



Department of State and  
Regional Development

# Submission to the Review of the National Innovation System

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<u>Declaration of Interest</u> The Review Panel requested that submissions include a declaration of interest of the organisation or individual behind any submission. The interest of the Department of State and Regional Development (DSRD) is to ensure the complementarity of the NSW and national approaches to innovation policy.	

## EXECUTIVE SUMMARY

This submission focuses on areas of direct relevance to the NSW innovation agenda and to the NSW Department of State and Regional Development (DSRD). It acknowledges the sound principles outlined in the National Innovation Agenda and seeks to highlight areas for expanded focus going forward.

After introducing the DSRD role and approach to innovation, this submission articulates:

- 1. Principles for innovation policy development;**
- 2. Principles for improved implementation/delivery;**
- 3. Recommended national innovation priorities; and**
- 4. A suggested role for public service innovation.**

The submission to the **Collaboration and Cooperative Research Centre (CRC) Working Group** is included in Appendices 1 and 2.

Three types of recommendations are outlined for the Panel to consider:

- The need for evidence-based policy guidance from the Federal Government regarding:
  - The program implications of an expanded view of innovation (1.1)
  - Optimal innovation policy models (1.2)
  - Closer alignment of innovation policy with general economic policy (1.3)
  - Methods to improve engagement between the public and private sectors on innovation (1.4)
- Methods for improved policy delivery mechanisms between the States and Commonwealth
  - Improved coordination between State and Federal programs, including full Federal funding for public research, to enhance government efficiency in delivering programs that support innovation (2.1 and 2.2)
- Suggestions for specific national priorities
  - An industry approach to innovation policy (3.1)
  - National collaboration in sectoral-based analyses, particularly in the

finance and logistics sectors (3.1)

- Best practice guidelines for government procurement for innovation (3.2)
- Regulatory measures to promote and encourage innovation (3.3)
- Public sector innovation as a key foundation for change, including through enhanced in-house expertise, effective risk management techniques, and use of pilot projects (4)

Appendices 1 and 2 outline recommendations with respect to:

- Collaborative Research
  - Develop a common IP management framework to govern multiparty research collaboration
  - Implement partnered funding structures that enhance involvement of Government research agencies
  - Implement full funding of research
- Cooperative Research Centres
  - Allow consortia to start smaller and grow
  - Decrease the number and type of organisations that become core participants of the CRC
  - Allow for greater flexibility in the type of governance model used
  - Establish an end-point for CRCs

## **Introduction**

The NSW Department of State and Regional Development ('DSRD' or 'the Department') welcomes the opportunity to provide a submission to the Review of the National Innovation System (RNIS). As the agency responsible for securing innovative and sustainable business and industry development for NSW, DSRD maintains a strong interest in contributing towards the outcomes of this Review.

### Role of DSRD

DSRD is the agency with leadership responsibility for delivering on the 2006 NSW Government Statement on Innovation<sup>1</sup>. The Department aims to enhance the NSW business environment by ensuring that impediments to innovation are identified and addressed, and facilitating greater adoption of innovation.

The NSW Innovation Council was established in November 2007 to lead the NSW Government's work in innovation policy. The Council includes high level public and private sector members and provides policy guidance on where Government can add the most value. Examples of work currently driven by the Council and undertaken by DSRD, in conjunction with other agencies and industry, include policies to improve high level skills in parts of the creative industry; support for the productivity and efficiency of the logistics industry; and actions to encourage innovation in a low carbon economy.

### NSW Approach to Innovation Policy

The NSW economy is the largest in Australia, with the services sector representing 83% of the State economy (compared to 77% for Australia)<sup>2</sup>. As a result, while innovation within the services sector is important for Australia, it is especially important for NSW. (Full details on the structure of the NSW economy and the role of DSRD in **Appendix 3**)

NSW has developed a contemporary, practical approach to innovation that reflects the characteristics of the NSW economy. The NSW Statement on Innovation advocates a stronger focus on improving productivity in industries that are most likely to produce benefits for the broader NSW economy. The

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<sup>1</sup> NSW Statement on Innovation - [www.business.nsw.gov.au/NR/rdonlyres/0851EEBF-97CA-456E-9F99-73ED34153997/0/NSW\\_INNOVATION\\_STATEMENT\\_NOV2006.pdf](http://www.business.nsw.gov.au/NR/rdonlyres/0851EEBF-97CA-456E-9F99-73ED34153997/0/NSW_INNOVATION_STATEMENT_NOV2006.pdf)

<sup>2</sup> *5220.0 State Accounts (2006-7)*, Australian Bureau of Statistics, November 2007.

five key sectors chosen for initial investigation are Logistics, Financial Services, Creative Industries, Manufacturing and Resources.

Underlying this sectoral approach, the Statement targets five innovation policy goals:

1. Improve human capital
2. Upgrade knowledge and information infrastructure
3. Reduce the cost to business of utilising science and technology
4. Encourage capital allocation to invest in innovation
5. Reduce regulatory barriers to innovative NSW companies

Drawing on this framework, DSRD supports principles similar to those outlined in the National Innovation Agenda (NIA), and for the purposes of this submission NSW re-asserts its support of the NIA<sup>3</sup>. DSRD however, goes further than the NIA in advocating an industry approach to innovation, and seeks to highlight aspects of the NIA deserving of greater attention. Specifically, DSRD is progressing its innovation agenda through a sector by sector approach and an assertion of the centrality of innovation policy to broader economic policy.

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<sup>3</sup> Department of Innovation, Industry and Regional Development (DIIRD), *Progressing a Shared National Innovation Agenda*, March 2008 (developed by the Victorian government in consultation with all State and Territory Governments). The original NIA proposal from March 2007 is available at [www.diird.vic.gov.au/corplivewr/assets/main/lib60026/nia-proposal.pdf](http://www.diird.vic.gov.au/corplivewr/assets/main/lib60026/nia-proposal.pdf).

## 1. Principles for Innovation Policy Development

**1.1 An expanded view of innovation.** The historical emphasis of innovation on the high-tech industry and R&D needs to be supplemented with a more balanced approach that includes adoption and commercial development of innovation across all industry sectors.

Innovation takes place across the whole of the value chain. It is not purely the result of 'inventions' nor is innovation the exclusive purview of research and development. Customer demand is a significant driver of innovation, and customer-driven modifications to products or processes can entail minimal or no R&D. In fact, the ABS *Innovation in Australian Business, 2005* survey found that only 26% of innovating businesses surveyed reported that they had spent money on R&D<sup>4</sup>.

Secondly, innovation occurs in every industry and is an important stimulant of growth and competitiveness.

The above two assertions are not currently reflected in the Australian national innovation system. Review Panel Advisor, Keith Smith, and Jonathan West noted:

Virtually all OECD countries in effect focus innovation policy support on the technologies underpinning high-tech sectors, either via direct support for such fields as ICT, biotechnology and nanotechnology, or via subsidies to R&D. Seeing that about half of all business R&D in OECD countries is performed in high tech sectors (sectors that typically account for less than 3 percent of GDP), R&D tax credits are in effect a subsidy to high tech sectors.<sup>5</sup>

Applying the above point to the cycle of innovation model outlined by Review Panel Chair, Terry Cutler, DSRD asserts that the knowledge diffusion and application aspects require relative expansion. It is effective application and diffusion of new technologies, products, and processes that will equip Australian industry to better take advantage of 98% of innovation created offshore, and better utilise the 2% of innovation created here. This requires capabilities and resources to recognise opportunities and to successfully implement and adapt these new products and processes.

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<sup>4</sup> *8158.0 Innovation in Australian Business (2005)*, Australian Bureau of Statistics, December 2006, p. 22.

<sup>5</sup> Keith Smith and Jonathan West, *Innovation Policy, Productivity, and the Reform Agenda in Australia: A Framework for Analysis*, Australian Innovation Research Centre, January 2007, p. 13.

This principle does not minimise the importance of R&D. Indeed, public and private sector R&D, together with professional and R&D-related education, produces and diffuses knowledge, provides advanced skills and builds a basis for creative problem solving. As such, R&D should continue to be supported at an appropriate level as an important contributor to Australia's innovative capacity. However, a mind-shift is required to ensure that government balances its effort across the entire innovation cycle.

As an example, current tax arrangements provide incentives for R&D, but an expanded view of innovation might provide tax incentives to support innovation activity across the value chain more generally. The current system of R&D tax offsets and credits favours the minority of companies (26%) that engage in R&D. Innovation elsewhere in the value chain might include important drivers such as market research and pilot testing.

*The need for an expanded view of innovation has been highlighted by the Review Panel. This submission acknowledges and supports the far-reaching implications of this expanded focus on the programs and policy levers implemented to support innovation policy.*

**1.2 An authoritative policy tool-kit underpinned by pragmatic, market-based approach to action.** NSW DSRD believes that government action on innovation should be about supporting the market, not replacing it. In addition, government should take a pragmatic approach to pursuing public good objectives beyond the immediate interest/knowledge of the market. To do this, more information (namely, an evidence-base) is required on the best policy levers to affect innovation.

The Productivity Commission noted:

[G]overnment intervention in the economy is most likely to generate net benefits when focused on addressing genuine and significant market failures. ... That said, there is a tendency for proponents of [industry] assistance to co-opt the language of market failure — labelling ordinary inter-industry linkages as 'spillovers', for instance — or to assert that a particular market outcome represents a market failure and justifies a particular assistance measure. No market is without its imperfections but, for instance, the failure of particular commercial enterprises does not constitute market failure. ... [T]he task for policy making is to identify those instances of sufficient significance that 'corrective' government action (and its costs) are warranted.<sup>6</sup>

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<sup>6</sup> Productivity Commission, *Trade and Services Review 2006-7*, March 2008, p. 6.6 (79).

Government programs which support business development goals should not be confused with innovation policy. Business development programs yield valid outcomes, but they sometimes engage only a small proportion of the economy and can ultimately act to support uncompetitive companies. The impact of such industry assistance can have an explicitly negative impact on innovation because it directs resources (including labour and finance) away from more competitive areas of the economy.

For economic development programs to have a positive impact on innovation, they should be aimed at generic, not company-specific, capacity building, so as to be a catalyst for change and innovation. For example, access to information and expertise is a key challenge in isolated locations. Government intervention could address this market failure via infrastructure improvements such as affordable and accessible broadband. Similarly, small companies, which do not have the capital to invest in in-house research, would benefit from greater accessibility to public sector research.

Equally dangerous to good policy are rigid applications of neo-classical economic theory that assert that the market will always prevail. DSRD supports a pragmatic market based approach. The story of innovation in the Australian wine industry presents a good template for the 'pragmatic, market supporting' approach.

In the paper, *Success Factors in Australian Industries*, it is commented that in the wine industry, industry associations “provided the context in which collaboration germinated, produced a coordinated vision for the future and were critical agents for change”<sup>7</sup>. In their ideal form, industry associations contribute to networking, certification, education and research. But using the wine industry as an example, collaboration was not spontaneous. It occurred in part under pressure from government – government initiatives led to the development of industry associations (e.g. a body responsible for export marketing) and the establishment of industry levies which funded R&D. The role played by government is described as “catalytic” and had the effect of re-invigorating the wine industry and promoting innovation, with a minimal but clever outlay of government funds<sup>8</sup>.

A further issue in innovation policy are fundamental deficiencies in the measurement of innovation. As a result, in order to provide measurable

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<sup>7</sup> Ramsay, C. and Bladier, R., *Success Factors in Australian Industries: Levers for fostering & sustaining growth industries – a synthesis of earlier research*, November 2005, p. 15.

<sup>8</sup> *ibid.*, p. 35.

outcomes and ensure accountability, government agencies prefer programs that are easiest to measure. For example, using current methodology, a grant program in which Company X receives \$Y can claim to be a success if the company's revenues increase by a multiple of \$Y – regardless of whether there is a causal relationship between the grant funding and the company's growth.

To date, a lot of analysis about innovation has taken place after the fact (such as the wine example included above). What is most useful at this stage is policy research that provides a predictive basis for the impact of different policy levers on innovation – namely an evidence base to identify what works, in what circumstances, and why. In developing such an evidence base, methodology around measurement will also require investigation.

***DSRD recommends the Commonwealth takes a leadership role in defining the optimal approach for innovation policy. A national innovation policy goal should be the development of an authoritative body of evidence around desirable policy models.***

### **1.3 Innovation policy more closely aligned with general economic policy.**

Innovation is a key determinant of economic growth and improvements in living standards over the long run.<sup>9</sup>

Gene Tunny, Macroeconomic Policy Division, Australian Treasury

In a global economy, innovation-based competitiveness provides a more stable foundation for productivity growth than the traditional emphasis on low-cost production.<sup>10</sup>

Professor Joshua Gans, University of Melbourne

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.<sup>11</sup>

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<sup>9</sup> Gene Tunny, *Innovation across the OECD: A review of recent studies*, 2006, p. 1.

<sup>10</sup> Gans, J. and Hayes, R. *Assessing Australia's Innovation Capacity, 2007 Update*, January 2008, p. 16.

<sup>11</sup> OECD, *Economic Policy Reforms: Going for Growth 2006*, March 2006, p. 56.

Organisation of Economic Cooperation and Development  
(OECD)

Given the intrinsic role of innovation in productivity growth (and as a consequence economic growth), innovation policy must be central to general economic planning rather than shifted to the periphery. In order to have real impact on innovation, government needs to apply the core tools of government, and the core tools of economic policy to the innovation challenge.

Governments have a range of levers that can have a profound effect on innovation activity. At a State level, key levers of innovation include infrastructure provision, government procurement, environmental planning, business regulations, and the education and training system. At the national level the tax system, trade policy, intellectual property laws, and the tertiary training system play powerful roles. Yet the focus of innovation policy to date has been through relatively specific research support and generic business programs.

If innovation lies at the centre of economic growth, then it follows that economic policy needs to have innovation thinking at its core – not on the periphery. Just as competition policy is an integral part of economic policy, so too should innovation policy. This would require a significant mind-shift as well as institutional change. *In this context the suggestion of Professor Gans for an ACCC equivalent for innovation policy<sup>12</sup> deserves further consideration by the Panel.*

***DSRD recommends the Panel consider how innovation policy thinking can be more closely aligned with general economic policy-making within government.***

**1.4 Expand public-private sector collaboration in the innovation system.**

Private sector involvement in influencing innovation policy should be expanded as should the flow of innovation between and within public and private sectors.

The public and private sectors need to operate within the same innovation system because innovations and knowledge developments within one sector can have positive effects on the other.

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<sup>12</sup> Interview on Radio National, 18 August 2003

In the UK, the National Endowment for Science, Technology and the Arts (NESTA) provides an example of a single body able to bring together disparate disciplines and sector areas - in particular across the arts and sciences - because it is specifically charged with encouraging innovation. In Australia, the university ARC system for research and development tends to 'silo' sectors along discipline lines even though innovation needs to bring disparate sectors together.

Nanotechnology, climate change and creative industries provide illustrative examples of why and how public and private sector collaboration could be improved.

**Nanotechnology** - It has been estimated that sales of products derived from nanotechnology will be worth in excess of US\$2.6 trillion per annum in the next ten years, an increase from an estimated value of US\$30-\$200 billion in 2005. However this assumes development of an enabling regulatory environment. Industry may be reluctant to embrace nanotechnology in its products for a number of reasons. First and foremost, there is a lack of clarity in regulation around nanoparticles and nanomaterials. Other reasons include: a lack of understanding of the risks and benefits of using the technology; the unknown effect that nanomaterials and nanoparticles may have on human, animal and environmental health; lack of industry knowledge on how nanotechnologies can be used to drive innovation; and inadequate understanding of nanotechnology from the general public.

Knowledge on nanotechnology needs to underpin appropriate regulatory development which will in turn underpin public confidence and clarity on the operating environment for industry. This interplay of public and private capabilities will enable the development of innovations from nanotechnology. A continuing national coordination framework based around the Australian Office of Nanotechnology should be considered to enable the collaboration required.

**Climate Change** - Climate change has become a high profile and pressing issue for both government and industry. The Commonwealth is currently developing an emissions trading scheme to reduce greenhouse gas emissions. This will in turn impact companies through the cost of monitoring emissions as well as developing ways to reduce or offset emissions. Underpinning both the policy and industry approaches is knowledge and expertise which exists within both the public and private sectors. By having a

national innovation system which drives interaction between the public and private sectors, climate change policy could support innovation, assist industry adaption to the new operating environment, and avoid perverse outcomes for industry.

**Creative Industries** – The creative sector is strongly identified with innovation both in the past and in the digital future. In spite of a legacy of disconnected policy goals between government agencies supporting cultural industries and those supporting innovation generally within the economy, the State’s cultural institutions deliver significant commercial outcomes. As an example, R&D undertaken in publicly funded cultural institutions is highly collaborative and becomes a valuable resource for practitioners in different sub-sectors and can legitimise emerging technologies<sup>13</sup>. As commercial advantage is not the primary driver of cultural institutions, open dialogue and collaboration in R&D takes place across international boundaries and sectors, creating a significant multiplier effect. Simultaneously, investment in the cultural industries creates commercial opportunities for creative industries such as film, design, games and web tools.

***DSRD supports and welcomes ideas to increase meaningful and ongoing engagement between and within the public and private sectors to enable the benefits of innovations and knowledge developments to flow seamlessly.***

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<sup>13</sup> John Holden, *Publicly-funded Culture and the Creative Industries*, Arts Council England, June 2007, pp. 16-21.

## **2. Principles for Improved Delivery/Implementation**

**2.1 Delivery of services should not be duplicated.** Improved consultation and, where appropriate, coordination, between the Commonwealth and State Governments can lead to improved outcomes for both levels of Government in a number of areas. Furthermore, any new system should seek to improve upon rather than replace or further duplicate existing delivery structures.

A systems approach to innovation will expand the need for coordination between multiple government actors. Robust innovation policy requires operation across departmental agencies, and across Federal, State and even local jurisdictions. Recognising this, a clear system or method for effective consultation and coordination between State and Federal program managers is necessary to ensure the range of desired outcomes are achieved and if needed, programs are amended accordingly.

**2.2 Consolidation of Federal research funding.** DSRD supports a Commonwealth full funding model for publicly funded research. The current model leads to inefficiencies and sub-optimal allocation in universities and State governments, and increases the administrative burden associated with research programs.

Current Commonwealth research funding provides around 70% of research project costs. The shortfall is made up by cross-subsidising research from within Universities and contributions from State Governments, philanthropy and the private sector. This leads to at least three adverse outcomes: 1) grant applicants deliberately inflate project costs; 2) grant recipients arbitrarily scale back projects retroactively or 3) grant recipients delay commencement of projects by needing to undertake additional fundraising from other sources that become minority contributors with minimal control of the design of the project. Furthermore, when the shortfall in Federal funding is supplemented by funds from elsewhere in the university, it largely comes at the expense of equipment and facility maintenance, and is sourced from international and full-fee student income.<sup>14</sup>

Full funding of research is considered to cover the full direct costs of research including staffing, consumables, access to major equipment etc as well as

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<sup>14</sup> Professor Alan Robson AM, Chair the Group of Eight, *The role of universities in innovation*, Address to the National Press Club, Canberra 2 April 2008

providing funding to cover indirect costs such as laboratory spaces, libraries, administration etc. An example of how this might operate is the US National Science Foundation which provides funding for direct costs and indirect costs using a formula provided to determine the indirect costs based on agreed cost rates for types of institutions. The issue of the level of funding for research, funding from external sources and the impact on the universities teaching role was not sufficiently addressed in the Productivity Commission's report on *Public Support for Science and Innovation* as it was deemed to be outside of scope.

It is acknowledged that increasing the amount of funding to projects will either require an increase in funding for research projects or a reduction in the number of Federally-funded projects. Even if the latter course was chosen, the result would be cost-neutral for the Federal government; it would direct other sources of funding towards increasing capacity (such as through funding infrastructure or research networks); and it would encourage more collaborative research to be funded and designed according to the objectives of State, private and/or philanthropic sources.

Support for collaborative research should be maintained as an important link between the public and private sectors. Areas for improvement and recommendations regarding collaborative research and the CRC program are outlined in **Appendix 1** and **Appendix 2**, respectively.

***The Review presents a valuable opportunity to improve the efficiency of government delivery of programs that support innovation. DSRD seeks constructive action to improve the delivery and coordination between State and Federal programs.***

### 3. National Innovation Priorities

**3.1 Industry Focus.** Establishing a holistic view of the issues faced by an industry, allows identification of specific drivers and barriers of innovation, and highlights the importance of cross-agency and cross-jurisdictional actions.

An industry focus in innovation policy provides evidence around the drivers or barriers of innovation in a particular industry, as opposed to broad analyses of skills issues, tax treatments or R&D capabilities which provide evidence across the whole economy. Although cross-industry linkages are important to innovation policy, an industry focus provides a stronger foundation for policy analysis and where required, intervention. Drivers of innovation might include customer demand, infrastructure availability, educational foundations, or labour mobility. Barriers to innovation might include fragmentation of research, lack of standards, or secrecy amongst competing firms<sup>15</sup>. Analysis of issues, such as the knowledge infrastructure, business capabilities and financial resources, for firms in a particular sector makes it possible to prioritise actions to build their innovative capacity.

An industry approach leads to industry and government acting in concert towards a joint goal. As outlined in section 1.2 of this submission, the wine industry provides a useful model of successful innovation policy intervention. The success of the industry is attributable to a mix of government and non-government actions, including: 1) establishment of representative industry groups such as the Winemakers Federation of Australia; 2) government support through funding of the Wine Export Council and the Grape and Wine R&D Corporation; and 3) considerable investment and ambition of industry firms. By acting together, government and industry achieved their joint objectives.

'Picking winners' is a highly risky policy prescription. However, an industry-focused approach provides a systematic way to target key sectors of the economy, including new industries that are likely to become a major part of the economy. As Professor Jonathan West states in his paper that underpins the NSW Statement on Innovation, innovation policy should target sectors of sufficient weight and potential to matter: ideally identified through quantitative analysis of member firms' capacity to generate high-wage jobs; increasing market capitalization; faster than average sales growth; above

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<sup>15</sup> Bergek et al, p. 20-25.

average export orientation; substantial productivity growth; and relatively rapid introduction of new products or processes<sup>16</sup>.

Taking an industry focus in innovation policy does not automatically translate into specific policy interventions for each industry. However, it can anticipate the impact of different policy interventions on various sectors, and allow policy makers to avoid perverse outcomes. As an example, a certain tax policy may produce positive outcomes for retail firms, but not in the finance sector. Similarly R&D funding might support IT and life sciences companies, but be underutilised by companies in the logistics or creative industry sectors. An industry approach provides the evidence to refine policy interventions.

The work of DSRD to date in the Logistics, Financial Services and Creative sectors is demonstrating the effectiveness of this approach. Such an approach, is however limited without the full engagement of the Commonwealth government. For example, a deep understanding of how the finance industry works and the potential for government to reduce barriers to innovation is a less than optimal exercise if there is not the capacity at the end for both the State and Commonwealth to work collaboratively towards a solution. Equally, the capacity to provide an education and training system in the creative sector geared for innovation is impossible without collaboration between schools, universities and vocational education institutions.

***DSRD reaffirms the importance of an industry approach to innovation policy. Specifically, DSRD seeks national collaboration in sectoral-based analyses, particularly in the finance and logistics sectors that have obvious cross-jurisdictional operations, unique strengths, and national significance.***

**3.2 Government Procurement.** Given customers are a key driver of innovation, government should effectively and intelligently use its role as a major customer to support innovation.

The NIA outlines the importance of government procurement in supporting market-based innovation, by engaging companies to creatively find solutions to public issues, improve government services, and as a means to providing

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<sup>16</sup> West, J., *A Strategy to Accelerate Innovation in NSW Outline for Policy Development*, Australian Innovation Research Centre, 2006, p. 10.

SMEs with customer validation and funding<sup>17</sup>. Government demand can also lead to broader acceptance, generate a critical mass, develop the industry structure, improve export-readiness, send strong signals to private users, and in contrast to R&D subsidies, not only improve technological capabilities but can also enhance production capacities<sup>18</sup>.

Governments have direct power as a customer. The NSW Government is one of the biggest 'customers' in Australia. It spends \$7 billion each year on construction and maintenance of its built assets and an estimated \$12 billion on other goods and services<sup>19</sup>. As an example, the NSW government spends \$108m on new desktops, notebooks, servers and associated services annually. In many cases the NSW Government is the single largest customer in the industry.

Given the importance of innovation to economic growth, governments could choose to better leverage their role as customer to support innovation. An important next step would be to develop at a national level some evidence-based policy that demonstrates how governments can best manage procurement to support innovation; such as approach would make resulting costs transparent so that budgets can reflect the addition of this policy driver to the procurement decision.

Certain government procurement policies provide increased access or a preference for smaller firms, or local firms. For example, the US Small Business Act ensures that small businesses and minority-owned businesses have the maximum practicable opportunity to participate in providing goods and services to the government<sup>20</sup>. But such policies do not factor in the "innovation dividend". Government procurement guidelines could be used particularly to challenge SMEs to deliver more significant programs, rather than provide support to an SME via preferential selection or support during a procurement process.

Our analysis points to at least two expected outcomes of revitalised government procurement policies.

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<sup>17</sup> DIIRD, p. 20.

<sup>18</sup> Fraunhofer Institute Systems and Innovation Research, *Innovation and Public Procurement. Review of Issues at Stake*, December 2005, p. 14. (Study for the European Commission)

<sup>19</sup> Procurement Planning Program 2003-04 Report (TRP 04-3)

[www.treasury.nsw.gov.au/\\_data/assets/pdf\\_file/0008/5399/trp04-3.pdf](http://www.treasury.nsw.gov.au/_data/assets/pdf_file/0008/5399/trp04-3.pdf)

<sup>20</sup> [www.sbtcd.org/services/fed\\_assistance.asp](http://www.sbtcd.org/services/fed_assistance.asp). Similarly, Tasmania sets guidelines to maximise local access to contracts ([www.icntas.org.au/Government-Procurement/](http://www.icntas.org.au/Government-Procurement/)).

First, an innovation-oriented procurement system would assign a value to “whole-of-life” benefits and positive externalities such as broader social, environmental and technological gains.

Second, government procurement for innovation would improve the methodology around risk management. Procurement of products or services that are in the earlier stages of their lifecycle requires a more sophisticated approach to risk management (including prototype testing, splitting of projects, extending of negotiation procedures or including additional feedback loops to manage the project).<sup>21</sup>

Few countries have successfully incorporated this approach into their procurement system. A 2005 assessment of Innovation and Public Procurement for the European Commission noted that:

With the exception of the USA and the UK where policies are explicit and actively pursued, innovative procurement occurs more as a result of good ad hoc policies, good culture and good people.<sup>22</sup>

Developing an innovation-friendly approach to government procurement would require significant changes to procurement criteria and processes, and agency budgets due to possibly higher upfront procurement costs. To achieve this, a greater tolerance of risk would be required, including procurement staff and management training to deliver greater risk management oversight throughout the life of projects. Another underlying requirement for government procurement to encourage innovation is a solid level of technical expertise within government departments to assess, guide and manage innovative projects involving cutting-edge processes and products.

The Australian Procurement and Construction Council may be a useful vehicle for furthering Federal-State procurement initiatives, due to their work to date in this area.

***DSRD recommends the development of national best practice guidelines for procurement for innovation by the Federal Government in conjunction with the States.***

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<sup>21</sup> Fraunhofer, p. v.

<sup>22</sup> *ibid.*, p. vii.

**3.3 Regulation.** Opportunities exist to advance innovation through a shift in regulation from prescriptive instruments that set minimum standards towards performance based regulation that sets outcomes that allow innovative firms to exceed the standards.

The National Innovation Agenda (NIA) advocates exploration of the ideas outlined by Lateral Economics to achieve the goal of regulatory flexibility<sup>23</sup>. The NIA also recommends efficient regulation of new technologies. We agree on both counts and also support systematic reviews of the full impact of regulations from the perspective of business in a certain sector or supply chain. In NSW, the Small Business Regulation Review (within DSRD) and the Better Regulation Office promote regulatory efficiency in the state. Despite these efforts, layers of federal and state regulations can create disincentives for firms to innovate, introduce new processes, products or practices.

Our analysis of the NSW freight industry showed that companies were subject to a multitude of regulators including state agencies such as the RTA, Department of Transport, RailCorp, Department of Planning, Department of Environment and Climate Change, and federal agencies such as Department of Infrastructure, Transport, Regional Development and Local Government, Customs, Treasury, AQIS, ACCC, as well as local councils. Besides the sheer regulatory burden placed on companies as a result, it is inevitable that efforts to introduce new business practices or improvements (such as a new stacking mechanism, trainee program or log book system) would be stymied by one or more existing regulations.

***Beyond streamlining of regulations, DSRD is seeking further guidance and support from the National Innovation System to ensure that the full weight of regulatory measures can promote and encourage innovation. DSRD also seeks guidance on alternatives to regulation, where appropriate, for example through industry leadership or sponsored research around specific industry issues.***

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<sup>23</sup> Lateral Economics, *Beyond Taylorism: Regulation for Innovation*, August 2007.

#### **4. The Critical Role of Innovation in the Public Sector**

Public sector innovation is critical to the achievement of a robust and effective National Innovation System. Beyond being a national innovation priority itself, public sector innovation is the enabler of each of the above principles and recommendations.

Innovation in the public sector involves fostering an environment that allows government agencies to recommend and introduce operational and process changes to deliver more efficient and effective services to the community.

Governments in Australia and around the world are typified by a low risk approach and behaviour. This approach has sometimes proven to be valuable – with government being a secure and stable institution not persuaded by trends or fads. However, the increasing demands of service delivery, especially in high growth areas such as health and education, set against modest rates of growth in revenues, mean consistent innovation is required.

This submission suggests the importance of public sector innovation in five areas:

1. Enhanced collaboration with private sector in policy development;
2. Government procurement practices that recognise positive externalities created by innovation;
3. Regulatory approaches that promote and encourage innovation, including alternatives to regulation;
4. Strengthening of in-house expertise to support the above; and
5. Greater and smarter use of pilot projects.

The first three areas are covered earlier in the submission (in sections 1.4, 3.2 and 3.3 respectively), with an explicit acknowledgement that these actions can not take place without leadership, an evidence-base, and best practice sharing on the most effective means to accomplishing these goals. The last two warrant further explanation.

##### **Strengthening of in-house expertise**

In NSW over half of the public sector workforce is over 45 years of age compared to one-third of the NSW working population. The NSW government and others around the country are facing up to the real challenges of skill retention and rejuvenation.

Government can not simply contract out its core functions. It needs and should have core-expertise.

The national innovation priorities referred to earlier require government to be a sophisticated and demanding customer of innovation. Additionally the government can itself be an innovator through internal research, such as monitoring environmental activity which assists in planning activities. Where government is a purchaser of research or innovations it needs a sufficient level of internal expertise to assess potential purchases as well as the internal capacity for adopting new innovations into core activities of government.

An example of valuable in-house expertise is in the NSW Department of Primary Industries. Its in-house research capabilities were used to identify feed options that reduced methane emissions and reduced feed costs. Those solutions were then presented to farmers with clear economic arguments for their adoption. This research acted as an effective alternative to prescriptive regulation that would have mandated actions to reduce the impact of the livestock on the environment. In this example, in-house government expertise of both content and econometrics is valued in assessing different options.

Through in-house expertise, government agencies can increase their value proposition to end-users and support economic goals.

### **Greater and smarter use of pilot projects**

Government departments are characterised by risk-aversion and gradual, deliberate change. This makes sense especially when one considers the type of critical services governments provide, and the high levels of accountability and transparency in government expenditure. With public pressure to ensure minimal mistakes, major program changes are few and far between. Yet experience shows successful new ventures rarely occur without failures along the way.

Capacity needs to be strengthened within organisational processes to protect and promote pilots and new small scale projects.

Institutions also need to be able to support corrective mechanisms. This means, where pilot projects are not showing the desired results, the approach needs to learn and adapt, rather than abandon.

IP Australia demonstrated the value of a pilot project in its goal to enhance its international reputation and reduce the duplication of work between its office and the US equivalent, the United States Patent and Trade Mark Office (USPTO). As Dr Ian Heath, IP Australia's Director General noted:

On 24 January 2007, after an initial small feasibility test, the USPTO and IP Australia agreed to extend the project for an additional 12 months. Under the agreement, IP Australia will provide search and examination services on international patent applications filed with the USPTO under provisions of the PCT [Patent Cooperation Treaty]. Participation in this project is a significant opportunity for IP Australia to move closer to its vision of being an office of choice and for enhancing its international reputation.<sup>24</sup>

In the delivery of public sector services, it is important to build tolerance of pilot programs and new services without the end-users of the services feeling like 'guinea pigs'. In building an evidence-base around risk management strategies in public services, investigation of large utility companies and other essential service providers could be instructive.

***Examples of public sector innovation indicate the value of in-house expertise and the need for effective risk management to deliver better services to the community. DSRD supports development of an evidence-base for action and solutions to enhance public sector innovation in consultation with Federal agencies.***

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<sup>24</sup> [www.innovationaustralia.net/article/article.php?article=1,031](http://www.innovationaustralia.net/article/article.php?article=1,031)

## APPENDIX 1

### IMPROVEMENT OF INNOVATION OUTCOMES FROM COLLABORATIVE RESEARCH

As noted in section 1.1 research and development should continue to be supported at an appropriate level as an important contributor to Australia's innovative capacity. Collaborative research enables interaction between organisations traditionally sitting in different parts of the innovation system and provides a connection between the public and private sectors.

Collaborative research builds diverse skill sets, supports on-going training within the workforce and defines a pathway for translation, whether through commercialisation, training or policy development. Effectively structured collaborative research provides a strong and strategic value proposition to government, philanthropists and industry partners. A collaborative approach to provision of research infrastructure, while not relevant in all instances, can maximise the return on investment, avoid duplication, and meet the needs of a broader range of researchers.

Research in Australia is undertaken and used by a range of groups including businesses, universities, public and private research organisations, and agencies of the Commonwealth, State and Territory Governments. As such, programs which seek to build capacity should encourage involvement of, and benefit to, each of these groups.

#### RECOMMENDATIONS

DSRD has provided co-funding in a broad range of collaborative programs including the Biotechnology Innovation Fund, ARC Centre of Excellence, Cooperative Research Centre, NCRIS and Medical Research Support Programs.

Based on this experience, DSRD recommends the development of principles in three key areas. Separate comments are made regarding CRCs in **Appendix 2**.

- 1) Develop a common, best practice IP management framework to govern multiparty research collaboration.**

Local, State and Federal public organisations have developed their own guidelines governing accounting and management of IP. For instance the NSW Government has developed the *Intellectual Property Management Framework for the NSW Public Sector*, which in addition to a set of mandatory Intellectual Property Principles, includes a non-mandatory *Better Practice Guide* which sets out principles for the management of IP and includes information and advice about its creation, use, protection, and commercialisation.

However there is no reference framework for collaborative research that provides consistency of management, treatment and valuation of IP held within and between universities, agencies and other public sector institutions and industry across jurisdictions. Such a framework would assist with diffusion by providing collaborators with consistent negotiation processes and guidelines.

It is recommended that consideration be given to:

- a) Performing an analysis of the national intellectual property frameworks of individual Governments, their relevant agencies and within universities with specific reference to their effectiveness in supporting multiple party collaborative research. This common reference framework would help address hurdles currently encountered in research contract initiation, management, IP assignment, researcher co-appointments and expectation of ownership and earnings.
- b) Determining in line with a) above, mechanisms to promote the flow of IP to, and use by, the private sector, while ensuring that the bulk of IP developed within the public sector is given an opportunity to be absorbed and diffused amongst domestic users and not immediately lost to off-shore companies. This requires a better understanding of the absorptive capacity and needs of domestic users.

## **2) Implement partnered funding structures that enhance involvement of Government research agencies**

### ***a) State and Territory Government agencies***

Mechanisms should be developed to more effectively engage infrastructure and expertise held within Government agencies in the National Innovation System. Specifically, State and Territory Government agencies involved in agriculture, health, environment and natural resources, engineering, infrastructure, communications and emergency response capacity, have

significant R&D capacity, and most have operational structures that allow access by external users, particularly business. However many Commonwealth funding mechanisms do not adequately encourage participation of these State and Territory elements of the research sector in Commonwealth-driven funding programs, including those run by the ARC and also in some NCRIS capabilities.

Partnered funding models should be developed to allow an equal partnership of State and Territory agencies, as well as the ability of State agency collaboration partners to receive Commonwealth funding.

*b) Access by SMEs to Commonwealth agencies*

It has been suggested anecdotally that funding to organisations such as CSIRO requires implementation of significant cost recovery and commercialisation elements. An unintended consequence has been an increase in cost and complexity to external organisations utilising the research capacity of these important institutions. This is of particular concern to the SME sector, which may be limited due to cost constraints from accessing this infrastructure as effectively as it should.

In 2006-07 it was estimated that 38% of businesses operating in NSW employed between 1 and 19 people, 3.8% of businesses employed between 20 and 199 people, while 0.3% had over 200 employees. Consequently it is important that innovation capacity, including research, development and prototyping services are readily accessible by small business.

It is recommended that the Commonwealth Government review the incidence and type of usage of national research facilities by industry sectors, and by SMEs in particular.

### **3) Implement Full Funding of Research**

As previously noted, research and development should continue to be supported at an appropriate level as an important contributor to Australia's innovation, knowledge, economic, environmental and social capacity. Key to maintaining a strong R&D sector is the provision of sufficient and appropriately governed research project and infrastructure funding.

As outlined in section 2.2, it is recommended that in those Commonwealth funding schemes where there is a single grant body such as in the ARC Discovery Grants, and ARC Linkage Infrastructure, Equipment and Facilities

(LIEF) grants, a funding model that provides the full quantum of funding required to undertake the research proposed is employed.

Under current arrangements, partial funding may divert institutional resources from:

- Maintenance and renewal of assets
- Adequate administrative support for researchers
- Technical capacity for operation of instrumentation
- Commercialisation activities
- Education: resulting in higher student-lecturer ratios and diminished provision of resources to demonstration and practical elements.

Furthermore the partial funding may detract from involvement of other partners – including industry, philanthropy, and State and Territory jurisdictions. In the case of the latter, it is evident that under a full funding model, funds from jurisdictions could be directed to provide a stronger value proposition in line with that State or Territory’s priorities for capacity and infrastructure rather than filling a funding gap.

In addition to moving toward full funding of the grant, with respect to equipment purchases, it is recommended that consideration be given to a requirement for applicants to account for depreciation, maintenance and repair, and that the scope of grants is increased to address these costs over the useful infrastructure lifetime.

## APPENDIX 2

### INCREASED FLEXIBILITY FOR COOPERATIVE RESEARCH CENTRE APPLICATION AND OPERATION

DSRD currently supports the Commonwealth's CRC program through four mechanisms:

- 1) CRC liaison activities, that:
  - Enhance linkages of established CRCs with external partners and users, including industry, Government agencies and the education sector
  - Facilitate proposing CRCs to identify relevant university, industry and Government partners, structures and interaction with the Commonwealth
- 2) Provision of financial support for development of competitive business proposals at Stage two of the Commonwealth process – CRC Business Case Support Program
- 3) Provision of financial support from the Science Leveraging Fund to CRCs with significant operations and benefit to NSW
- 4) Current participant in the CRC for Sustainable Tourism

While the Department supports continuing the CRC program, including a revised and additional focus on public good outcomes, the current review provides the opportunity for a number of issues to be addressed.

**Timeframe for application and establishment is excessive.** The current timeframe to bring together a CRC consortium and to successfully proceed through the application round typically lasts 1.5 years, with a further 0.5 – 1 year to put in place company constitutions, participants agreements and IP management frameworks etc. This means that in effect up to 2.5 years has passed before the research work of the collaboration begins. This long lead time can negatively impact the:

- Attractiveness for potential partners to be involved at the outset
- Initial and on-going commitment of partners, particularly industry, through the process
- Usefulness of the research projects on commencement and completion, due to delays to market for time critical applications and products.

**Lack of flexibility excludes potential partners.** Some degree of flexibility is accommodated in the current CRC program, for example the manner in which CRCs manage and account for their IP. However, there is less freedom in establishing CRC collaborations in terms of:

- size (consortia seeking less than ~\$25m in DIISR funding, or more than \$40m over seven years are unlikely to be funded in that form)
- Governance (incorporation required),
- Timeframe (seven years unless successfully refunded),
- Outcomes (industry, commercial and economic outcomes).

CRCs cover a range of innovation fields in both industry and public sectors, resulting in various CRCs having different needs and potential outcomes. The main drivers for a CRC are outcomes, whether for public good or commercial gain or skills and training. The CRC application and funding program should more effectively allow for the varying needs of different research disciplines, social and environmental policy areas, and industry sectors.

For example, incorporation of the venture may simplify participation in CRCs with a largely private good output, but not be as effective for public good CRCs. In an incorporated entity, controlled by a board rather than by member organisations, the direction of the CRC might depart from the original intention of the partners when first constituted. As a result, R&D directions become primarily motivated by commercial opportunities rather than public good outcomes.

Additionally, there are large differences between industries. The needs and business models of industries with rapid product development cycles such as IT/computing and those with longer product development protocols (e.g. pharmaceuticals) are very different. As such a one size fits all approach to structuring CRCs will not produce consistent outcomes across the range of CRCs.

The current system requires partners in a bidding consortium to make firm and binding commitments to the partnership at an early stage, prior to the negotiation of IP management, and prior to the decision about the specific research projects that will be undertaken. While this may be understandable given the size of the Commonwealth grant to CRCs, this requirement of an early commitment means that partners with a lesser interest in the enterprise at the early stages of bidding may decide not to proceed. If they leave, they create considerable difficulties for the other parties, with the CRC consortium

needing to replace the withdrawing participant(s) with an organization of similar scale and type.

Currently CRCs have as many as 25 participant organisations, which are encouraged to be core participants, and therefore are expected to negotiate and sign a single Participants Agreement (PA), Company Constitution etc. Having this number of co-signatories creates a significant barrier to swift establishment, with very time consuming and expensive contractual negotiations required to get full agreement by all parties on all aspects of the contracts and constitution. Reducing the number of organisations that sign the PA and constitution, and relying more on representative entities to manage participation on behalf of a group of like bodies would simplify this. This would be particularly the case where research outputs are public good or industry sector-wide.

The new Advanced Manufacturing CRC is a model where participation of SMEs occurs through portal member organisations such as Victorian Centre for Advanced Manufacturing and Materials. In this model, VCAMM is a core participant, while the SME partners will collaborate with the CRC under individual project-level agreements, underwritten by the core participant's contribution. This approach could be adapted to other CRC consortia. Industry associations or representative bodies could join the CRC and manage the participation on behalf of individual companies or the industry sector on the whole. Individual companies, although not core participants, would still gain benefit from being involved in the activities of the CRC.

There needs to be increased flexibility in regards to the structure of CRCs, the manner in which participant organisations are involved and their ability to move in and out of the CRC.

**Limiting multiple funding rounds may effectively encourage new and different CRCs.** There are a range of CRCs which have received funding in multiple rounds (up to 21 years of funding). Where the research program or research outcomes justify and require ongoing support there should be a mechanism for moving this research out of the CRC and either into the private sector or back into the public sector. This will allow CRC funding to be freed up for new CRCs as well ensuring the research is maintained longer term.

Under the current CRC Program application framework, there are relatively few new consortia winning funding. For example in the 2006 CRC funding round, of the ten consortia that received full program funding at the

completion of the process, only three were new consortia (30%). By comparison of thirty stage 1 applications that were submitted, approximately sixteen of these were new bids (50%).

## RECOMMENDATIONS

A more flexible program structure that shortens and simplifies the application and establishment process could make participation in a CRC consortium simpler, more attractive, with greater outcomes being achieved and shared across the industry/sector as a whole. DSRD suggests the following mechanisms for consideration:

- 1) **Allow consortia to start smaller and grow.** Currently the CRC Committee relies on the application process to give comfort that the Commonwealth's \$25–40m will be well spent – necessitating an in-depth application process and firm partner commitments from the outset. Allowing a more gradual up-scaling of the CRC or a trial period would be a more effective method to provide the assurance needed to sign over the funding. This could occur through:
  - Trial/demonstration phase – during the first two or three years of the grant, consortia are required to demonstrate that the research teams and projects brought together have the capacity to deliver. Following a review, the scale of the consortia could then be increased to full scale.
  - Organic growth – the research consortium would start small, and as it demonstrates its strength and capacity, through R&D outcomes and also by having new organisations wishing to join, it would then be able to make a case to the funders (Commonwealth and partners) that the group needed to upscale. This would also allow the CRC committee to respond to both changes in the capabilities of the consortium, and also to changes in the fundamentals of the field and sector – i.e. as an issue grew (or decreased) in importance or a new market was created, then the scale of the CRC could change accordingly.
- 2) **Decreasing the number and type of organisations that become core participants of the CRC.** Increase the number of participants through less stringent or binding arrangements as associate partners, or via contracts or supporting participant arrangements.

- 3) **Allow for greater flexibility in the type of governance model used.** This would allow for governance arrangements best suited to the partners and activities of the capability to be instituted.
- 4) **Establish an end-point for CRCs.** Once research outcomes are achieved or the research is of greater relevance elsewhere, facilitate the transfer of research programs from CRCs into the private sector or back into the public sector. A current model of transfer is with the successful move of long term collaborative partnerships from ARC Centres of Excellence into National Research Institutes.

## APPENDIX 3

### DSRD'S ROLE IN INNOVATION AND THE NSW ECONOMY

#### **The Role and Purpose of DSRD**

The NSW Department of State and Regional Development ('DSRD' or 'the Department') is the business development agency of the NSW Government. Its mission is to secure innovative and sustainable business and industry development for NSW. DSRD comprises the following divisions and units:

- § Investment Division
- § Industry Division
- § Small Business Development Division
- § Policy and Resources Division
- § Regional Development Division
- § Tourism NSW
- § NSW Office for Science and Medical Research
- § Innovation Unit
- § International Business Relations Unit
- § Communications Unit
- § Executive Support Unit
- § Retail Tenancy Unit

DSRD is the lead NSW Government agency for two priorities in the NSW State Plan: Priority P1, 'Increased business investment' and Priority P6, 'Increased business investment in rural and regional NSW'<sup>25</sup>. The Department's budget for 2007-08 is \$181.9 million.

DSRD is the agency with leadership responsibility for delivering on the 2006 NSW Government Statement on Innovation. The Statement advocates a policy approach based on enhancing innovation in key sectors that will have a significant impact upon the economy and across key capabilities supporting these innovation systems. The Department aims to enhance the NSW business environment by ensuring that impediments to innovation are identified and addressed, and facilitating greater adoption of innovation.

#### **DSRD's Role in Innovation**

The NSW Innovation Council was established in November 2007 to drive government action to stimulate innovation. The Council consists of high level

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<sup>25</sup> NSW State Plan - [www.nsw.gov.au/stateplan/pdf/State\\_Plan\\_complete.pdf](http://www.nsw.gov.au/stateplan/pdf/State_Plan_complete.pdf)

public and private sector members, and undertakes innovation policy development and implementation through the Innovation Unit and other divisions within DSRD.

DSRD offers a range of programs that either directly support innovation or support the development of the foundations of innovation. A significant share of the Department's funding is directed towards supporting science and medical research institutes and their research capabilities. The Office for Science and Medical Research (OSMR), located within DSRD, works with research institutes, universities and businesses to promote growth and innovation in science and medical research to achieve better economic, technological, health and environmental outcomes for the people of NSW.

The Department has key programs aimed at facilitating commercialisation of new ideas, industry networking and exports. These programs are premised on the strong link between business competitiveness and innovation, and the importance of customer demand in driving innovation. As a result, programs explicitly or implicitly promote productivity improvement and application of new techniques, market focus and/or technologies to improve a firm's competitive position by focusing on the needs of existing or new customers. DSRD's business investment programs encourage new investment to service a growing customer base and improve efficiency and viability of surrounding business.

DSRD industry and investment programs are primarily directed towards the five innovation sectors as identified in the 2006 NSW Government Statement on Innovation.

The Department's regional programs recognise that regional businesses and regions by virtue of their relative geographic isolation are required to implement innovation in their processes as a survival mechanism. DSRD provides access to information and expertise in such circumstances.

The Department also works with other government agencies to develop policies and approaches to build infrastructure, capabilities and create an environment supportive of innovation activity. For example, the Department is currently working with other government agencies on developing policies and programs to: improve high level skills in parts of the creative industry; support the productivity and efficiency of the logistics industry; and a study on the move to a low carbon economy.

## NSW Key Characteristics for Innovation

The NSW economy is the largest in Australia. The following table highlights the overall structure of the NSW and Australian economies.

The table highlights the importance of the services sector, not only to NSW, but to Australia as a whole. The services sector represents 77 percent of the Australian economy and 83 percent of the NSW economy (excluding 'ownership of dwellings' and 'taxes and subsidies').

Industry Structure - New South Wales and Australia, 2006-07

Sector/industry	NSW (A\$ million)	% share of NSW total <sup>1</sup>	Australia (A\$ million)	% share of Aust total <sup>1</sup>	NSW as % of Australia
<b>Primary:</b>	<b>12,953</b>	<b>4.6</b>	<b>97,154</b>	<b>11.0</b>	<b>13.3</b>
Agriculture, forestry and fishing	4,789	1.7	22,346	2.5	21.4
Mining	8,164	2.9	74,808	8.5	10.9
<b>Manufacturing</b>	<b>34,368</b>	<b>12.2</b>	<b>107,497</b>	<b>12.2</b>	<b>32.0</b>
<b>Services:</b>	<b>233,686</b>	<b>83.2</b>	<b>675,618</b>	<b>76.8</b>	<b>34.6</b>
Property and business services	49,776	17.7	127,180	14.4	39.1
Finance and insurance	33,379	11.9	75,542	8.6	44.2
Construction	22,454	8.0	71,274	8.1	31.5
Health and community services	19,627	7.0	61,124	6.9	32.1
Retail trade	18,101	6.4	57,313	6.5	31.6
Wholesale trade	16,887	6.0	47,800	5.4	35.3
Education	14,128	5.0	44,032	5.0	32.1
Transport and storage	14,252	5.1	49,942	5.7	28.5
Government administration and defence	11,795	4.2	40,638	4.6	29.0
Communication services	8,185	2.9	24,389	2.8	33.6
Accommodation, cafes and restaurants	7,732	2.8	20,990	2.4	36.8
Electricity, gas and water	6,292	2.2	22,244	2.5	28.3
Personal and other services	5,801	2.1	18,461	2.1	31.4
Cultural and recreational services	5,277	1.9	14,689	1.7	35.9
<b>Sub-total</b>	<b>281,007</b>	<b>100.0</b>	<b>880,269</b>	<b>100.0</b>	<b>31.9</b>
Ownership of dwellings	29,422		81,611		
<b>Gross value added at basic prices</b>	<b>310,430</b>		<b>961,880</b>		
Taxes and subsidies	24,714		84,485		
<b>Gross State Product</b>	<b>335,144</b>		<b>1,046,365</b>		

Note: 1 - Gross Value added excluding Ownership of dwellings

Source: ABS Cat. No. 5220.0, State Accounts, 2006-07

Especially important for NSW are property and business services and the finance and insurance industries. Property and business services account for around 15 percent of the NSW economy (and NSW is home to 39 percent of Australia's property and business services industry). The finance and insurance industry accounts for 10 percent of the NSW economy, with 44 percent of Australia's finance and insurance industry located in NSW.

Services exports represent over 40 percent of all of NSW's exports compared to 22 percent for Australia as a whole. Over half of the value of Australia's

total exports from the Finance and Insurance, Computer and Information, and Other Business Services industries is from NSW.

*As a result, while innovation within the services sector is important for Australia, it is especially important for NSW.*