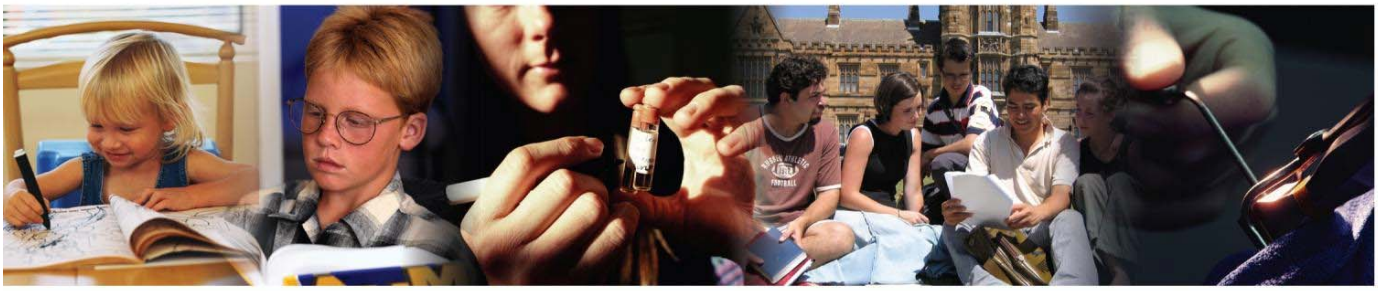
New Directions for innovation, competitiveness and productivity

New Directions paper and a ten point plan for innovation in Australia



April 2007

ALP

www.alp.org.au

New Directions for innovation, competitiveness and productivity

New Directions paper and a ten point plan for innovation in Australia

KEVIN RUDD MP
FEDERAL LABOR LEADER

SENATOR KIM CARR
SHADOW MINISTER FOR INDUSTRY, INNOVATION, SCIENCE AND RESEARCH

April 2007

EXECUTIVE SUMMARY

As Australia looks towards the second decade of the twenty-first century, it faces a range of 'mega-challenges', including more intense competition from regional trading partners like China and India, the ageing of Australia's population and reduction in the size of the workforce, and the great economic, social and environmental challenge of climate change.

To meet these challenges, Australian businesses will need to produce new goods and services that the world wants to buy. Australian businesses will need to find new ways of doing business that are more efficient. Australian businesses will need to be more flexible in dealing with the changing nature and demography of our workforce. Australian businesses will need to increase their energy and water efficiency and cut their greenhouse gas emissions.

Through innovation, Australian businesses will develop new solutions to meet these challenges.

This paper argues that the long term prosperity of our economy, industry, and business rests in being more innovative and more productive.

In the twenty-first century, innovation policy is industry policy.

This paper identifies worrying trends in Australia's economic indicators that are linked to its innovation performance:

- Productivity growth has been falling. Labour productivity growth fell from an average annual 3.2 per cent to 2.2 per cent in the latest five year period (1998-99 to 2003-04) compared with the previous five year period. During the same period, multifactor productivity growth fell from 2.1 to 1.0 per cent.[1]

- Benchmarked against the United States economy, Australia's labour productivity fell back from a peak of 85 per cent to just 79 per cent between 1998 and 2005, almost completely losing the relative gains of the 1990s.[2]

- International competitiveness has been falling. Growth in Australian export volumes has been slower this decade than in any other since World War II and our run of 59 consecutive monthly trade deficits is a record.[3]

While many factors have contributed to these outcomes, some have been beyond the control of business strategies and government policies. For example, the strength of the Australian dollar has constrained manufacturing and key services exports, and the drought has constrained agricultural exports. However, it is the trend deterioration in some indicators of Australia's economic performance that is of great concern. Australia's deteriorating productivity and export performance highlight the critical need for Australian businesses – across the economy – to adapt and be innovative to meet the challenges of coming decades. For example, the following performance indicators must be improved:

- Almost two thirds of all Australian businesses are classified as 'non-innovators' by the Australian Bureau of Statistics, meaning they had not introduced new products, services, operational processes or organisational processes in the past two years.[4]

[1] Parnham, Dean and Wong, Marn-Heong (2006) *How Strong is Australia's Productivity Performance?* Productivity Perspectives Conference, Productivity Commission
[2] Groningen Growth and Development Centre, Total Economy Database, October 2006
[3] ABS Catalogue 5368.0, *International Trade in Goods and Services*, January 2007
[4] ABS, *Innovation in Australian Business*, Cat No. 8158.0, 7 December 2006

- Australia is ranked 15th in the OECD by investment in research and development, which at 1.8 per cent of GDP is well below the OECD average of 2.3 per cent.[5]

- The average annual growth rate of real business investment in R&D fell from 11.4 per cent in the period 1986-87 to 1995-96, to only 5.1 per cent in the decade from 1995-96 to 2004-05.

- Australian venture capital is only around 0.1 per cent of GDP, less than half the OECD average. Early stage venture capital is only 0.025 per cent of GDP, less than a quarter of the OECD average.[6]

- Australian businesses must contend with a confusing and non-integrated innovation system. Australia has 169 government programs aimed at supporting business innovation.[7]

The argument advanced in this paper is that Australia can improve its economic performance and secure its future prosperity by training a more creative workforce and facilitating more innovation in the Australian economy. The paper also identifies that innovation is crucial in building a fairer and more sustainable economy, including through its in role addressing social and environmental challenges.

The paper identifies key areas where Australia can improve its innovation policies and performance, providing a ten point framework for Labor's innovation policy:

1. Build a culture of innovation and new ideas by strengthening investment in creativity and knowledge generation.

2. Focus incentives for business R&D to promote global competitiveness, delivering the best outcomes for exports and economic growth.

3. Accelerate the take up of new technology, so Australian firms can access the best ideas from around Australia and the rest of the world.

4. Make Australia's innovation system truly international, by supporting partnerships, collaboration and foreign investment in Australian R&D.

5. Use government procurement to support innovative Australian firms.

6. Strengthen publicly funded innovation and research infrastructure and develop multiple pathways for industry to access the knowledge and expertise in universities and research agencies.

7. Strengthen the skill base for innovation, including in maths, science and engineering, and professional training for firms to manage innovation.

8. Develop and implement a set of national innovation priorities, with a broader focus than the current national research priorities.

9. Strengthen the governance of the national innovation system to support higher expectations of government agencies and business.

10. Review the bewildering array of government innovation and industry assistance programs to reduce duplication and improve effectiveness.

[5] OECD *Main Science and Technology Indicators* 2006
[6] OECD, *Economic Policy Reforms: Going for Growth*, 2006, p.64
[7] House of Representatives Standing Committee on Science and Innovation, *Pathways to Technological Innovation*, June 2006

A key finding is the need for national leadership to drive improvements in Australia's innovation performance. To promote national leadership in innovation a Rudd Labor Government will:

- establish ten *Enterprise Connect* innovation centres around Australia to connect business people with ideas people, with an investment of up to $200 million over four years;

- restore the Chief Scientist to a full-time position, in recognition of the fundamental contribution science makes to the nation's wellbeing;

- establish Industry Innovation Councils for key sectors to support the *Enterprise Connect* network by building partnerships among all participants in the supply chain and developing long-term strategic approaches to improving productivity; and

- bring responsibility for innovation, industry, science and research within the one Department.

These initiatives build on policies Labor has already announced that will make Australia more productive and innovative and ensure that all Australians have access to a stake in the nation's innovation future. Under these policies, a Rudd Labor Government will:

- revolutionise Australia's communications infrastructure by investing, in partnership with the private sector, up to $4.7 billion over five years to create a new world class National Broadband Network and connect 98 per cent of Australians to high speed broadband internet services;

- provide $111 million over four years in financial incentives for university students to study and teach maths and science;

- substantially increase the Mandatory Renewable Energy Target and set up a $500 million National Clean Coal Initiative and a $500 million Green Car Innovation Fund to generate additional investment in innovation to tackle climate change and protect Australian jobs;

- invest in Early Childhood to give our children the best start in life, boosting their capacity to learn and be healthy, thus maximising their education and employment opportunities later in life; and

- set up a National Curriculum Board to develop a rigorous, consistent and quality curriculum for all Australian students – from kindergarten to year 12.

Contents

1. Introduction

The Australian economy has enjoyed a long period of continued economic growth and prosperity dating back to the period of the previous Labor Government. But economic conditions are ever changing. The conditions that created the prosperity we have enjoyed in recent years will not guarantee long term prosperity. If we are to have high standards of living into the future, we must adapt to changing global conditions.

Looking ahead to the second decade of the twenty-first century, every Australian business, and the Australian economy as a whole, faces challenges both old and new:

- **Boosting productivity growth**. Benchmarked against the United States economy, Australia's labour productivity fell back from a peak of 85 per cent to just 79 per cent between 1998 and 2005, almost completely losing the relative productivity gains of the 1990s.[8] Australia must reverse this trend because productivity growth is the key to improving future living standards.[9]

- **Increasing international competitiveness**. Australian businesses must be able to produce goods and services the world wants to buy if Australia is to address its large external imbalances. Deteriorating export performance in recent years has contributed to an unprecedented 59 consecutive monthly trade deficits.

- **Sustaining prosperity beyond the mining boom**. Australia is likely to face moderating conditions in global resources markets, removing the positive boost to national income from higher terms of trade that in 2006-07 added $55 billion to the economy.[10]

- **Meeting the challenge of China and India**. As a small open economy, Australia has always faced a tough international trading environment. However, the industrialisation of regional giants like China and India will intensify competition in manufacturing and service industries like never before.

- **Skilled workers in an ageing population**. The ageing of Australia's population will put greater strain on the nation's health system and the federal budget and could reduce the pool of skilled workers in some industries. Maintaining high levels of workforce participation and productivity will be critical in overcoming this challenge.

- **Addressing climate change**. The world faces higher temperatures, more variable weather conditions, and consequent threats to the earth's fragile eco-system. Australia contributes disproportionately to climate change and will be disproportionately affected by it. Australia also exports large amounts of commodities that contribute to emissions in other countries. For all these reasons Australia should take a lead in finding innovative solutions to these environmental problems.

Australian governments must implement new economic policies to meet these challenges and sustain Australia's prosperity into the second decade of the twenty-first century and beyond. Critical to these policies is how Australian governments facilitate business solutions. Australia will need businesses that are more productive, that can take on competitors from advanced and industrialised economies, can prosper beyond the resources boom, and find new solutions to the challenge of climate change.

Australian businesses will meet these challenges through innovation.

---

[8] Groningen Growth and Development Centre, *Total Economic Database*, October 2006

[9] It has recently been argued that "policy and institutional change may be needed" for Australia to catch up some distance on US productivity levels because geographical and historical factors constrain Australia's productivity performance (see the Productivity Commission's March 2007 Staff Working Paper *Can Australia Match US Productivity Performance?*).

[10] Calculated by Economics@ANZ, based on ABS statistics of the faster growth rate of gross domestic income ahead of gross domestic product, cited by ANZ Chief Economist, Saul Eslake, September 2006

Australian businesses will not be able to meet these challenges with 'elbow-grease' alone. Old ways of thinking and doing businesses will not be enough. Australian businesses will need to produce new goods and services. They will have to produce and deliver them with different production processes and new forms of organisation. That is exactly what innovation is all about.

In the twenty-first century, industry policy is innovation policy.

Innovation policy encompasses a broad suite of measures stretching from research in the laboratory, where ideas are developed, to the cashier where goods are purchased. Innovation policy is about creating and applying new technologies, fostering new ways of thinking and doing business and building highly-skilled and creative workplaces. Building an innovative workforce – and giving all Australians a stake in the nation's innovation future – is why Australia needs an education revolution.

While there is a broad bipartisan consensus on macroeconomic policy in Australia, significant differences are emerging in areas of microeconomic policy such as innovation policy.[11]

This paper argues that innovation policy is a critical element of a nation's overall economic policy; explains where innovation fits into businesses and into the Australian economy; surveys Australia's broad innovation performance and recent trends in key indicators; and presents a ten-point framework of where Australia's innovation policy can improve.

The conclusion of this paper is simple: Australia needs better policies that foster a culture of innovation today to build our long term prosperity for tomorrow.

[11] See Former Reserve Bank Governor, Ian Macfarlane, December 2006, *The Search for Stability*, Boyer Lectures, ABC Radio National and ANZ Bank Chief Economist Saul Eslake in January 2007 presentation: *The Australian Economy: Presentation to Economics and Politics students from the University of Delaware*

2. Innovation in business and the economy

2.1 Innovation drives economic growth

A strong consensus of economists, business analysts and policy makers identify innovation as central to a nation's economic performance. The days when a nation's economic health could be built on favourable endowments of inputs to production like abundant land, precious minerals, or raw labour resources are over. Businesses in all economies, but especially in advanced economies like Australia, are increasingly reliant on new ideas and their application, in order to remain competitive in a tough global marketplace.

> "Most of the rise in material standards of living since the industrial revolution has been the consequence of innovation. New or improved products and services – and new and improved ways of producing them – have for a long time been the main motor of economic growth."
>
> OECD, *Economic Policy Reforms: Going for Growth 2006*

> "Innovation is a key driver of economic growth."
>
> ABS, *Innovation in Australian Business*, Cat No. 8158.0, 7 December 2006

> "Technological progress and commercial innovation lie at the heart of ongoing productivity growth in modern economies."
>
> ACCI, *The Future of Australia's Manufacturing Sector: A Blueprint for Success*, January 2007

> "Innovation is a key determinant of economic growth and improvements in living standards over the long run."
>
> Gene Tunny, Macroeconomic Policy Division, Australian Treasury
> *Innovation across the OECD: A review of recent studies*
> Economic Round-up, Summer 2006

> "While productivity has become the primary determinant of our economic prosperity as a nation, the ability to innovate has become an increasingly important factor in productivity growth. Improvements in Australia's productivity growth as a result of two decades of micro-economic reform are beginning to fade. In a global and domestic economy in which knowledge and know-how is becoming increasingly important, the way we use and apply knowledge is now as important to the value-add in the economy as efficiencies in production."
>
> *New Pathways to Prosperity: A National Innovation Framework for Australia*
> Business Council of Australia, November 2006

> "Over the past half-century, the increase in the value of raw materials has accounted for only a fraction of the overall growth of US gross domestic product. The rest of that growth reflects the embodiment of ideas in products and services that consumers value. This shift of emphasis from physical material to ideas as the core of value creation appears to have accelerated in recent decades… Ideas are at the centre of productivity growth."
>
> Alan Greenspan, February 2004
> Remarks to the Stanford Institute for Economic Policy Research Economic Summit

Being innovative is the best means of dealing with risks and creating opportunities for the businesses and jobs of tomorrow. Innovative businesses are changing businesses. They offer new products and services, and undertake production and delivery in new and more efficient

ways. Australia simply must produce goods and services that the world wants to buy – that means offering new and improved goods and services, and doing things better, faster and of better value.

An innovative economy is likely to be an internationally competitive and prosperous economy. Higher levels of innovation will help Australian businesses break into overseas markets and boost Australia's exports, helping to address the nation's large trade imbalance.[12] Innovation has also been identified as the primary defence for Australian businesses, especially manufacturers, against increasing competition from China and other emerging-market players.[13]

In short, innovation keeps the economy competitive, boosts profits for businesses, and offers workers and families better jobs and a better way of life.

2.2 Innovation for the environment and society

It is important to note that it is not only business that innovates, and that firm productivity is not the sole driver or outcome of innovation. Innovation also occurs across the government and community sectors, resulting in better ways of delivering services, from health care to public transport. Research and innovation are central to improvements in Defence Force capability and the capacity to tackle environmental challenges such as salinity, drought and climate change.[14]

In many instances, government and business will work together to find solutions to the challenges we face as a society. For example, part of government's role in responding to climate change is to establish a framework to encourage business innovation:

> "We need to turn our innovators loose. … We need to understand where we're going so that our businesses, our scientists, our engineers can get to work on the technologies that we'll need [to address climate change]."[15]

This paper focuses on business innovation and its role in driving productivity growth. However, the ten point plan outlined in Section 4 acknowledges both implicitly and explicitly that a comprehensive national innovation system not only leads to a more productive economy but also a healthier environment and stronger, fairer society.

2.3 A framework for understanding innovation

A consistent theme in economic and business literature is that innovation is too often narrowcast as being simply about inventions, science, technology and new products. The traditional view of innovation as only about the development and application of scientific research has well and truly passed its use-by-date. Knowledge creation, while important, does not sufficiently capture the breadth of innovation activities undertaken by Australian businesses.[16] Indeed, innovation is where white coats meet blue collars.

The ABS defines business innovation as the introduction of a new or significantly improved: good or service; operational process; or organisational/managerial process.[17] In short, innovation is simply how a business uses knowledge to better meet the needs of customers – either through new goods and services that are demanded by consumers, or by offering them

[12] See, for example, the 2005 National Manufacturing Summit's *Innovation in Manufacturing* and ANU Professor Mark Dodgson, quoted on Radio National, 13 February 2000
[13] KMPG (2006) *Globalisation and Manufacturing Survey*
[14] Productivity Commission, *Public Support for Science and Innovation*, Research Report, 7 March 2007
[15] Tony Haymet, Speech to National Climate Change Summit, 31 March 2007
[16] See, for example, Business Council of Australia N*ew Concepts in Innovation: The Keys to a Growing Australia*, March 2006
[17] ABS, *Innovation in Australian Business*, Cat No. 8158.0, 7 December 2006

at a lower price, as a result of improved internal processes. While technology is obviously a critical enabler of much innovation, it is customer needs and market dynamics that drive innovation.[18] As noted by Professor Jonathan West:

> "Much innovation policy is based on an implicit assumption that … scientific researchers first discover useful things, engineers then transform these discoveries into manufacturable products, after which the marketers sell the results to customers…In fact, innovation projects more often begin at the end point of the sequence outlined above. Companies usually start by leveraging their understanding of particular customer needs … Usually, firms endeavour to create new products by utilising their own existing capabilities …"[19]

Over time, innovation has become more focused on customers, on knowledge and information, and on human capital.[20] Innovation is not confined to research work, but occurs across all parts of a business. Most innovation is incremental, rather than revolutionary – it is aimed at improving products and services, rather than creating entirely new ones.[21] And innovation is not only about new businesses, but adding value to existing businesses. Even countries with a significant reliance on natural resources have a lot to gain from innovation.

Innovation does not require a firm to have its own idea for new or improved products or processes. The application of someone else's idea or technology (known as diffusion) is the final link in the innovation chain:

> "Most Australian industry innovation … generally does not involve a new to the world technology, service, process or organisational change, but more commonly encompasses 'new to the business' or 'new to the industry' innovation."[22]

Indeed, diffusion is critical for Australia, which contributes only 2 per cent of the world's innovation. How to access the other 98 per cent of new technology and process innovation is a key challenge for a small, open economy.[23]

Innovation systems go to the very nature of the modern market economy, and they are necessarily complex. In its *Innovation Report 2004-05*, the Australian Government identified six components of innovation: knowledge creation, human resources, finance, knowledge diffusion, international collaboration, and market outcomes.

Human capital is integral to a nation's innovation performance. A more skilled and creative workforce is better able to generate new ideas and to apply them in business. This means improving scientific and technical education and also improving education to foster a more creative and entrepreneurial workforce.

> "...how many times does it have to be said? The government has to increase its investment in universities and technical education. You can't have an innovative, knowledge economy without knowledgeable, creative people."
>
> ANU Professor Mark Dodgson, Radio National, 13 February 2000

---

[18] Business Council of Australia (March 2006) *New Concepts in Innovation: The Keys to a Growing Australia*

[19] West, J, *A Strategy to Accelerate Innovation in NSW: Outline for Policy Development*

[20] Business Council of Australia, *New Concepts in Innovation: The Keys to a Growing Australia*, March 2006.

[21] Business Council of Australia, *New Concepts in Innovation: The Keys to a Growing Australia*, March 2006. See also KPMG, *Globalization and Manufacturing*, global survey of senior executives of manufacturing companies.

[22] DITR, Submission 93 to Productivity Commission Review of Public Support for Science and Innovation, p. 34

[23] ACCI, *The Future of Australia's Manufacturing Sector: A Blueprint for Success*, January 2007

> "...there is a substantial body of opinion that skills in the workforce increase the rate of innovation through fostering the absorption and further development of technologies."
>
> Productivity Commission, 2002, *Skill and Australia's Productivity Surge*

The importance of human capital to innovation has also been highlighted by the Business Council of Australia, which has called for a "national commitment to invest in human capital and infrastructure, including schools and universities, vocational education and training and provision of lifelong learning".[24] According to a recent skills report, Australia not only needs a workforce with higher levels of technical skills, but also more developed 'soft-skills', such as communication, teamwork, problem-solving, entrepreneurship and leadership, if Australia is to have a more innovative economy.[25] Researchers also identify open and competitive markets as critical to boosting the 'absorptive capacity' of the economy – the "capacity to understand and make use of new knowledge".[26]

While Australia's innovation system is complex, various attempts to benchmark its performance have been undertaken by international and domestic researchers. The following section analyses Australia's broad innovation performance, and recent trends in key components of innovation such as research and development and venture capital.

CASE STUDY: The Australian wine industry – Innovation drives export success

Innovation has been a strength of the Australian wine industry since the 1950s. Today, Australia produces around 3.5 per cent of the world's wine, but it accounts for about one in five technical papers on wine published internationally. So it is no exaggeration to say that Australian wine producers and the researchers working with them are redefining the world of wine. Australian innovation has changed the way grapes are grown, vinified, packaged and marketed around the globe.

The quality and saleability of Australian wine has been improved by innovations in the vineyard and, such as night harvesting and widespread adoption of water-saving drip irrigation; innovations in processing, such as the widespread development and implementation of rotary fomenters in the early 1990s; and innovations in international marketing, accompanied by targeted industry investment.

Many of these innovations arose from an organised system of collaborative research, innovation and marketing, demonstrating the benefits of industry cooperation and strong links between industry and research agencies.

The result has been a boom in exports since the early 1990s. Wine exports have risen from 54.2 million litres in 1990-91 to a staggering 722.0 million litres in 2005-06, making Australian the world's fourth largest wine exporter.

Source: Innovation Australia, www.innovationaustralia.net; and ABS, *Sales of Australian Wine and Brandy by Winemakers*, Cat No. 8504.0, Feb 2007

[24] Business Council of Australia *New Pathways to Prosperity: A National Innovation Framework for Australia*, 2006 p. 26
[25] Allen Consulting*, World Class Skills for World Class Industries*, 2006
[26] Gene Tunny, *Innovation across the OECD: A review of recent studies*, Treasury Economic Roundup, 2006 p.73

3. Australia's innovation performance

3.1 Australia's overall innovation performance shows room for improvement

Australia's long period of continued economic expansion, which dates back to the previous Labor Government, highlights the success of Australian businesses in introducing new ways of doing business and new goods and services for the Australian and global marketplaces. Innovative Australian businesses, alongside decades of economic reform and recent favourable external conditions, have been critical factors in Australia's recent economic successes. Whether Australia remains a prosperous nation depends on the future capacity of Australian businesses to be innovative.

Some broad measures of business performance suggest that there is room for improvement in Australia's innovation performance, which will in turn boost productivity:

- Productivity growth has been falling. Labour productivity growth fell from an average annual 3.2 per cent to 2.2 per cent in the latest five year period (1998-99 to 2003-04) compared with the previous five year period. During the same period, multifactor productivity growth fell from 2.1 to 1.0 per cent.[27]

- Benchmarked against the United States economy, Australia's labour productivity fell back from a peak of 85 per cent to just 79 per cent between 1998 and 2005, almost completely losing the relative gains of the 1990s (see Chart 1).[28]

- International competitiveness has been falling. Growth in Australian export volumes has been slower this decade than in any other since World War II and our run of 59 consecutive monthly trade deficits is a record.[29]

Chart 1: Australian labour productivity as a percentage of US

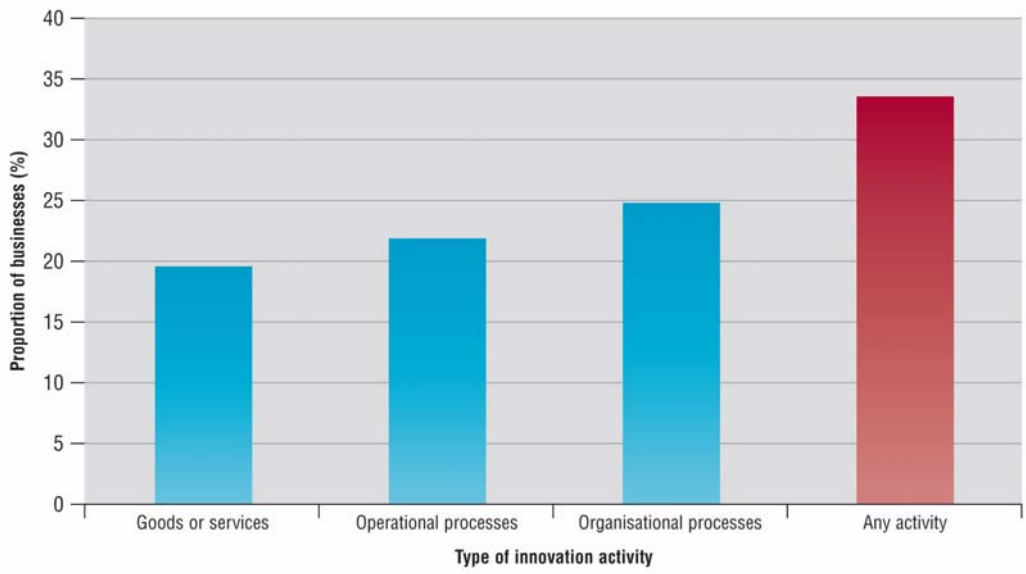
Source: Groningen Growth and Development Centre, Total Economy Database, October 2006

[27] Parnham, Dean and Wong, Marn-Heong (2006) *How Strong is Australia's Productivity Performance?* Productivity Perspectives Conference, Productivity Commission
[28] Groningen Growth and Development Centre, Total Economy Database, October 2006
[29] ABS Catalogue 5368.0, *International Trade in Goods and Services*, January 2007

A more direct assessment of Australia's innovation performance by the Australian Bureau of Statistics confirms that while the proportion of Australian businesses that are innovative is similar to levels in comparable economies such as New Zealand and the European Union, there are areas where significant improvements can be made. [30]

According to the ABS, over 2004 and 2005, just over a third of Australia's businesses (33.5 per cent), undertook some form of innovation (see Chart 2). Looking at this from the opposite direction – almost two thirds of businesses are classified as 'non-innovators'. That is a substantial number of businesses.

Chart 2: Innovation in Australian businesses



Source: ABS, 2006, Innovation in Australian Businesses 2006, Catalogue 8158.0

This report identified some key characteristics of Australia's innovative businesses:

- In 2004-05, businesses spent $30.6 billion on innovation and related activities, representing 3.7 per cent of total business expenditure.

- Almost a quarter of all businesses undertook innovation in organisational or managerial processes (24.9 per cent), while 21.6 per cent implemented new or significantly improved operational processes and almost one in five (19.4 per cent) introduced new or significantly improved goods or services in the two years to 2005.

- Larger businesses with 100 or more employees were much more likely to be innovative (51.5 per cent) than small businesses with 5-19 employees (28.4 per cent). Similarly, businesses with more than 10 per cent foreign ownership had significantly higher levels of innovation (at almost 59 per cent), than wholly Australian owned businesses (33.6 per cent).

- Innovation activity was concentrated in certain industries such as electricity, gas and water supply (48.8 per cent of businesses innovating), wholesale trade (43.4 per cent) and manufacturing (41.7 per cent). Significant increases were recorded in the wholesale trade, mining and hospitality sectors, but there was a marked fall in innovation by communication services companies.

[30] ABS, *Innovation in Australian Business*, Cat No. 8158.0, 7 December 2006

- Innovative businesses get their ideas from many sources. For example, 75.8 per cent of innovating businesses sourced ideas internally, 69.9 per cent from market sources, such as clients, suppliers, consultants and competitors, and 43.6 per cent from external sources such as meetings, journals and conferences.

- Acquiring new equipment or technology, or hiring new skilled staff were the main methods used to acquire knowledge or abilities to introduce new goods, services and processes.

These results suggest that if Australia is to boost its innovation performance, it will need new ways of facilitating innovation in areas where the barriers to innovation are the highest – in smaller businesses and businesses with less exposure to international developments and trends. Australia will also need to boost its collaboration effort and a build highly trained and creative workforce to foster even more innovation.

CASE STUDY: Wotif.com – transferring ideas from one industry to another

In four years, Brisbane company Wotif.com turned a simple idea into a domestic and international success, becoming Australia's third most visited travel website and opening offices in Canada, New Zealand, Singapore and the United Kingdom. The website now lists more than 6,000 hotels, motels, serviced apartments, resorts and guest houses in 36 countries.

Wotif.com started life as a great idea: offering vacant hotel rooms at cut-price rates to last-minute travellers. The practice, known as yield management, began in the aviation industry in the 1970s, when the industry started lowering prices in response to demand, to ensure that as many seats as possible are occupied.

Chief executive officer and company co-founder, Graeme Wood, saw the potential to use his marketing and software expertise to build on the experience of the aviation industry and fill a gap between the hotel sector and customers who were increasingly comfortable searching for accommodation and booking online.

Wotif.com is a company that is well aware it needs to keep on innovating to maintain its success. As Graeme Wood says, "… big ideas must be followed up with lots of little ideas. You must continue to apply innovative approaches to your business. … Every little thing is an improvement. I don't think innovation is about high technology. Whether you have a big idea or a little idea, creativity is the foundation of innovation."

Source: DITR, Case Studies, innovation>business>success – an information guide for SMEs; and AusIndustry, Success Stories, www.ausindustry.gov.au

3.2 Most developed economies have greater innovation capacity than Australia

Consistent with the national assessment of Australia's innovation performance by the Australian Bureau of Statistics, international studies also highlight the gaps in Australia's innovation performance.

In 2006, Australia was ranked 24th on innovation, according to the World Economic Forum's *Global Competitiveness Report* – only just making it into the top 20 per cent of the 125 nations surveyed. This placed Australia behind innovation leaders in North America, Scandinavia and Europe, as well as a number of economies in our own region – Japan, Taiwan, Singapore, South Korea and Malaysia. Ranked 26th, India is catching up. Indeed,

India ranked ahead of Australia on one of the two pillars identified as "innovation factors" – coming in 25th on business sophistication, compared with Australia's 28th.[31]

Analysis of the seven subindexes that comprise the innovation pillar identified only two areas of notable competitive advantage for Australia, with rankings of 10th in intellectual property protection and 16th in the quality of scientific research institutions. In terms of notable competitive disadvantages identified, Australia ranked:

- 21st in the number of patents for innovation granted, per million population;
- 25th on university/industry research collaboration;
- 28th on company spending on research and development;
- 30th on government procurement of technology products based on technical performance and innovativeness rather than simply price;
- 35th in capacity for innovation, or the degree to which companies conduct formal research or pioneer new products and processes; and
- 35th in the availability of scientists and engineers.

Overall, the World Economic Forum's report suggests a disconnect between the efforts of policy makers and public research agencies and their impacts at the industry and business level.[32] Ensuring that government policies have more impact on business innovation activities should be a priority for Australia.

The OECD's analysis of the component parts of Australia's innovation system backs this up, generally identifying good outcomes from scientific performance, skills base and use of technology. Low expenditure on business research and development and weak linkages between public researchers and industry were considered the major impediments to an improved innovation performance.[33]

A particularly worrying development, given that Australia has fallen further behind the United States in its productivity performance over recent years, is the extent to which key figures and organisations in that country are expressing concern about its performance. For example, in early 2006, the Augustine report to the President and Congress, *Rising above the gathering storm*, warned that the United States was in danger of losing its competitiveness. The report's recommendations were focused on rebuilding the pool of students in maths, science and technology by vastly improving the school system; strengthening the nation's commitment to basic research; improving the higher education system; and providing a supportive environment for innovation.[34]

The United States' response to the challenges from the changing economic geography of competition is characterised by both a holistic framework of thinking and a sense of urgency. Both of these characteristics are absent from the approach of the current Australian Government.

[31] World Economic Forum, *Global Competitiveness Report 2006*
[32] For example, see also World Economic Forum, *Global Competitiveness Report 2003*
[33] OECD (2004) *Public-private partnerships for research and innovation: an evaluation of the Australian experience*
[34] Norman R. Augustine, *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, Washington, 2006

3.3 Australia's research and development performance

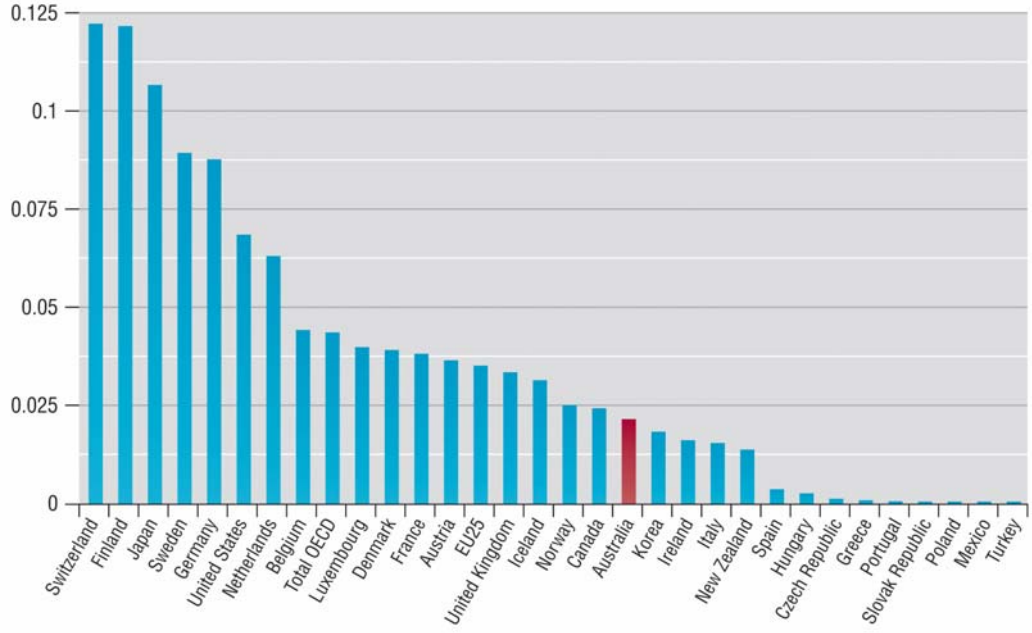
A critical driver of a nation's innovative capacity is its research and development performance and the strength of its research institutions. Universities, as research hubs with major research personnel resources, are critical to building Australia's research capacity.

International surveys suggest that, by world standards, Australia's university sector is not driving innovation as well as in many competitor nations. Such surveys, which measure research output (as well as teaching and graduate outcomes) show that Australia's universities are poorly rated compared with their counterparts in North America, Europe and East Asia. The *2006 Times Higher Education Supplement* survey, for example, rated only one Australian university in the world's top 20 – the Australian National University (at 16th place).

According to the Shanghai Jiao Tong University's Institute of Higher Education ranking system, Australia has two universities in the world's top 100 – the Australian National University and the University of Melbourne. In this survey, most of Australia's top 16 universities did not even rank in the top 200.

Likewise, Australia's research output, measured by number of patent families per thousand people, is very low by international standards (see Chart 3).

Chart 3: Number of patent families per thousand capita population in OECD countries



Source: OECD Main Science and Technology Indicators 2006

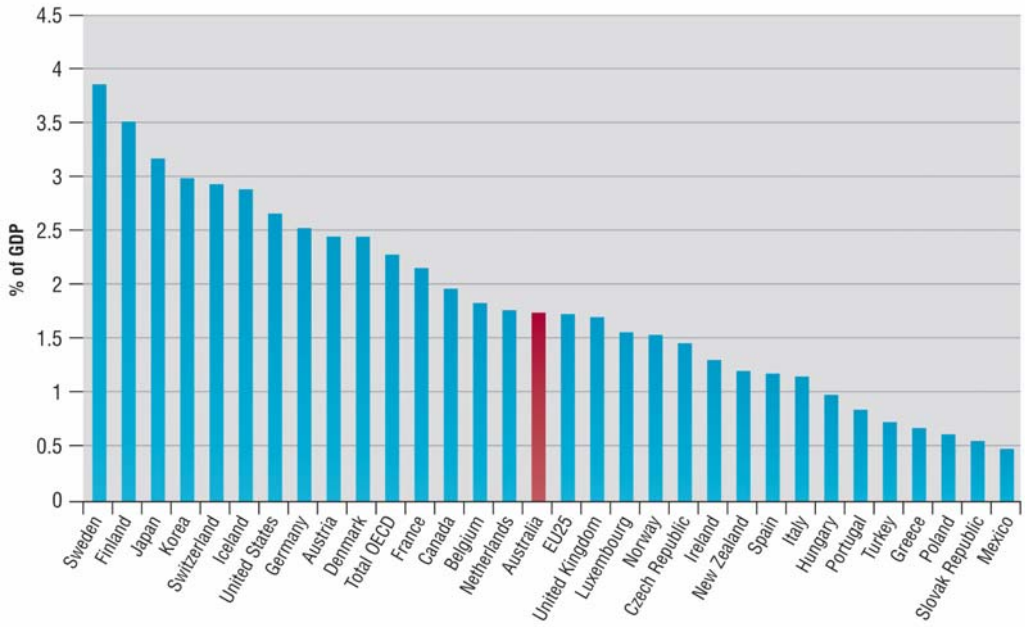
While Australia's researchers have always punched above their weight in terms of achieving scientific breakthroughs, the capacity for Australia to maintain its reputation in this area and to improve its broader research performance is under threat. A major factor here is the small proportion of the workforce with degrees in maths and statistics; only 0.4 per cent of Australian university students graduate with maths and statistics qualifications compared with an OECD average of around 1 per cent.[35]

[35] *Mathematics and Statistics: Critical Skills for Australia's Future*, December 2006: p.8

Under-investment in Australia's research activities has also played a crucial role. Investment in research and development in Australia, at only 1.8 per cent of GDP, is well below the OECD average of 2.3 per cent, and behind 14 other OECD countries (see Chart 4).[36]

Business investment in research and development, at 0.95 per cent of GDP, is also well below the OECD average of 1.53 per cent and behind 14 other OECD nations,[37] despite a significant increase during the mid 1980s and mid 1990s.[38]

Chart 4: Gross domestic expenditure on R&D in OECD countries



Source: OECD Main Science and Technology Indicators 2006

While Australia's overall low level of research and development expenditure is generally attributed to its distance from foreign markets, lower level of trade intensity, and lack of research intensive industries such as pharmaceuticals and electronics,[39] policy decisions too have played a role.[40] Despite committing to "...improve Australia's international ranking in terms of expenditure on business R&D, as a share of GDP" at 1996 election, the Howard Government's main policy – to cut the research and development tax concession from 150 per cent to 125 per cent – has seen business investment in research and development grow in dollar terms at half the rate of the previous decade.

The Prime Minister's Science, Education and Innovation Council's Working Group on Asia highlighted the continuing failure of Australia's investment in research infrastructure to reach a scale that would enable Australia to be internationally competitive in research:

> "The universities need substantial funding to address their global competitiveness and capture opportunities. They need this funding to build world class infrastructure to attract the best researchers in their field…"[41]

[36] OECD, *Main Science and Technology Indicators*, 2006
[37] OECD, *Op cit.*
[38] Zheng and Shanks, *Econometric Modelling of R&D and Australia's Productivity*, Productivity Commission Staff Working Paper, April 2005
[39] See, for example, Jaumotte, F and Pain, N, 'From ideas to development: the determinants of R&D and patenting', *OECD Economics Department Working Paper*, no. 457, 2005
[40] In its 2006 *Going for Growth Report*, the OECD argued that even when adjusted for variations in industry structure, Australia still had a low level of R&D intensity compared with other OECD countries
[41] *Strengthening Australia's position in the new world order*: Working Group on Asia Report to PMSEIC, June 2006, p. vi

The importance of research and innovation has also been highlighted by the Australian Vice-Chancellors' Committee, which has recommended that Australia pursue a national innovation strategy that includes, among other targets, the goal of increasing Australian investment in research and innovation to 2 per cent of GDP by 2010 and to 3 per cent of GDP by 2020.[42]

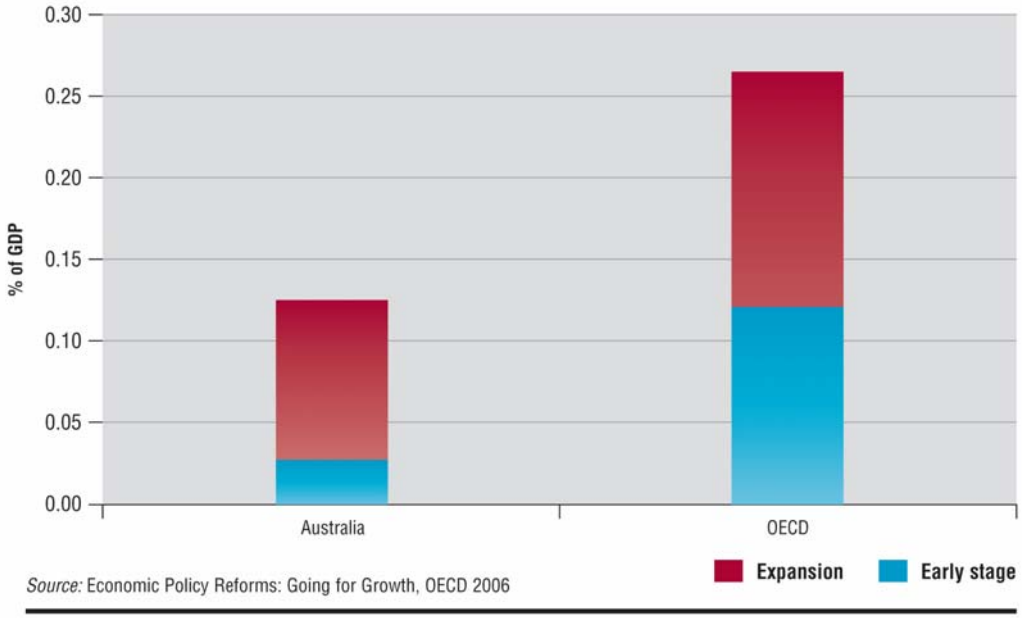
3.4 Australia's venture capital performance

Another critical input to Australia's innovation performance is access to capital. Venture capital assists firms in starting-up, expanding or commercialising an idea or technology. Venture capital includes general private sector capital providers (such as banks or investors), corporate capital (companies), venture capital funds or, in some cases, Government assistance. Venture capital funds generally make an equity investment in private firms, and may also bring management expertise and strategic advice as well as capital.

Venture capital is often the vehicle used for promoting the start-up and growth of highly innovative businesses, as venture capital is generally used for high-risk ventures with an expectation of high returns.

Australian venture capital is only around 0.1 per cent of GDP, less than half the OECD average (see Chart 5). Early stage venture capital is only 0.025 per cent of GDP, less than a quarter of the OECD average.[43]

Chart 5: Venture capital investment



Source: Economic Policy Reforms: Going for Growth, OECD 2006

In addition to the small pool of available capital, Australian industry faces a number of other impediments to raising capital, especially venture capital, including: the perception by financiers and capital providers that Australian industry is not as high-tech and profitable as industry in other countries; and lack of skills (especially in small and medium enterprises) in formulating a competitive proposal or 'selling' the opportunities for strong returns from investment in early stage businesses.

[42] AVCC Submission to the Productivity Commission Research Study on Public Support for Science and Innovation, August 2006.
[43] Economic Policy Reforms: Going for Growth, OECD 2006, p.64

In its analysis of Australia's innovation performance, the OECD recommends that Australia improve opportunities for venture capital investments. The OECD argues that "in order to stimulate entrepreneurial ventures in knowledge-intensive activities, [Australia should] enhance the rate of commercialisation of university research."[44] Like research and development, the venture capital component of innovation performance is another area with significant room for improvement for the Australian economy.

CASE STUDY: Australian construction – potential to lead the world in green building

With a coordinated program of innovation, Australia's building and construction industry has the capacity to become an international leader.

The Cooperative Research Centre (CRC) for Construction Innovation, in its '2020 Vision' report, identified the creation of buildings and infrastructure that minimise their impact on the natural environment as one of the sector's greatest business opportunities.

With a range of 'eco-buildings' being designed around the country, the CRC took the innovation to a new level by planning an entire subdivision for energy efficiency. The concept is being trialled on new urban developments at Brookwater and Kelvin Grove in Brisbane, Queensland. The CRC estimates that if all of the planned 8000 new homes at Brookwater were in a solar suburb, it would be equivalent to taking 3000 cars off the road every year.

The Construction Innovation CRC has also been working towards a comprehensive set of eco-design tools for all stages of the construction life cycle, to minimise energy use, greenhouse emissions and other forms of waste or pollution. Its first success was the Life Cycle Analysis of Design (LCADesign) software – dubbed the 'green calculator' – which is designed to provide an immediate cost and environmental 'footprint' assessment of any commercial building.

Dr Peter Newton of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) says: "… the calculator provides an instant display of the volume and cost of all the materials involved in its construction [and] it can calculate the environmental impact of all those materials – how many tonnes of clay were used to make them, how much water, how much energy, and how much greenhouse gas and other polluting emissions they made to air, land or water."

By providing an industry-level plan for innovation in the construction sector, the CRC has been giving the building and construction sectors the opportunity to set new benchmarks, raise living standards and lower environmental costs at home, while gaining new competitive advantage in international markets.

Commonwealth funding for the Construction Innovation CRC expires in 2008.

Source: Innovation Australia, www.innovationaustralia.net; CRC for Construction Innovation, www.construction-innovation.info

[44] *Economic Policy Reforms: Going for Growth*, OECD 2006, p.82

4. The policy challenge

As discussed in previous sections, the term innovation encompasses a wide range of activities, from basic science and research, through outcome-driven R&D, to cultural or organisational transformation within a business. Furthermore, innovation is critical not only to improving business or industry outcomes, but also to solving national and global challenges and finding better ways to deliver community services.[45] It follows that the innovation system – the framework within which innovation occurs – is complex.

A strong national innovation system is one that fosters curiosity and supports scientific endeavour; encourages collaboration within and between research agencies, universities, industry, business and government; and provides strong foundations for innovation with appropriate facilities, infrastructure, regulation and skills development.

Labor believes governments have a clear role in underpinning the nation's capacity for innovation with strong research infrastructure and a world class education and training system. Beyond this, governments also play a vital role in encouraging collaboration; facilitating the development of national priorities; addressing market failures which serve to reduce innovative activity; and supporting activities, such as industry R&D, that generate spill-over benefits for the broader community and economy.

This section outlines a ten point plan to improve Australia's innovation performance. Labor will use these ten points to provide a framework for its innovation policy, building on its existing announcements.

A key finding is the need for national leadership to drive improvements in Australia's innovation performance. To promote national leadership in innovation a Rudd Labor Government will:

- establish ten *Enterprise Connect* innovation centres around Australia to connect business people with ideas people, with an investment of up to $200 million over four years;

- restore the Chief Scientist to a full-time position, in recognition of the fundamental contribution science makes to the nation's wellbeing;

- establish Industry Innovation Councils for key sectors to support the *Enterprise Connect* network by building partnerships among all participants in the supply chain and developing long-term strategic approaches to improving productivity; and

- bring responsibility for innovation, industry, science and research within the one Department.

These initiatives build on policies Labor has already announced that will make Australia more productive and innovative and ensure that all Australians have access to a stake in the nation's innovation future. Under these policies, a Rudd Labor Government will:

- revolutionise Australia's communications infrastructure by investing, in partnership with the private sector, up to $4.7 billion over five years to create a new world class National Broadband Network and connect 98 per cent of Australians to high speed broadband internet services;

- provide $111 million over four years in financial incentives for university students to study and teach maths and science;

[45] Cutler, T, Submission to Productivity Commission, *Public Support for Science and Innovation*

- substantially increase the Mandatory Renewable Energy Target and set up a $500 million National Clean Coal Initiative and a $500 million Green Car Innovation Fund to generate additional investment in innovation to tackle climate change and protect Australian jobs;

- invest in Early Childhood to give our children the best start in life, boosting their capacity to learn and be healthy, thus maximising their education and employment opportunities later in life; and

- set up a National Curriculum Board to develop a rigorous, consistent and quality curriculum for all Australian students – from kindergarten to year 12.

4.1 Strengthening investment in creativity and knowledge generation

Innovation relies on creativity as well as knowledge. Australians have a well-deserved reputation as inventors. Australian scientists and engineers have historically been seen as not only well trained technically, but also able to think creatively and manage complexity.[46] It is a comparative advantage that we must maintain.[47]

Australia can only achieve this by creating a culture of innovation in our community, including our schools; by fostering the curiosity of our children; by encouraging our best and brightest young people to pursue careers in science, maths, engineering and ICT; and by ensuring that when they do make such a choice, they receive world class education and training.

Labor is committed to implementing an education revolution in Australia. Creating a culture of innovation will be at the heart of that revolution, which is why Labor has already committed to restoring the Chief Scientist to a full-time position – recognising the fundamental contribution science makes to the nation's wellbeing – and encouraging more students to study maths and science and go on to become maths and science teachers in our schools (see Section 4.7 below).

Labor understands that healthy universities are critical to a nation's innovation framework – a great university is a factory of knowledge. Labor is committed to rebuilding the international reputation of Australia's universities by attracting and retaining the best academics and ensuring they have the facilities and equipment they need to fulfil their role as generators and disseminators of knowledge.

Australia's universities are not keeping pace with those of our international competitors in driving innovation. Labor will reverse this trend by investing in our universities – recognising the importance of research, innovation and knowledge transfer, teaching and community engagement.

Labor also understands that the benefit from investment in public research, education and skills will be greatest when these feed into a business sector that is itself characterised by a culture of innovation. Labor will work in partnership with business to strengthen innovation in Australian business, including through the development of a network of *Enterprise Connect* innovation centres supported by Industry Innovation Councils for specific sectors. These initiatives are discussed further below. Labor will also work with industry to improve information from governments and reduce the red tape that surrounds existing innovation programs, making them easier to identify and access.

---

[46] AEEMA, Supplementary to Submission 19, House of Representatives Standing Committee on Economics, Finance and Public Administration, Inquiry into Australia's Manufacturing Industry Now and Beyond the Resources Boom, August 2006

[47] In its 2006 *Going for Growth Report*, the OECD argued that Australia could boost its innovation performance by promoting innovation in services. Its recommendation was: "To enhance innovation in the growing services industries, broaden the opportunities for those sectors to participate in programmes facilitating the transfer of knowledge from public research institutes" (p. 82)

4.2 Focus incentives for business R&D to promote global competitiveness

One of the most disturbing aspects of Australia's economic performance in recent years has been its trade performance. Despite the mining boom, growth in export volumes has slowed from averaging 8.4 per cent a year under Labor to just 1.1 per cent a year over the past five years.[48] This has left Australia with record current account deficits and a foreign debt of half a trillion dollars.

Professor John Houghton's recent CEDA paper points out that:

> "Australia has one of the lowest trade to GDP ratios among OECD countries, with goods trade around 20% of GDP, and services trade less than 5% and declining".[49]

The only other advanced countries with similar trade ratios – including the US and Japan – have very large domestic markets. Australia does not have this safety net.

Australia must lift its export performance as a national priority. There is a broad consensus that better performance in business R&D and innovation is critical to maintaining and improving the international competitiveness of Australian exporters. By the same token, access to international customers and supply chains is a driver of innovation in Australian business, creating a virtuous circle of innovation and export capability.

This requires a consideration of ways to sharpen R&D incentives to promote sustained reinvestment for growth, with a focus on building competitiveness in global markets. In this context, there have recently been a number of reports and media comments about potential improvements to the 125 per cent general R&D tax concession, the 175 per cent Premium concession introduced in 2001 and the Tax Offset for smaller, loss making companies.[50] Labor considers that there may be potential to improve on the current arrangements.

The Government has not been investing sufficiently in export promotion. Since 1995-96, the Government has reduced expenditure on export promotion by $100 million in real terms.[51] The Government abolished the International Trade Enhancement Scheme (ITES) and Innovative Agricultural Marketing Program (IAMP) when it came to office and has not replaced these schemes. The Government has also disinvested in the Export Market Development Grant Scheme, with the program's funding cap not keeping pace in real terms. Labor is examining the eligibility criteria and funding cap for EMDG Scheme and is considering how this program, along with other trade facilitation measures, can better promote Australian innovation.

4.3 Accelerate technology diffusion and take up

Australia's innovation system must become more integrated within the wider, global innovation system. World-wide, the main sources and drivers of innovation are customers and suppliers. Australia's remoteness, together with our small and diffuse population, means that Australian firms face significant obstacles in participating in global networks as well as achieving economies of scale in production.[52] These negative consequences of Australia's geography make pursuing further liberalisation of international trade and investment through the Doha Round of multilateral negotiations a critical component of an innovation strategy.

---

[48] ABS Catalogue 5368.0, *International Trade in Goods and Services*, January 2007

[49] John Houghton, *Connecting to the global chains: Australia's participation in the new wave of globalisation*, CEDA, 2007

[50] See, for example: Productivity Commission, *Public Support for Science and Innovation*, Research Report, 7 March 2007; House of Representatives Standing Committee on Science and Innovation, *Pathways to Technological Innovation*, June 2006

[51] Calculations based on Austrade statistics, tabled in Senate Estimates, 15 February, 2007

[52] See the Productivity Commission's March 2007 Staff Working Paper '*Can Australia Match US Productivity Performance'* for a discussion of how Australia's geography constrains productivity growth.

Australian firms have historically faced significant obstacles in participating in global industry networks as a result of Australia's remoteness. In its submission to the Productivity Commission, the Department of Industry, Tourism and Resources (DITR) observed that:

> "Australian SMEs have a poor record in the take-up of new technologies and knowledge. The DEST Mapping Australian Science and Innovation, reports on average only 34% of Australian SMEs take up external technologies compared to over 85% in Europe and the US."[53]

Despite this, the Howard Government has neglected the development of crucial advisory and intermediary services to firms, to educate them about general technologies which can be applied for increased competitiveness. DITR notes that "extension services have been provided to SMEs in the agricultural sector for decades, but not in other industry sectors. Many Australian SMEs operate in sectors without collaborative infrastructure and networks".[54]

The recent National Manufacturing Forum report strongly recommended measures to improve advisory services to established firms.[55] At the same time, studies of productivity growth in service industries highlight the crucial function played by adaptation of general purpose technologies in driving this growth.

This is why Labor has committed to establishing ten innovation centres around Australia to connect business people with ideas people. Labor will invest up to $200 million over four years in this initiative, known as *Enterprise Connect*.

Businesses will be able to access *Enterprise Connect* innovation centres to find and adapt the latest research and technology; get help in solving identified problems; work out how new processes can help their business; and cut through red tape to identify sources of government support for their innovative activities. Labor also recognises that prototyping and product realisation can be a challenge for small and medium sized businesses without the scale to fund their own testing facilities. *Enterprise Connect* centres will offer access to such facilities to help Australian companies turn their innovative ideas into new products.

To avoid wasteful duplication, Labor will ensure that *Enterprise Connect* operates as part of a system of industry innovation support, which also includes existing services and centres including: QMI Solutions in Queensland; intermediary services such as TechFast and InnovationXchange; State-based innovation services; Cooperative Research Centres (CRCs); research Centres of Excellence; and universities and publicly funded research agencies.

The *Enterprise Connect* network will be supported by the advice of Industry Innovation Councils established for specific sectors. These Councils will consider the particular facilities and services required to support long-term strategies for innovation and productivity in the relevant sectors. Further detail on the role of the Councils is provided in Section 4.8 below.

4.4 Internationalise Australia's innovation system

With the growing internationalisation of R&D, Australia runs the risk of falling behind in international collaborations, both in public sector research and in industry R&D. Current guidelines for government assistance programs reinforce national boundaries around innovation flows. This not only reduces the incentive for foreign companies to invest in R&D in Australia, but potentially inhibits access by innovative Australian companies to global supply chains, because they are unable to get in on the "ground floor" during the design and development phase of a project.

---

[53] DITR, *Productivity Commission Submission Number DR185*, 21 December 2006
[54] DITR, *Productivity Commission Submission Number DR185*, 21 December 2006, p. 14
[55] National Manufacturing Forum, *Strategic Actions to Boost Australian Manufacturing*, October 2006

As part of the review discussed in Section 4.10, Labor will examine the guidelines around all R&D and innovation programs to ensure that they encourage, rather than inhibit, international collaboration and foreign investment in R&D in Australia. This examination will include the number of R&D programs, their efficacy and the role of government.

While an economy the size of Australia's dictates that we must prioritise our research investment, the absence of key research facilities and infrastructure partially explains why we are falling behind our partners and competitors. An additional way in which Australia can overcome these problems is to be involved in internationally-shared research platforms. Examples of such platforms include the European Union has developed a number of shared platforms, including the Ocean Observation System (EORO-ARGO), the Integrated Carbon Observation System (ICOS) monitoring greenhouse balance, the High Powered Experimental research facility of large-scale lasers and the European Extremely Large Telescope.

Labor will also examine ways of giving the Australian Trade Commission (Austrade) a greater innovation focus, to facilitate Australian business involvement in global production chains through research and development, foreign investment and exports.

4.5 Leverage government procurement to underpin innovation

Governments are a significant source of business for Australian firms. They have capacity to support innovative firms and provide an early market for new products. This helps those firms in marketing their products both domestically and internationally. Labor will examine United States models for government R&D contracting to SMEs and other measures to support innovative Australian suppliers, in line with our international commitments and obligations.

Labor's Green Car Challenge is an example of how government procurement can be used to encourage and support innovation. Under the Green Car Challenge, Labor has pledged to purchase green cars as part of the Commonwealth fleet if Australian car manufacturers can create value-for-money environmentally friendly vehicles. Alongside this challenge, Labor will support the Australian car industry to develop and build green cars in Australia through its $500 million Green Car Innovation Fund, designed to generate $2 billion in investment, securing jobs in the automotive industry and tackling climate change.

Labor believes that ownership and licensing arrangements for intellectual property developed in the course of Commonwealth Government projects should enable companies to take up commercialisation opportunities where these are not in conflict with national security considerations or the integrity of government administration. During the 2004 election campaign, the Coalition gave a commitment that, if re-elected, the Howard Government would change its contracting arrangements to allow companies to exploit and commercialise the intellectual property generated through government contracts.[56] It has failed to keep this promise.

4.6 Strengthen the public research and innovation infrastructure as a platform for industry and firms

In recent years, the Howard Government's policy in relation to public research has focussed too heavily on commercialisation at the expense of long term basic and applied research. While commercialisation is an important element of innovation policy, many experts and commentators are questioning whether public research agencies themselves are the most appropriate organisations to be driving commercialisation. International experience, in both Great Britain and the United States, has clearly demonstrated that commercialisation and the exploitation of intellectual property provide supplementary revenue streams at best, and that these are not a satisfactory substitute for long term public investment.

[56] The Howard Government Election 2004 Policy: Information Technology

It is also argued, including by the Productivity Commission, that the critical importance of public benefit research serving national interests and public need has been overshadowed by the focus on commercialisation.[57] Furthermore, increasing dependence on short-term, unpredictable commercial funding can undermine public accessibility to research results and lead to increasing casualisation of the scientific and research workforce.

Labor will maintain the dual system of research funding for Australian universities and will protect the integrity of the major research funding agencies, the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). It will also emphasise that both research and research training needs to concentrated in institutions with demonstrable research excellence and, consequently, will develop a "hubs and spokes" model of research programming with the objectives of building a critical mass of researchers in priority areas, promoting world-scale research capabilities and facilitating greater collaboration between publicly-funded researchers and between the public and private research sectors.

Labor believes that a greater investment is required in developing the next generation of Australian researchers. Recent OECD reports on labour market characteristics demonstrate the scale of the problem in Australia and the looming skills shortage in researchers. For example, the number of PhD's in the Australian labour force is 7.8 per thousand, compared with 8.2 in Canada, 10.7 in the USA, 20.1 in Germany and 27.5 in Switzerland.[58]

There are a range of measures that could be taken to improve the training and career opportunities for Australian researchers, including: restructuring the current Research Training Scheme to attract more students into PhD studies; and ensuring better career paths are available for Australian researchers, with the availability of mid-career researcher development programs.

Labor will ensure Australia's public research funding is based on a long term commitment to the Australian national interest, including stronger support for the researchers and scientists who will be called upon to take the lead in addressing the major economic, social and environmental issues facing the country. Labor also understands the critical importance of promoting stronger collaboration between universities, publicly funded research agencies and industry.[59]

Given the concerns expressed by the Productivity Commission about the outcomes of the CRC program, Labor believes it is critical that the policy settings for the program be re-examined. The governance of CRCs has become over-proscribed. The one-size-fits-all model is clearly not working and is adding operational costs, to the detriment of research investment. The ongoing evaluation of CRCs needs to take into account the full spectrum of research benefits, rather than the current reliance on commercial outcomes and cash flows. Other settings that require re-assessment include timeframes for CRC funding and the involvement of commercial partners in all facets of research.

One vital aspect of supporting Australia's researchers is to ensure that they have the infrastructure they need to do their job. However, investment in research infrastructure has languished under the current government and strategic national infrastructure projects remain unaddressed.

High speed broadband is a critical piece of infrastructure for both researchers and Australian firms. More than this, high speed broadband provides benefits across the economy and society – from school students doing homework to university researchers collaborating with

[57] Productivity Commission, *Public Support for Science and Innovation*, Research Report, 7 March 2007
[58] Auriol, L, *Labour Market Characteristsicsand International Mobility of Doctorate Holders: Results for Seven Countries,* DSTI Working Papers 2007/2, 2007
[59] In this context, the CSIRO has developed a proposal for an "Australian Growth Partnerships" program to engage small and medium enterprises in demand driven collaborations with research agencies, detailed in its submission to the House of Representatives Standing Committee on Science and Innovation, *Pathways to Technological Innovation*, June 2006

international colleagues; and from telemedicine to global design centres and manufacturing logistics.

Broadband infrastructure has been identified as a critical enabler for productivity enhancing innovation in the use of information and communications. Recent research has found that information and communications technology spurs innovation by giving researchers new tools, enabling small firms to significantly expand ICT and facilitating increased collaboration. In this way, high speed broadband helps to create a virtuous circle in which greater ICT use increases ICT innovation, which in turn leads to more productive use of the technology.

Australia's poor broadband performance must be improved. The latest OECD Broadband Statistics show Australia's is ranked only 17th out of 30 surveyed economies in the developed world.[60] The World Economic Forum ranks Australia 25th in the world in terms of available internet bandwidth.[61]

Australia clearly needs a nation building investment in broadband infrastructure to bring the country back into line with our international competitors. This is why Labor has committed to establishing a world class National Broadband Network by investing, in partnership with the private sector, up to $4.7 billion over five years to connect 98 per cent of Australians to broadband internet services that will offer speeds more than 40 times faster than currently available in most regions.

4.7 Strengthen the skill base for innovation

Labor is committed to an education revolution in Australia. Critical to our policy on innovation is encouraging more Australians to study maths and science and work in those fields. As part of this commitment, Labor has already announced that it will halve HECS fees for maths and science students while they are studying. Maths and science graduates who take up work such as teaching in our primary and secondary school systems will then have their HECS repayments halved for up to five years.

In order for firms to be in a position to take up new technologies, they also need a range of scarce "problem solving" skills to be able to scan, identify, and access external sources of innovation and new technology. Where small and medium firms do not have these skills in-house, Labor's *Enterprise Connect* centres will be able to help firms identify their needs and to link them with appropriate innovation. To complement this, consideration should be given to the development of professional training programs to help businesses manage innovation.[62]

Labor also recognises that the acquisition of skills and knowledge does not end when a person graduates or completes an apprenticeship. In addition, industry innovation is often generated by people with no formal qualifications at all – people on the shop floor who identify a problem and set out to solve it. It is therefore critical that knowledge and skills are developed and fostered in the workplace. To support this, Labor will work with Australian businesses to strengthen the national commitment to on-the-job training and continuous learning throughout a person's career.

[60] OECD Broadband Statistics to June 2006, available at: www.oecd.org/sti/ict/broadband
[61] World Economic Forum *The Global Information Technology Report, 2005-06*, p. 143
[62] In its 2006 *Going for Growth Report*, the OECD argued that Australia could boost its innovation performance by improving overall workforce skills. Its recommendation was: "In order to improve the absorptive capacity of the workforce, reduce the proportion of early school leavers by pursuing efforts to strengthen the vocational education and training system." (p. 82)

4.8 Develop and implement national innovation priorities

The Howard Government has established a set of national research priorities. Labor will develop a set of national innovation priorities to complement the national research priorities. Together, these will provide a framework for a national innovation system, ensuring that the objectives of research programs and other innovation initiatives are complementary. The national innovation priorities will address areas such as:

- support for frontier science and emerging technologies where Australia has sustainable competitive advantage globally, such as mining, food processing, marine and agricultural science, radiophysics, renewable energy and some areas of biotechnology;
- innovation to sustain the competitiveness of existing industries, especially manufacturing;
- the diffusion of technology and new thinking across Australian industry;
- developing the capabilities in industry to produce, use and profit from innovation;
- marshalling R&D and innovation to solve major national challenges, including in the environment, water management and health arenas; and
- improving and sustaining the quality of life of all Australians.

Labor's national innovation priorities will be finalised as part of the review discussed in Section 4.10 below.

Labor will work with industry partners to establish long-term Industry Innovation Councils for specific sectors. These Councils will support the *Enterprise Connect* network and facilitate the integration of these centres into the broader innovation framework.

The Councils will comprise high level decision makers from the private sector, workers, the science and innovation community and Commonwealth and State/Territory governments. By building strong, productive and ongoing working relationships among all participants in the supply chain, the Councils will facilitate whole-of-government and industry commitment to new directions and initiatives aimed at:

- improving productivity, global competitiveness and market access to secure the future of the sector;
- achieving best practice in employment and training to build a highly skilled and flexible workforce for the 21st century;
- ensuring the sustainable development of each sector; and
- enabling each sector to be part of Australia's response to the global challenge of climate change.

4.9 Strengthen the governance of the national innovation system

A piecemeal approach to innovation – as occurs under the Howard Government – leads to waste, as well as lost opportunities. Labor will strengthen the governance of the innovation system to support higher expectations of government agencies and industry, and to enhance institutional autonomy for universities.

Labor will bring together the key policy areas of industry, science and research within the one Department to provide national leadership on innovation. Labor will also adopt a 'whole of government' perspective in innovation, breaking down the current silo approach and improving coordination and collaboration within government. Labor will ensure that all Commonwealth agencies are aware of Australia's National Innovation Priorities and develop policies with these in mind. A set of principles will be established to underpin the role and participation of the public sector in industrial innovation.

All governments have a responsibility to provide best possible settings and support for an innovation-driven economy. Labor will promote a truly national innovation agenda, seeking State and Territory agreement to the National Innovation Priorities and aiming to streamline programs across jurisdictions in line with the priorities. In doing this, Federal Labor acknowledges that most Australian State and Territory Governments have their own innovation strategies.[63] However, some States have also identified the need for a national innovation agenda and have been pushing for a national plan to ensure Australia remains competitive in the future.[64]

A nation's system of innovation works best when governments complement and facilitate business innovation. This partnership approach underpins Labor's approach to governance. To facilitate greater information in the marketplace, Labor will promote the voluntary reporting of innovation performance within the private sector. Large businesses will be encouraged to participate in programs to share their knowledge and skills, particularly with SMEs.

4.10 Review government innovation and industry assistance programs

As noted above, there are currently 169 government programs in Australia aimed at supporting business innovation.[65] Labor will work with the States and Territories to review this bewildering agglomeration to ensure that support for innovation is well-targeted and easy to access, with the aim of reducing the fragmentation of innovation assistance.

On coming to office, Labor will initiate a wide-ranging review of Australia's innovation system, with the aim of:

- identifying and minimising regulatory barriers to innovation;
- assessing the complex mix of current assistance programs against these priorities;
- examining the scope for simplifying the system and reducing duplication, so that it is easier for firms to identify and access relevant programs; and
- identifying gaps and weaknesses in the innovation system and developing new policy proposals to address them.

In proposing this review, Labor recognises that governments do not have all the answers, but that they can make a real difference by partnering with industry to build a culture of innovation. When these partnerships involve investment in specific sectors, there will be an expectation of industry commitment and co-investment. This principle underpins Labor's National Clean Coal Fund and Green Car Partnership, which will require industry to contribute on a two-to-one and three-to-one basis respectively.

At an economy-wide level, Labor will work with business and industry to ensure that there is a focus on developing common targets for concrete outcomes within a coordinated innovation system. Support for business R&D and innovation will be assessed against definable criteria in areas such as: promoting skills formation; growing investment and exports; creating new markets and new opportunities for Australian business; fuelling industries of strategic and competitiveness importance; and improving environmental sustainability and responding to climate change.

---

[63] For example, see Queensland's Smart State Strategy 2005-2015, http://www.smartstate.qld.gov.au/strategy/strategy05_15/index.shtm ; *NSW Government Statement on Innovation*, November 2006

[64] John Brumby, *Victoria's National Innovation Agenda*, Speech to BRW Innovation Leadership Summit, December 2006

[65] House of Representatives Standing Committee on Science and Innovation, *Pathways to Technological Innovation*, June 2006

5. Conclusion

Australian governments must implement new economic policies to meet the challenges we face and to sustain Australia's prosperity into the second decade of the twenty-first century and beyond. Critical to these policies is how Australian governments will facilitate business solutions to this nation's emerging challenges: intense global competition, the subsiding of the resources boom, population ageing and climate change.

Australian businesses will meet the challenges of the future through innovation.

Australia can improve its innovation policies across ten key areas: knowledge generation, business R&D incentives, technology take-up, international collaboration, government procurement, university/business links, improving the skills base, innovation priorities, governance and streamlining of programs.

The argument advanced in this policy paper is that Australia can improve its economic performance and meet the challenges of the future by training a more creative workforce and facilitating more innovation in the Australian economy.

Australia needs better policies that foster a culture of innovation today to build our long term prosperity for tomorrow.

Authorised by Tim Gartrell, 19 National Circuit, Barton, ACT 2600