstraction. Nor is it an end itself. It is how we make a better Australia, and contribute to making a better world — a prosperous, fair and decent world, in which everyone has the chance of a fulfilling life.

Senator Kim Carr
Minister for Innovation, Industry, Science and Research

A handwritten signature in black ink, reading "Kim Carr", with a horizontal line underneath.

ABBREVIATIONS

ABS	Australian Bureau of Statistics
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
ERA	Excellence in Research for Australia
GDP	Gross Domestic Product
ICT	Information and communication technology
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
SME	Small and medium-sized enterprise
TCF	Textiles, clothing and footwear

EXECUTIVE SUMMARY

*The 2009–10
Budget includes
\$8.58 billion
for science and
innovation, an
increase of
25 per cent.*

The Australian Government's goal is to create a better Australia — a fairer, richer, healthier and greener Australia that can meet the challenges and grasp the opportunities of the twenty-first century. We will do that by improving the things we make and the way we make them — the services we deliver and the way we deliver them. We will do it by transforming existing industries and building new ones to provide quality jobs. We will do it by making new discoveries and having great ideas. Our aim is to make innovation a way of life.

Innovation is the key to making Australia more productive and more competitive. It is the key to answering the challenge of climate change, the challenge of national security, the age-old challenges of disease and want. It is the key to creating a future that is better than the past.

Investing in innovation is also one of the most effective ways we can cushion Australia against the effects of the global downturn and accelerate recovery. It will simultaneously keep people in work today and generate jobs for the future.

Our capacity for invention and discovery depends on the strength of our national innovation system. This is the system we use to harness the creativity of our people. It is the system we rely on to transform great ideas into great results for the community, the economy and the environment. Genius is wasted if you can't capture it and apply it to the real world. That's what the national innovation system does.

Entrepreneurs, policy-makers, researchers, workers, and consumers are all part of the innovation system. One way to make the system stronger is by strengthening its constituent parts. The other is by strengthening the links between those parts. Australia needs to do both.

Early action

The Government took office on 3 December 2007 keenly aware of two things. First, that innovation is critical to lifting per capita incomes and community living standards. And second, that urgent action was needed to boost Australia's innovation capacity and performance.

The Commonwealth science and innovation budget increased from \$6.56 billion in 2007–08 to \$6.88 billion in 2008–09 — a rise of 5 per cent. The Government is now providing a significant boost in the 2009–10 Budget, which includes \$8.58 billion for science and

innovation. This is 25 per cent more than in 2008–09. This direct investment in Australian innovation is supported by investments in infrastructure to sustain the innovation process — including the National Broadband Network — and in the Education Revolution, which is transforming every stage of the learning journey from pre-school to post-doc.

At the same time, the Government has produced a policy framework to guide the development of Australia's innovation system over the next ten years. *Powering Ideas* outlines that framework.

Gathering evidence and ideas

This paper builds on investigations and policy work undertaken throughout 2008.

It responds to the recommendations of *Venturous Australia — Building Strength in Innovation: Review of the National Innovation System*.

It draws on *Collaborating to a Purpose: Review of the Cooperative Research Centres Program*; *Building Innovative Capability: Review of the Australian Textile, Clothing and Footwear Industries*; the *Final Report of the Review of Australia's Automotive Industry*; the *Final Report of the Pharmaceuticals Industry Strategy Group*; the *Final Report of the Review of Australian Higher Education*; and the House of Representatives Standing Committee on Industry, Science and Innovation's Inquiry into Research Training and Research Workforce Issues in Australian Universities, *Building Australia's Research Capacity*.

It is also informed by the conclusions of the Australia 2020 Summit held in April last year, as outlined in the summit's *Final Report*.

Australia's innovation performance

Australia's recent innovation performance has been uneven, and we have failed to keep pace with the rest of the world. In the last eight years, Australia has slipped from fifth to eighteenth in the World Economic Forum's Global Competitiveness Index. Our multi-factor productivity grew 1.4 per cent a year on average between 1982–83 and 1995–96. Growth has averaged only 0.9 per cent a year since then, which is no better than we achieved in the 1960s. Since 2003–04, our productivity has actually declined.

The reasons for this are not hard to find. Commonwealth spending on science and innovation has fallen 22 per cent as a share of GDP since 1993–94. Business spending on research and development collapsed in the late 1990s, and while it has grown since then, we still lag many of the countries we compete with. The proportion of Australian firms introducing innovations has been stuck at one in three for years. A decade of policy neglect has hurt Australia's innovation performance, making us less productive and competitive, and reducing our ability to meet the needs and aspirations of Australian families and communities.

Australia's innovation system will need to work better if we want to maintain the way of life we value so much.

Meanwhile, the bar keeps rising. China's R&D spending has grown by 22 per cent a year since 1996, compared to 8 per cent a year in Australia. Australia spends 2 per cent of GDP on research and development. Austria, Denmark, Germany, Iceland, Switzerland, Taiwan, and the United States spend more than 2.5 per cent; Finland, Japan, South Korea, and Sweden spend more than 3 per cent; Israel spends more than 4 per cent.

While Commonwealth spending on science and innovation fell to 0.58 per cent of GDP in 2007–08, Denmark is steadily increasing government spending on R&D — from 0.89 per cent of GDP in 2008, to 0.94 per cent in 2009, with a target of 1 per cent in 2010. In the United States, President Obama has pledged to double funding for federal science agencies over the next decade.

There is much more to innovation than laboratory R&D, of course. Improvements to the way we organise, manage, operate, and market things are equally important. Nevertheless, investment in science and technology is critical to the growth of knowledge-based economies, and an important indicator of innovation capacity and performance. Measures like R&D expenditure are commonly used to compare countries, and in recent times, these comparisons have not favoured Australia.

Our innovation system has worked well enough, often enough, to show us what success looks like. Products of the system earning returns for Australia internationally include Google Maps, Biota's flu treatment (Relenza), CSIRO's polymer bank notes and wireless networking technology, CSL's anti-cancer vaccine (Gardasil), Cross Market Surveillance Service's stock market fraud detection system, and Cochlear's bionic ear.

These examples remind us that groundbreaking innovation requires sustained commitment, sometimes for decades. Translating new ideas into money-making products and services takes staying power. It requires an innovation system that offers an unbroken path from vision to realisation. The market alone can't deliver this, and governments have a responsibility to step in where markets fail. It is their job to plug gaps in the system through which ideas might be lost. Too many Australian inventions and discoveries end up being commercialised overseas, where the value they create is captured by others. This costs Australia jobs and wealth, and denies us the chance to build new industries.

Australia has shown that it can produce world-beating innovations, but we have never done it enough, and it is getting harder all the time. Old players are investing heavily to maintain their position, while new ones crowd onto the field. Countries like Russia and South Africa have more than doubled their R&D spending over the past decade. The share of global research and development performed by non-OECD countries increased from 11.7 per cent in 1996 to 18.4 per cent in 2005, and it continues to rise.

Australia's innovation system will need to work better if we want to compete in this environment. It will need to work better if we want to

prevent further productivity decline. It will need to work better if we want to maintain the way of life we value so much.

A stronger innovation system

The Australian Government's investments in research and innovation infrastructure are designed to support jobs and growth in the short-term, while increasing our long-term capacity to produce and commercialise new ideas.

It is essential that we keep thinking beyond the needs of today — hence the ten-year horizon of this agenda. Our objective is to build a stronger national innovation system. This will involve investment in reform and renewal. It will involve setting priorities and strengthening coordination; improving skills and expanding research capacity; increasing innovation in business, government and the community sector; and boosting collaboration — domestic and international — across the system.

National Innovation Priorities

Australia's resources are finite. We can make the most of them by focusing on problems we are uniquely placed to solve, and opportunities we are uniquely placed to grasp. That means setting priorities. The Australian Government has adopted seven National Innovation Priorities to focus the production, diffusion and application of new knowledge. All of these priorities are equally important. They address the country's long-term weakness in business innovation, and in collaboration between researchers and industry. The National Innovation Priorities complement Australia's National Research Priorities, which help focus public-sector research.

Priority 1: Public research funding supports high-quality research that addresses national challenges and opens up new opportunities.

Priority 2: Australia has a strong base of skilled researchers to support the national research effort in both the public and private sectors.

Priority 3: The innovation system fosters industries of the future, securing value from the commercialisation of Australian research and development.

Priority 4: More effective dissemination of new technologies, processes, and ideas increases innovation across the economy, with a particular focus on small and medium-sized enterprises.

Priority 5: The innovation system encourages a culture of collaboration within the research sector and between researchers and industry.

Priority 6: Australian researchers and businesses are involved in more international collaborations on research and development.

Priority 7: The public and community sectors work with others in the innovation system to improve policy development and service delivery.

Measures to renew and expand Australia's publicly-funded research capabilities will yield high returns.

Skills and research capacity

Universities and public research organisations provide knowledge to fuel the innovation system and skilled people to drive it. International evidence suggests that up to three-quarters of private sector patents draw on public sector research. Measures to renew and expand Australia's publicly-funded research workforce, research infrastructure, and machinery for sharing research results will yield high returns.

With this in mind, the Australian Government will ...

Capacity

- Progressively increase the number of research groups performing at world-class levels, as measured by international performance benchmarks.
- Use mission-based funding compacts and other funding mechanisms to promote collaboration by encouraging universities to organise themselves into research hubs and spokes, and to pursue opportunities to undertake industry-driven research more vigorously.
- Progressively address the gap in funding for indirect research costs — *starting by augmenting the Research Infrastructure Block Grants Scheme with a new Sustainable Research Excellence in Universities Initiative.*
- Help smaller and regional universities develop their research capacity by teaming up with other institutions — *supported by a new Collaborative Research Networks Scheme.*
- Increase the capacity of public research organisations, especially to tackle complex problems, participate in domestic and international collaborations, and undertake multidisciplinary research.
- Continue to invest in research infrastructure to support collaboration and give Australian researchers access to the latest technology, guided by the *Strategic Roadmap for Australian Research Infrastructure (2008)* — *building on \$580 million for university research and teaching infrastructure in the first round of the Education Investment Fund, \$321 million for research infrastructure in the second round, and \$901 million for projects identified through the roadmap and funded under the Super Science Initiative; the third round of the Education Investment Fund will be conducted in 2009–10 to maintain the momentum.*

Skills

- Develop a research workforce strategy to address expected shortfalls in the supply of research-qualified people.
- Increase the stipend for Australian Postgraduate Awards — *with an increase of more than 10 per cent announced in the 2009–10 Budget, lifting the stipend to \$22,500 in 2010.*
- Significantly increase the number of students completing higher degrees by research over the next decade — *building on the Government's ambition to lift the proportion of 25–34-year-olds*

with a bachelor's degree and its new incentives to get undergraduates studying maths and science (both of which will enlarge the pool of students qualified to undertake research degrees), as well as its action to double the number of Australian Postgraduate Awards in the 2008–09 Budget.

- Create viable career paths for Australian researchers — *building on the Government's measures to support research trainees (more Australian Postgraduate Awards with higher stipends), early-career researchers (Super Science Fellowships), mid-career researchers (Future Fellowships), and senior researchers (Australian Laureate Fellowships).*

Accountability

- Introduce mission-based funding compacts that allow universities to determine their own research and collaboration agendas in line with national priorities.
- Implement Excellence in Research for Australia to measure the quality of university research and guide the allocation of resources.
- Require universities to provide more meaningful data on research costs through activity-based reporting, and to meet specific performance targets to be developed in consultation with the sector.

Business innovation

While profit opportunities and competition motivate most business innovation, governments can support innovative businesses by reducing impediments and providing incentives to address specific market failures. Australia has relatively few large firms, so it is especially important that we lift the innovation performance of smaller ones. It is also essential that firms can access finance to commercialise their ideas. This was a problem before the global financial crisis; it is a bigger problem now.

With this in mind, the Australian Government will ...

- Aim to increase the proportion of businesses engaging in innovation by 25 per cent over the next decade — *building on initiatives including Enterprise Connect, Clean Business Australia, and the new \$4.5 billion Clean Energy Initiative.*
- Aim to increase the number of businesses investing in R&D over time — *fuelled by the introduction of a new R&D Tax Credit, which will double the tax incentive for small-business R&D (restoring it to pre-1996 levels), and lift the base tax incentive for R&D by larger firms.*
- Support innovative responses to climate change — *including through Clean Business Australia, the Green Car Innovation Fund, the Clean Energy Initiative, the Global Carbon Capture and Storage Institute, and the Climate Change Action Fund.*
- Improve innovation skills and workplace capabilities, including management and leadership skills — *building on Enterprise Connect and the Education Revolution.*

Australia has relatively few large firms, so it is especially important that we lift the innovation performance of smaller ones.

- Support the efforts of Australian firms to get their ideas to market — *through initiatives including Climate Ready, the Green Car Innovation Fund, and the new Commonwealth Commercialisation Institute.*
- Work with the private sector to increase the supply of venture capital — *building on the Government's measures to maintain stability and liquidity in the Australian financial system during the global financial crisis, and on the new Innovation Investment Follow-on Fund.*
- Maintain a continuous dialogue with industry about how we can maximise business innovation — *including through Enterprise Connect, Industry Innovation Councils, and working groups like that established for pharmaceuticals.*

Public sector innovation

The Australian Government must lead the national innovation system by example, embracing new and better ways to develop policy, deliver services, and manage information — both on its own account and through its partners in the community sector. It can also use its procurement powers to stimulate innovation in the private sector.

With this in mind, the Australian Government will ...

- Take advice from the Australian Public Service Management Advisory Committee and the Australian National Audit Office on how the public sector can implement the recommendations of the Review of the National Innovation System.
- Use public procurement to drive research, innovation and technology development by Australian firms — *building on the new Commonwealth Procurement Guidelines released in December 2008.*
- Take steps to develop a more coordinated approach to Commonwealth information management, innovation, and engagement involving the Australian Government Information Management Office and other federal agencies.
- Consider options for reforming the Australian patent system to increase innovation, investment and trade; and supporting intellectual property education for researchers and business.
- Improve the management and regulation of biotechnology and nanotechnology to maximise community confidence and community benefits from the use of new technology — *starting with a new National Enabling Technologies Strategy.*

Collaboration

Collaboration stretches our research dollars further, spreads risk, favours serendipity, propagates skills, and builds critical mass. It is increasingly the engine of innovation. Australia has everything to gain from improving connections within the national innovation system and expanding its participation in international research and innovation networks. It is especially important that we increase the level of collaboration between public researchers and private industry — we rank last in the OECD on this measure.

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is increasingly
the engine of
innovation.*

With this in mind, the Australian Government will ...

- Aim to double the level of collaboration between Australian businesses, universities, and publicly-funded research agencies over the next decade — *building on initiatives including mission-based funding compacts for universities, Enterprise Connect (including its Researchers in Business Program), Industry Innovation Councils, the new Joint Research Engagement Scheme, and the new Royal Institution of Australia.*
- Increase international collaboration in research by Australian universities — *building on actions to open important Australian Research Council awards and fellowships to international applicants, and increase multilateral engagement (for example, in the Square Kilometre Array radio-telescope project).*
- Renew the Cooperative Research Centres Program along the lines proposed in *Collaborating to a Purpose — building on the new program guidelines released in 2008, which reinstate public good as a funding criterion, encourage research in the humanities, arts and social sciences, and increase the program's focus on the needs of end-users.*
- Improve Enterprise Connect's services to individual firms, anticipating that Enterprise Connect will continue to develop and may include regional clusters and networks uniting businesses, researchers and educational institutions.
- Promote proven models for linking public and not-for-profit researchers with industry and the wider Australian community — *including the CSIRO's National Research Flagships and the CSIRO ICT Centre.*

Governance

To ensure that Australia continues to have the right innovation priorities and that we are pursuing them in the right way, we must continuously evaluate our policies and measure our performance. This will tell us what's working, what isn't, and what we can improve. Given the growing complexity of the innovation process, we also need to ensure that the national innovation system is governed effectively.

With this in mind, the Australia Government will ...

- Strengthen the Prime Minister's Science, Engineering and Innovation Council, especially its capacity to look over the horizon and identify emerging trends.
- Use the Commonwealth, State and Territory Advisory Council on Innovation to improve intergovernmental coordination, starting with the design and delivery of business programs.
- Give the interagency Coordination Committee for Science and Technology more responsibility and rename it the Coordination Committee on Innovation.
- Increase the use of metrics, analysis, and evaluation to inform policy development and decision-making.

The future

By 2020, the Australian Government wants a national innovation system in which:

- the *Commonwealth* clearly articulates national priorities and aspirations to make the best use of resources, drive change, and provide benchmarks against which to measure success;
- *universities and research organisations* attract the best minds to conduct world-class research, fuelling the innovation system with new knowledge and ideas;
- *businesses of all sizes and in all sectors* embrace innovation as the pathway to greater competitiveness, supported by government policies that minimise barriers and maximise opportunities for the commercialisation of new ideas and new technologies;
- *governments and community organisations* consciously seek to improve policy development and service delivery through innovation; and
- *researchers, businesses and governments* work collaboratively to secure value from commercial innovation and to address national and global challenges.

We embrace these aims not for what they are, but for what they represent — a radically expanded power to create jobs, build prosperity, save lives, eliminate disadvantage, protect our fragile planet, and increase happiness. Innovation can help us achieve all these things. It is our best hope for a better future.

