NSW Regional Innovation Strategy:

Resilient Businesses, Sustainable Jobs

NSW GOVERNMENT | Industry & Investment

NSW Regional Innovation Strategy

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Executive Summary

Overview

Businesses in regional NSW face a number of challenges, many of which are common across the state though some are unique to specific regions or industries. The ongoing effects of the drought, inland de-population coupled with population growth on the coast, access to markets, and fluctuating global economic conditions are among these.

Innovation is relevant to regional businesses as it increases competitiveness through the development of new, or significantly improved, products, services, systems and processes. The NSW Regional Innovation Strategy (RIS or 'Strategy') proposes a set of government actions to improve the innovative performance of regional businesses.

A framework based on extensive research has been developed that describes both the drivers of innovation in regional NSW (the pressures and the willingness to innovate) and the enablers of innovation (access to knowledge and the ability to implement change). Case studies of five industries explore this framework at the industry level – the wine manufacturing sector in the Riverina, tourist parks in the Northern Rivers, manufacturing in Western NSW, the coal industry in the Hunter, and the adoption of Integrated Pest Management in the vegetable industry.

Informed by the framework and the case studies, a Strategy for regional business innovation has been developed. The Strategy encompasses two key components:

1. A series of recommendations for the immediate expansion of innovative capacity in regional businesses. These recommendations will enhance the viability of businesses allowing them to maintain and create jobs.
2. The development and implementation of ***Innovation Initiatives*** for each major region in NSW[1] to increase the level of innovative business activity in the medium to long term.

The outcome of the Strategy implementation will be that regional businesses increase their level of innovative activity and are better equipped to face changing economic conditions whilst being positioned for future growth through innovation***.***

A set of six guiding principles have been developed that articulate the Strategy's framework:

> **Guiding Principle 1:** Innovation is an important strategy for businesses to adopt in order to overcome the challenges they face. It is a fundamental driver of economic prosperity, and sustainable job creation and retention in regional NSW.

[1] As Industry & Investment NSW is the lead agency in delivering the Strategy, the Initiatives will be based on I&I NSW (SRDT) regions. The boundaries of these regions are closely aligned to ABS statistical divisions.

Guiding Principle 2: Innovation is a broad based process which includes but is not confined to R&D and its commercialisation or diffusion. Innovation does and can occur in every segment and every sector of a business and the economy, regardless of the level of technology.

Guiding Principle 3: Innovation is an active process that requires full engagement by the business owners, managers and employees. Being willing and able to absorb knowledge for innovation is a key driver for change and for the development of a culture of innovation.

Guiding Principle 4: Access to knowledge is a key enabler for innovation to occur. Low levels of innovative activity can arise when:

- Businesses cannot access information from within their region or industry about successful innovations.
- Businesses have a limited insight into industry trends from outside the region and overseas, or from other industries.
- Businesses cannot access research and other services from research institutions that can help them in their innovation process.

Guiding Principle 5: Levels of innovative activity can increase where there is access to enabling services and facilities, such as finance and professional and technical services.

Guiding Principle 6: The innovative capacity and viability of regional businesses is strongly enhanced by the ability to access new markets, allowing the development of scale and a diverse customer base. Effective broadband, efficient logistics networks and access to new market information are critical.

These six guiding principles inform the two key components of the Strategy: recommendations for the immediate expansion of innovative capacity of regional businesses; and the development and implementation of *Innovation Initiatives*.

Recommendations for the immediate expansion of innovative capacity

These recommendations address issues raised through the process of developing this Strategy which included consultations with a range of government agencies, regional business, Industry and Investment NSW, State & Regional Development and Tourism (I&I NSW, SRDT) regional staff, research and industry organisations.

Seven **recommendations** have been developed that the Department will coordinate a response to:

1. Expand access to management training programs in regional areas.
2. Expand the roll-out of business innovation training (such as Lean).

3. Develop a pilot program to enhance knowledge sharing and the development of both formal and informal networks.

4. Leverage the transformative capacity of the National Broadband Network to enhance regional business innovation.

5. Promote the transfer of external knowledge to the regions by sponsoring experts to visit regional NSW and share knowledge with local businesses on innovation and industry trends. This could be via seminars or workshops, complemented by small group sessions or site visits.

6. Develop a scheme to enhance and increase the transfer of knowledge from the State's research institutions to the business community.

7. Develop a communications strategy to improve awareness by regional businesses of I&I NSW's role in providing information on various NSW and Commonwealth funding programs.

A range of actions for each recommendation has been developed in consultation with other government agencies such as the Department of Education and Training, and the Department of Environment, Climate Change and Water.

Evaluation of the implementation of the recommendations will inform the development of the *Innovation Initiatives* by acting as inputs to the analysis of innovation blockages and the prioritisation of the key issues.

Innovation Initiatives for medium-term capacity building

Innovation Initiatives will be developed for I&I NSW (SRDT) regions outside Sydney. These will provide a flexible mechanism for developing localised innovation policies over the medium term to respond to changing priorities of regional economies. The key components of the Initiatives are:

1. The development of an economic profile of the region
2. An examination of the innovation capacity of the region
3. Agreement between key stakeholders on the issues and actions
4. A plan to implement the agreed Initiatives
5. Ongoing monitoring and evaluation of the Initiatives

Innovation Initiatives will be linked to other regional growth and economic development plans, specifically the existing I&I NSW (SRDT) Regional Business Growth Plans.

NSW Regional Innovation Strategy:

Resilient Businesses, Sustainable Jobs

1. Introduction

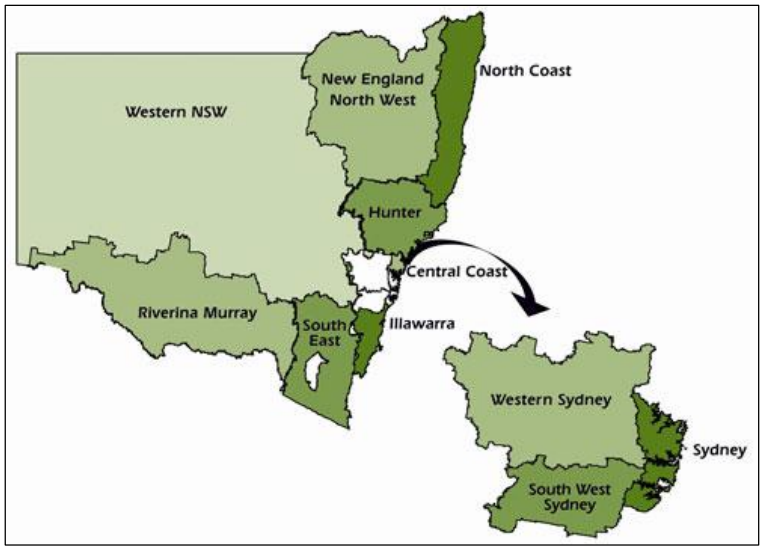
1.1. Purpose of the Regional Innovation Strategy

The purpose of the Strategy is to develop a strategic framework and policies to facilitate and enhance the innovative ability of businesses in regional NSW for long term sustainability. Innovation impacts upon regional business sustainability through the development of new, or significantly improved, products, services, systems and processes. The Strategy seeks to identify the main pressures encouraging innovative activity in regional NSW businesses, the main blockages in the innovation process and remedial actions the NSW Government can undertake.

The NSW Government is active in promoting community and environmental innovation to meet the needs of regional NSW. However, this Strategy focuses on innovation in regional businesses and industry, not social innovation.

Figure 1.1 identifies the major regions of NSW.

Figure 1.1 NSW regions



Source: NSW State Plan (2006)

1.2. What is Innovation?

As the focus of the Strategy is towards meeting the needs of businesses in regional NSW, innovation is defined as the application of fresh ideas that add commercial value. Consistent with the definition applied by the Australian Bureau of Statistics (ABS), innovation covers[2]:

- New or significantly improved *goods or services* (or a combination of these). The characteristics or intended uses of these differ significantly from those previously produced/offered.
- New or significantly improved *operational processes* or methods of producing or delivering goods or services of a business. This includes significant change in techniques, equipment and/or software.
- New or significantly improved *organisational/managerial processes*. This covers strategies, structures or routines of a business which aim to improve performance.
- New or significantly improved *marketing methods*. This includes design, packaging or sales methods aimed to increase the appeal of goods or services of a business or to enter new markets.

As the above definition highlights, innovation is not just about the development of a new idea through research and development, but is also about applying new ideas to problems to generate a more efficient or effective service, product or process. Innovation requires access to knowledge, whether that is through its creation or its diffusion from other sources. It also involves activities needed to bring an innovation to the end user.

Innovation takes place in all industries, but different sectors often innovate in different ways. In addition to this, the nature of the innovation system varies between industries and locations. Each industry and each region is unique, reflecting local economic, business and institutional structures, and governance arrangements as well as the history, culture, demographics and geography of the area. Different industries can face different pressures that encourage innovative activity. These industries will also use a different mix of tools (or enablers), to develop, diffuse, adopt and implement new ideas in response to these pressures.

Nationally, 38.9 percent of non-capital city businesses are innovative, compared with 35.8 percent in the capital cities. For NSW as a whole, 37.4 percent of businesses are innovative, slightly more than the Australian total.[3]

[2] Australian Bureau of Statistics (2007) 'Summary of IT Use and Innovation in Australian Businesses', 2006-07 8166.0, note 22
[3] Australian Bureau of Statistics (2008) 'Innovation in Australian Businesses', cat. no. 8158.0, 2006-07

1.3. Strategic Context

1.3.1. Key Regional Statistics

Regional NSW is home to 26 percent of the State's population and 29 percent of businesses.[4] It is highly diverse, with each region demonstrating and experiencing different, and at times opposing, trends.

Coastal regional NSW[5] has experienced strong population growth between 2001 and 2006, particularly among seniors and retirees (Table 1.1). This presents a challenge for the development of sustainable communities, but also opportunities. The retail and healthcare and social assistance sectors account for a higher proportion of employment in this region than they do in metro areas (Table 1.2).

In contrast, Inland NSW has witnessed a decline in population between 2001 and 2006 and also has the lowest proportion of its population with a non-school qualification (47 percent compared with 56 percent in metro areas). Mining and agriculture currently account for 16 percent of employment in the region. Together, employment in these sectors fell by 12 percent between 2001 and 2006, compounding the challenges for economic development.

Table 1.1: Key features of regional NSW

	Population		Proportion of population aged 15+ with a non-school qualification (2006)	Proportion of local population aged 55+	
	No. in 2006 (million)	Growth between 2001 and 2006		1996	2006
Coastal regional NSW	0.9	4.8%	50.2%	26.0%	31.5%
Inland NSW	0.7	-0.4%	46.5%	21.6%	27.0%
Metro*	4.9	3.7%	55.7%	20.3%	23.1%
NSW	**6.6**	**3.4%**	**53.9%**	**21.3%**	**24.7%**

*Metro: Greater Sydney, Newcastle, Wollongong
Source: ABS, Census

Table 1.2: Employment by industry in regional NSW

	Share of employment in the region				Contribution to total employment growth in NSW between 2001 and 2006 (% points)			
	Coastal regional NSW	Inland NSW	Metro*	NSW	Coastal regional NSW	Inland NSW	Metro*	NSW
Primary	7.4%	16.1%	1.0%	3.5%	-0.1%	-0.2%	0.0%	-0.3%
Manufacturing	7.7%	9.2%	10.3%	9.8%	0.0%	0.0%	-0.9%	-0.9%
Services	84.9%	74.7%	88.7%	86.7%	1.5%	0.6%	4.4%	6.5%
Retail trade	13.4%	11.7%	11.1%	11.4%	0.3%	0.1%	0.6%	1.0%
Accommodation & food services	8.9%	6.8%	6.4%	6.7%	0.1%	0.0%	0.2%	0.3%
Transport, postal & warehousing	4.0%	4.5%	5.4%	5.1%	0.1%	0.0%	0.3%	0.3%
Education & training	7.9%	8.6%	7.6%	7.8%	0.1%	0.1%	0.6%	0.9%
Health care & social assistance	11.8%	10.7%	10.6%	10.8%	0.3%	0.2%	1.3%	1.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**1.5%**	**0.3%**	**3.5%**	**5.3%**

*Metro: Greater Sydney, Newcastle, Wollongong
Source: ABS, Census

[4] Regional NSW excludes Newcastle and Wollongong. Sources: Australian Bureau of Statistics (2006) 'Census', Australian Bureau of Statistics (2007)'Count of Businesses'
[5] This includes the North Coast, Hunter (excluding Newcastle), Illawarra (excluding Wollongong) and South East regions.

1.3.2. Current Regional Challenges

Businesses in regional NSW face a number of challenges: water shortages; fluctuating economic conditions; access to markets and services; transport links; and demographic changes resulting in skills issues. Innovation represents one of the major actions that businesses can undertake to meet these challenges whether it be by:

- improving operational processes to increase the productivity and viability of individual businesses, or
- developing new products or services, or
- gaining customers in new markets.

A well-functioning regional innovation system will help in meeting these challenges and support long-term regional economic resilience.

Volatility in the global economy presents a particular challenge for businesses in regional NSW, especially in vulnerable markets such as in-bound tourism, export-oriented manufacturing and those companies who rely on discretionary spending (e.g. household goods retailers). Businesses that innovate may be better placed to overcome these challenges by developing or adapting new products and services, and focusing on new markets (e.g. domestic tourism).

1.3.3. Existing Government Policies

As a response to the global economic downturn experienced during the late 2000's, the NSW Government committed itself to increasing support for the NSW economy.

The Government's Response to the Jobs Summit, held in February 2009, identifies ways to drive infrastructure investment and jobs to limit the impacts of the global economic downturn on business. The industry sectors represented at the Summit were identified as key sectors for NSW Government activity and support.

Two of the key planks of the Response, supporting regional jobs and strengthening our skill base, and re-skilling in growth industries, relate directly to regional businesses. In addition, the Government has held a number of Regional Jobs Summits to identify location specific ways to support jobs and businesses.

Another plank of the Response is to make it easier to establish clean, renewable energy projects and attract green jobs to NSW. The *NSW Green Skills Strategy*, which identifies a range of environmentally important industries for a focused skills response, will ensure that the NSW workforce has the skills and knowledge to support the transition to a low carbon and more sustainable economy. For example, the Energy Efficiency Training for Trades and Professionals program, run jointly by the Department of Environment, Climate Change and Water and the Department of Education and Training will assist with providing some of the skills needed for innovation.

The Government is positioning NSW as the "clever" State, creating an environment in which knowledge, creativity and innovation drive economic growth to improve prosperity and quality of life. NSW Government strategically invests in the state's research sector

in areas such as robotics, photovoltaics and biotechnology helping create new jobs, skills and industries. Through the Research Partnerships Program, the Government will coordinate the development of research concentrations that contribute to Government's priority areas, with a goal of developing applications for funding under Cooperative Research Centres, ARC Centres of Excellence and other relevant programs.

The NSW Government also acknowledges the critical role innovation plays in driving productivity and economic growth expressed through the NSW Statement on Innovation.[6] The Statement seeks to ensure that impediments to innovation are identified and addressed, and that greater adoption of innovation is facilitated. It emphasises the need for government intervention to focus on providing foundational conditions for businesses to innovate and identifies key innovation sectors for government focus that are most likely to produce benefits for the broader NSW economy.

In 2007 the NSW Government established the Rural and Regional Taskforce. The Taskforce's role is to provide advice to Government on economic, environmental and social issues affecting rural communities in NSW[7]. Additionally, the NSW *Regional Development Act* aims to promote economic and employment growth in regional NSW.

These NSW Government actions and priorities acknowledge the unique challenges that regions in NSW experience as a result of their distance from cities and major markets. The development of regional specific priorities also ensures that the needs of regional NSW are not subsumed in meeting overall State objectives for NSW.

In 2009, the Australian and NSW Governments established a network of Regional Development Australia committees in the State, replacing existing Area Consultative Committees and Regional Development Boards. Regional Development Australia sees the promotion of innovative regions as a key driver of regional growth.[8]

This priority has also been expressed in a number of reviews undertaken for the Commonwealth Government.

The Review of the National Innovation System noted that "innovation is a vital part of maintaining the ongoing growth, profitability and sustainability of Australia's rural industries, especially in the face of increases in competition in domestic and international markets".[9] It specifically identified as a priority the development of a national rural innovation strategy.

Concurrently, the Green Paper from the Review of Australian Higher Education highlighted the difficulties providing higher education in regional areas where there are small markets unable to support an economic and viable presence.[10] The Review recommended additional funding for flexible and collaborative delivery of higher education provision in regional areas to replace the existing regional loading. In

[6] NSW Government (2006) 'Statement on Innovation'
[7] NSW Government (2008) 'Rural and Regional Taskforce Report to the Premier'
[8] Regional Development Australia (2009) Regional Development Fact Sheets – Strategies for Regional Growth
[9] Cutler (2008)Venturous Australia – Building strength in innovation, Annex 11
[10] Department of Education, Employment and Workplace Relations (2008) 'Review of Australian Higher Education: Final Report', 2008, p. xii.

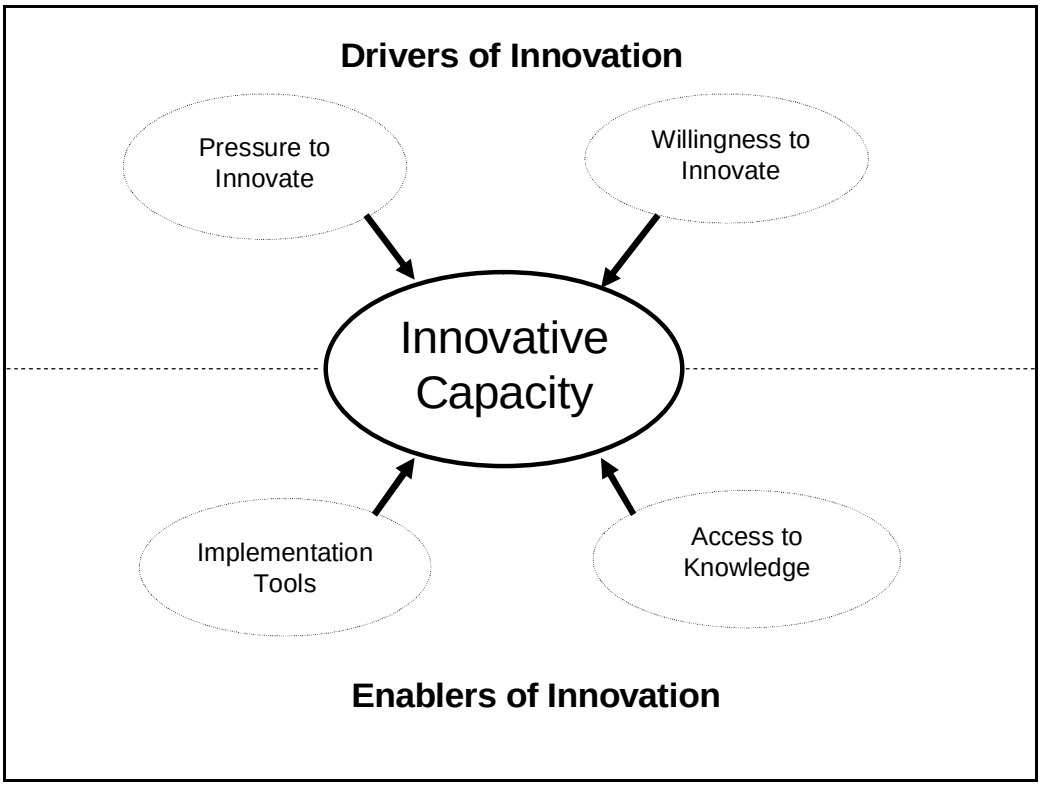
addition, the Review suggested the possible establishment of a new national university for regional areas.[11]

The Commonwealth has commenced Enterprise Connect, a national program to help small business become more "innovative, efficient and competitive". Through a network of advisors across Australia, based in dedicated manufacturing and sector-specific centres, in addition to the Innovative Regions Centre, regional businesses are expected to benefit from expert advice tailored to their individual needs.[12] The Commonwealth also has a regional presence through its AusIndustry and Tradestart (Austrade) offices.

1.4. Methodology

A key focus of the Strategy is an investigation of the key drivers of innovation and the key enablers or tools required by regional businesses to undertake innovative activity (Figure 1.2). However, it is recognised that drivers and enablers will sometimes be specific to regional areas and this will be addressed with the development of *Innovation Initiatives* outlined in Section 5.

Figure 1.2: Innovation Framework



[11] ibid, p. xx.
[12] Department of Innovation, Industry, Science and Research (2008) 'Enterprise Connect'

The Strategy investigates:

Drivers (pressure and willingness) to innovate

- *Pressure to innovate* represents the key challenges faced by a business that can lead to innovative activity. The strength of these pressures will affect a business' focus. For example, demanding customers are seen as a significant 'pressure' which can drive businesses to innovate.
- *Willingness to innovate* represents the business' openness to exploring new approaches or ideas.

Together these translate into the degree to which:

- an industry/business is likely to seek out new knowledge; and
- the motivation of businesses and industry to take advantage of new knowledge and incorporate it into their activities, processes and/or products.

Enablers to innovation:

- *Access to knowledge*. The ability to access new ideas or knowledge is a prerequisite enabler for innovation. Access to knowledge incorporates both the *creation* as well as the *diffusion* of knowledge and covers knowledge from both domestic and overseas knowledge sources.
- *Ability to implement or adopt innovations*. This component looks at the other enablers needed by the industry/business in regional NSW to innovate. These include access to business services, finance, information technology and government support. This is important as it relates to whether a business is able to introduce a desired innovation.

The development of the Strategy involved analysis of the innovation system in regional NSW through:

a) A high level analysis of the key drivers, enablers and institutions that are important to the regional NSW innovation system.

b) Case studies of five sectors to develop a strong understanding of the pressures driving innovation in these sectors, the key enablers and how the overall system is functioning. The following case studies were chosen:

- *Food and Beverage Industry - Wine Industry in the Riverina*. This is an example of an export-oriented industry that has been highly innovative in the past and is currently facing new challenges. The Riverina region is the largest wine producing area in NSW by volume and is the location of a diverse range of producers and major industry research and training organisations. This case study provided some insight into sources of knowledge and how it is diffused throughout the industry.
- *Tourism - Tourist Park accommodation in the North Coast*. This is a sub-segment of the tourist accommodation sector that has responded to evolving

consumer demand by moving to upgrade the type of product and services it provides to tourists (for example, by introducing luxury cabins). This case study also provided some insight into the challenges encountered by regional service industries. Further, while tourism was not one of the five initial innovation sectors, it was identified as a sector of importance in the NSW Innovation Statement. The focus of this case study is tourist parks in the Northern Rivers tourism sector, part of the North Coast region.

- *Manufacturing in selected companies in Orange and Dubbo*. The focus of this case study was a group of companies that had recently undertaken lean manufacturing training to improve their productivity. This case study provided a strong understanding of the challenges in introducing *process innovation* in a regional context. Manufacturing is also one of the five priority sectors identified in the NSW Innovation Statement and is a sector facing increasing international competition.

- *Integrated Pest Management uptake in the Vegetable Industry.* This presents a snapshot of the pressures of environmental toxicity, human and ecosystem health and pesticide resistance driving the adoption of IPM as an innovative strategy for pest management. It explores the barriers to adoption and examines the interrelationships of key enablers necessary for adoption. This case study shows that knowledge in isolation of peer learning and skill development is insufficient to change the culture of growers to embrace innovative practices and examines the role of intermediaries and R&D in influencing motivations.

- *Coal Industry in the Hunter.* Two sides to the coal industry in the Hunter were examined: the coal producers, and the equipment manufacturers and service providers. Both sectors have proven adept at responding to change through innovation. This case study provided an insight into how a region responds to change, for instance the closure of the BHP steelworks in 1999, and how collaboration with researchers extends beyond the region.

These five case studies were chosen for their ability to provide information that assists in the development and implementation of the Strategy. The selection considered factors such as alignment with the strategic priorities of the NSW Government, coverage of both goods and services industries, and current and future economic projections. In each sector, a different region was chosen to provide a more detailed understanding of different regional dynamics.

The methodology was informed by stakeholder consultations with a range of government agencies including the Department of Environment, Climate Change and Water, Department of Education and Training, the former Department of Primary Industries, SRDT staff, regional businesses, industry and research organisations and selected officers of Regional Development Australia.

2. Main Drivers and Enablers of Innovation in Regional NSW

2.1. Drivers of Innovation: Pressure to Innovate

All businesses face a range of pressures that drive them from a business-as-usual situation. However, in many cases these pressures are not sufficiently strong to require businesses to respond, or there is a lack of willingness on behalf of the business to adopt new or significantly improved products, services or processes. To illustrate this, the Australian Bureau of Statistics' (ABS) *2006-07 Innovation in Australian Business* survey notes that 62.8 percent of non-innovative businesses stated that there was nothing preventing them from undertaking innovation.[13] Therefore, it is useful to understand which pressures drive businesses in regional NSW to undertake innovative activity so that the relative demand for innovative solutions can be assessed and priorities for government action can be developed.

Some pressures are common to both metropolitan and regional areas, while others are felt more strongly in regional NSW. The main pressures encouraging or driving innovative activity in regional businesses are:

- a need to adapt to evolving consumer preferences
- the impact of industry competition
- responding to environmental constraints
- adjusting to skills and labour shortages
- adapting to new regulations and standards

2.1.1. Adapting to Evolving Consumer Preferences

Adapting to evolving consumer preferences is a critical driver of innovation across all businesses regardless of location; it is not unique to regional businesses. As noted by Professor West:

> "*Companies usually start by leveraging their understanding of particular customer needs to identify a potential new product (this does not imply that it simply 'listens to customers'; often businesses understand potential needs better than do customers). After conceiving the potential product, the company initiates an innovation project.*"[14]

Increases in personal wealth and real incomes have given households significant potential for discretionary spending in leisure and lifestyle goods and services. This has enabled more households to access premium markets, prompting entrepreneurial businesses to diversify their product range and engage in novel marketing practices. At the same time, certain markets have seen the opportunity to capture this increased spending power and offer customers a range of options and experiences, as well as attract new customers to the market.

[13] Australian Bureau of Statistics (2007) Innovation in Australian Businesses, 2006-07 8158.0
[14] West, J., (2006) A Strategy to Accelerate Innovation in NSW: Outline for Policy Development, p 6.

2.1.2. Industry Competition

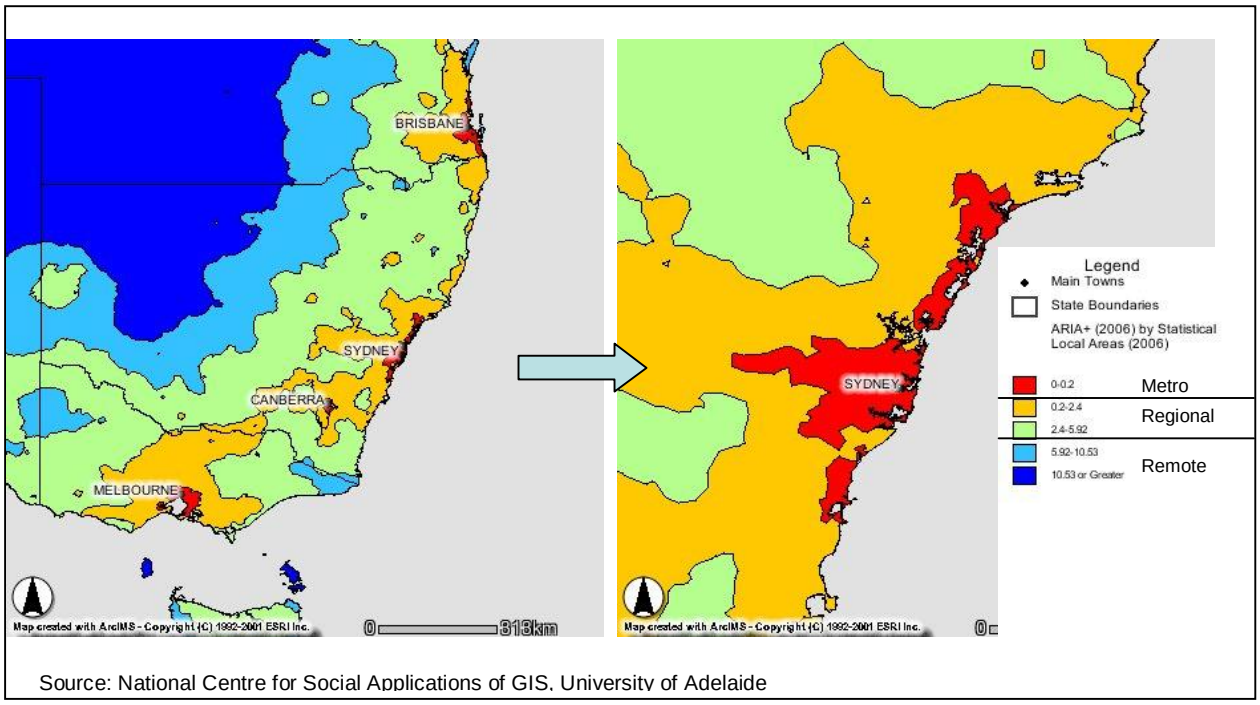
Industry in regional NSW faces similar global and national competitive pressures to those faced by metropolitan NSW. However, it also has to face regional-specific pressures such as access to markets, in particular competing in metro markets. Based on remoteness from service centres, 7.1 percent of the State's residents are located in outer regional, remote or very remote areas (20.3 percent live in inner regional areas with the remainder living in metro areas, see Figure 2.1).[15]

Many regional businesses in the resources sector are particularly exposed to overseas competition and are vulnerable to volatility in exchange rates and commodity prices. Such volatility also affects businesses that rely on primary producers.

In a survey of manufacturing businesses undertaken for the Department of Education and Training, more regional than metropolitan SMEs said they were impacted by global competition.[16]

Improved logistics (e.g. highway upgrades shortening journey times) and communications have opened up local markets to competition from outside the area but have also presented opportunities to compete in new markets.

Figure 2.1: Accessibility/Remoteness Index of Australia (ARIA) Scores for NSW



Source: National Centre for Social Applications of GIS, University of Adelaide

[15] NSW Health (2008) Report of the Chief Health Officer
[16] Manufacturing Learning Australia (2007) Survival skills: global competition and successful strategies in process manufacturing in NSW

2.1.3. Environmental Constraints

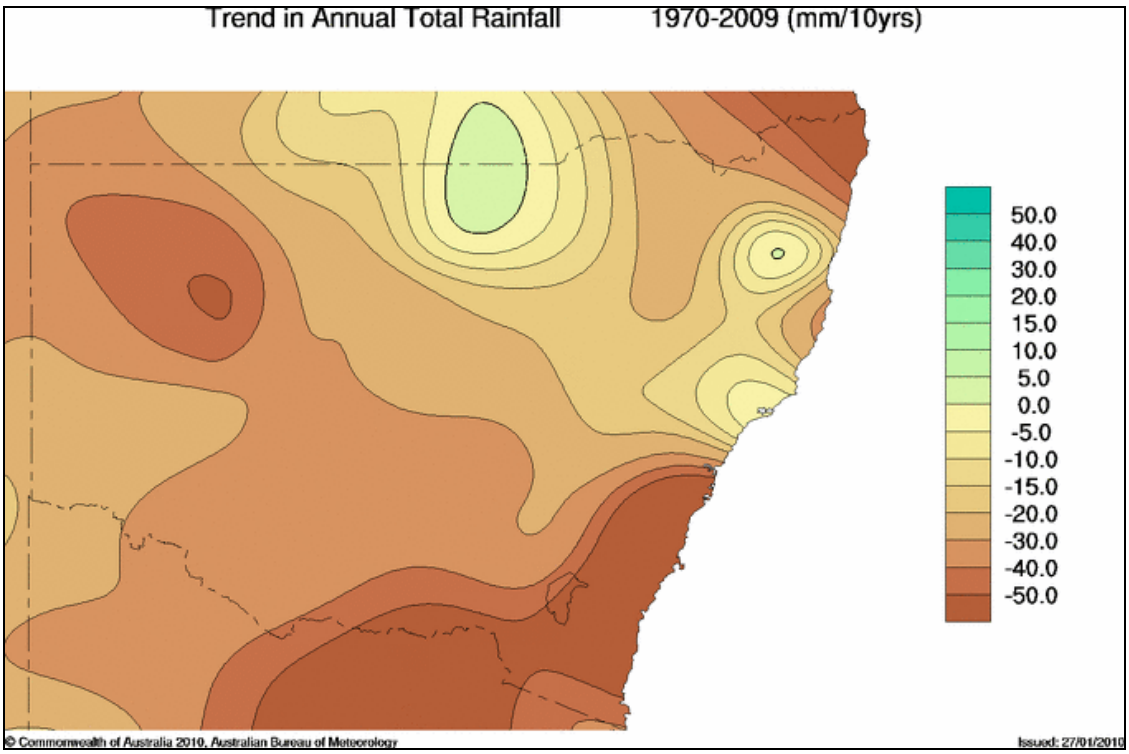
Environmental sustainability is an increasingly important issue for regional communities and businesses. Two main pressures, water shortages and energy usage, have become major issues for regional NSW businesses and have driven changes in production processes and new product development, particularly through development of environmental products and technologies. Climate change poses a significant long-term driver, particularly for primary industries adapted to local conditions. However, climate change also presents opportunities for new markets and products.

Water

In recent years the operations of local water utilities across regional NSW have been strongly influenced by drought. This has led to an increased focus on water conservation and demand management, particularly through water restrictions, pay-for-use water pricing and integrated water cycle management.[17]

By 2009, almost the entire state had experienced significant decreases in rainfall in every decade since 1970, with most areas experiencing an average decrease of 20-50mm every ten years (Figure 2.2). Regional economies rely on access to water for agricultural, horticultural, mining, and manufacturing industries. Water security issues are placing pressure on regional economic and social infrastructure.[18]

Figure 2.2: NSW rainfall map



Source: Bureau of Meterology,27 January 2010 Trend in Annual Total Rainfall 1970-2009

[17] Department of Environment, Climate Change and Water (2006) 'NSW State of Environment Report 2006'
[18] NSW Government (2008) Rural and Regional Taskforce, op.cit., p. 47

The extended period of below average rainfall and drought in many parts of the State, and a more general awareness of the need to conserve water resources, has helped drive the introduction of new processes and review overall operations by many regional businesses. This has helped to reduce demand for water allocation permits and encourage greater waste water recycling in the agricultural, mining and manufacturing sectors. Longer range forecasts of a sustained, lower than average rainfall combined with higher expected temperatures will have significant implications for regional businesses. In some cases this will threaten the survival of businesses and industries. In order to survive, business will need to develop new products and markets.

Carbon Reduction

The Commonwealth and NSW Governments' commitment to reducing carbon emissions is driving the introduction of new processes and technology. The move towards placing a price on carbon and other Commonwealth and NSW Government programs aimed at improving energy efficiency and encouraging less carbon-polluting energy sources, are becoming an increasingly important catalyst for innovation.

Native Vegetation

Primary and secondary industries, as well as residential development, often rely on clearing of native vegetation for expansion. However, native vegetation clearing is generally irreversible and has been identified as the process that represents the greatest single threat to biodiversity in NSW. The NSW Government has passed legislation – the Native Vegetation Act – which has greater capacity to end illegal clearing than past legislation.[19]

[19] Department of Environment, Climate Change and Water (2008) 'NSW State of Environment Report 2008'.

Sustainability Advantage Program

The NSW Department of Environment, Climate Change and Water (DECCW) runs the Sustainability Advantage program. This program helps companies with their environmental performance to reduce risk, lower costs, improve productivity and build a greener reputation.

Sustainability Advantage brings groups of businesses together in clusters that share regional, industry or supply chain interests. Cluster meetings provide an opportunity to draw on the ideas and experiences of like minded companies. Participating companies commit to an 18-month involvement and a modest financial contribution.

The Riverina cluster of Sustainability Advantage has 12 businesses taking part. Participants include a range of food and beverage companies spanning wine, dairy, fruit juice, poultry, and beef products. These businesses anticipate savings of $2,100,000 per annum directly related to participation in the program. Savings related to sustainability projects stimulated by, but not managed through, the program are currently estimated at $590,000.

One of the participants, De Bortoli, a wine production company, has changed its labelling, bottling and cropping techniques to improve efficiency as part of the program. Savings reported by De Bortoli include: $160,000 a year in lower energy consumption and $200,000 a year from the introduction of a system enabling the complete re-use of winery waste water for growing crops.

The De Bortoli Operations Manager, Mr Glastonbury, states that, "*The program galvanised us into a continuous learning and improvement program. To date we have seen some amazing improvements based on simple cultural changes in the business…The productivity rates on our cask and bottling lines have improved 37 and 30 percent respectively, and our lost time injury rates have fallen by over 80 percent in the past 12 months. In that period, process non conformances have dropped by 26 percent and customer complaints have dropped by 42 percent.*"

Source: http://www.environment.nsw.gov.au/sustainbus/sustainabilityadvantage.htm and Environment Newsletter for the Winemakers of the Riverina, February 2008

2.1.4. Skills and Labour

Another pressure for innovation has been the need to respond to long-term demographic changes in regional NSW. These changes, however, have not been consistent across the State. Non-coastal regions have experienced population falls and this has had an impact on the availability of labour and appropriately skilled staff.

Until recently, both the effects of the drought and the recent mining boom have also contributed to shortages in skills and labour in parts of regional NSW. This has led to further concerns about the availability of labour and the implications this would have on regional development. As the Rural and Regional Taskforce observed:

> "*The drought has seen many low-skilled and highly skilled workers that support agriculture and downstream processing move out of this sector with many attracted by the thousands of highly paid jobs available in the booming minerals and energy sector particularly in Western Australia and Queensland. There is a real concern in regional NSW that many of these workers are unlikely to return, significantly impacting on expansion of agricultural production as good growing conditions return.*"[20]

2.1.5. Regulations and Standards

Regulations can apply to a specific industry or can be relevant to all industries (for instance, OH&S). In some cases the introduction of new regulations can act as a trigger for owners and managers to re-evaluate their processes or even reflect more broadly on the products and services they offer and where they want to position themselves in the market. Regulation and standard setting can act to drive innovation through stimulation of private demand. Safety and performance regulations set expectations amongst private users and provide a trustworthy, widely available shortcut to knowledge about the safety and performance of an innovation, thereby lowering the transaction costs of adoption, e.g. energy efficiency ratings. Usage regulations ensure users are safeguarded by legally standardised ways of operating, e.g. regulation of electronic signatures to allow safe internet business transactions.[21]

2.2. Drivers of Innovation: Willingness to Innovate

'Willingness' refers to the motivation to use innovation to respond to challenges. While businesses may experience similar pressures, the way they respond to these pressures will be different. Depending upon the pressure, some may seek to increase staff or work longer hours, some may seek to forgo opportunities or even downsize to a manageable niche market. Only a proportion will choose to innovate to meet these challenges.

Any innovation is traditionally hampered by risk aversion. Any attempt at incorporating changes to a business (whether it be a new innovation or adapting an innovation from elsewhere) involves tolerance of risk so that it will have the desired effect and not cause unintended consequences in other parts of the business.

Studies, such as Hofstede's *Cultural Dimensions,*[22] have detailed personalities, managerial style, or corporate cultures that are more tolerant of risk as having the following qualities:[23]

- are more tolerant of opinions different from what they are used to
- they try to have as few rules as possible
- are less rigid and more flexible.

Related to this, Becker and Hyland state that:

[20] NSW Government (2008) 'Rural and Regional Taskforce', op.cit., p. 47
[21] NESTA (2008) 'Demand and Innovation Interim Report', Working Paper, Oct 2008
[22] Onepine (2008) 'Models and Materials 2 – Organisational Culture: theories, articles, links'
[23] ITIM International (2009) 'Geert Hofstede Cultural Dimensions'

> *"What may be overlooked or ignored [in the innovation process] in many organisations are the inhibitors to innovation, most often found in the people within the business. A key inhibitor is the inability and unwillingness of people, both individually and in groups, to relinquish past behaviour and practices and embrace the new ways needed to successfully implement innovations."* [24]

Leadership is a key factor in the willingness to innovate. According to the Australian Institute of Management, strong regional leadership is the key to stimulating investment and ensuring sustained regional development. Yet:

> *"[Regional, rural and remote] communities are struggling to stem migration to coastal or metropolitan communities and are fighting to attract, and then retain, professionals who have the capability to ensure strong regional leadership in their region."* [25]

2.3. Enablers of Innovation: Access to Knowledge

Enablers are the tools required to undertake an innovation. These have been divided into two broad components: access to knowledge and other innovation implementation tools.

The ability to generate and access knowledge and new ideas is a key enabler for innovation. The ABS *Innovation in Australian Business* survey highlights the importance of industry competitors, customers, suppliers and internal capacity as key sources of new ideas for innovation for all businesses (Table 2.1).

Table 2.1: Innovation–Active Businesses: Sources of Ideas or Information for Innovation, 2006–07

	Percent of Total
Within this business or related company	55.5
Clients, customers or buyers	44.1
Websites, journals, research papers, publications	31.8
Suppliers	31.7
Competitors and other businesses from the same industry	29.4
Professional conferences, seminars, meetings, trade shows	23.8
Industry associations	19.0
Consultants	16.7
Government agencies	4.1
Universities or other higher education institutions	2.6
Commercial laboratories/research and development enterprises	2.0
Private non-profit research institutions	1.4

Note: Businesses could identify more than one source of ideas or information.

Source: ABS, *Innovation in Australian Business, 2006-07* ABS Cat. No. 8158

The survey highlights that businesses obtain ideas from a wide range of sources, but that the main supply of ideas for businesses is from internal operations and customers.

[24] K. Becker and P.Hyland (2008) 'Overcoming Barriers to Innovation by Facilitating Unlearning', in Inside the Innovation Matrix, Australian Business Foundation

[25] Australian Institute of Management (2004) 'Proposed Centre for Rural/Remote Leadership' White Paper, p.7

The key sources of knowledge in regional NSW are:

- Internally-generated ideas by management and employees of the business.
- Movement of personnel between organisations (who have experience with different methods and processes).
- Formal and informal networks that exist within the industry as sources of ideas and as a conduit for what works and what does not.
- Generating and accessing knowledge of consumer and market dynamics, and implementing this market knowledge into products/service offerings, processes and marketing approaches.

Don Scott-Kemmis et al use the term 'absorptive capacity' to refer to business' capabilities to manage the acquisition of knowledge. They define it as:

> *"…the ability of a business to recognise the value of new, external information, assimilate it, and apply it to commercial ends, and hence, a business needs prior related knowledge to assimilate and use new knowledge."*[26]

The authors contend history shows that the process of knowledge diffusion/acquisition is not one of passive absorption. Rather, a high level of technological and managerial capability is required to identify, assess, acquire, integrate and adapt knowledge.

2.3.1. Skills to Develop Knowledge Internally

This refers to the knowledge generated by the management and employees within the business and the internal managerial and employee skills available in-house to develop and implement innovative products, services or processes.

A strong theme from the regional consultations was the high degree of self-sufficiency of many small and medium businesses, and the importance of in-house skills and capabilities in the generation, research, development and implementation of new ideas. The ABS *Innovation in Australian Business* survey and the IBM-Melbourne Institute 2008 *Innovation Index of Australian Industry* found that internal sources of ideas were more important than external sources of new ideas for Australian businesses, especially for medium-sized businesses.[27]

Given the importance of internally generated ideas, the innovative capability of many regional businesses rests on their skills base. The skills present are largely obtained from:

- Inward migration of skills held by people enticed to a region by particular employment opportunities or those seeking a 'sea-change' or 'tree-change'.
- Locally developed skills gained from local training institutions. The quality and relevance of these skills depends on the ability of these institutions to provide

[26] Scott-Kemmis, D. et al, (2007) 'Absorbing Innovation by Australian Enterprises: the Role of Absorptive Capacity', Report to the Department of Industry, Tourism and Resources, April 2007. NB The authors draw on earlier work by Cohen and Levinthal.
[27] IBM - Melbourne Institute (2008), Innovation Index of Australian Industry, p.29

training that is up-to-date with the latest knowledge and relevant to the evolving needs of local industry.

Inward migration and skills

Inward migration of skilled labour helps develop the capabilities of businesses by enabling them to take advantage of the experience and networks gained by employees who have worked in other regions. These capabilities can open opportunities to local businesses to access new markets. This is consistent with national trends reported by the IBM-Melbourne Institute *2008 Innovation Index of Australian Industry* which found that hiring new staff has become an increasingly important source for Australian businesses to generate innovative ideas.[28]

Local education and skills

Access to regional education institutions such as schools, VET and universities provide an important source of skilled labour. In regional NSW, there are five regional-based universities: the University of Wollongong, the University of Newcastle, Charles Sturt University (with campuses in Albury-Wodonga, Bathurst, Dubbo, Orange and Wagga Wagga), Southern Cross University (Lismore, Coffs Harbour and Tweed-Gold Coast) and the University of New England (Armidale), and four TAFE institutes, comprising 71 campuses. Additionally, the four Sydney universities offer services to regional NSW.

Regional higher education institutions provide critical training to regional populations, as well as encourage people seeking specialist, regional or rural industry-related skills to stay in or relocate to regional areas. Employees who have received training at regional higher education institutions contribute skills which enable ideas to be introduced, developed and refined in-house.

2.3.2. Networks

Formal networks (such as industry associations) or informal networks (such as friendships or trusted peers) are both important avenues for the diffusion of knowledge. The Review of the Cooperative Research Centres Program noted the benefits of collaboration and networks as:[29]

- overcoming the fragmentation of ideas caused by distance and a smaller resource base
- bringing together different perspectives, experience, skills and knowledge
- breaking down specialist silos and restrictive organisational boundaries and fostering cross-discipline interaction
- encouraging skills and knowledge transfer
- managing risks

[28] Ibid.
[29] O'Kane (2008), Collaborating to a purpose: Review of the Cooperative Research Centres Program. Page xi

Having a supportive network is important to the successful absorption of knowledge and successful implementation of innovations. A 2004 Australian study on knowledge exchange networks noted that:

> "*Culture impacts in the way in which people acquire information and knowledge as well as the way in which they use it, interpret and modify it, share it, and hoard it. Studies have concluded that a supportive culture for acquiring and sharing information is correlated with higher innovation and scientific and engineering productivity.*"[30]

Networks are also an important factor in cluster development, as is the co-location of specialist labour and support services. Having access to specific skills and capabilities that cannot be maintained within the business can facilitate innovation. However, the development of this expertise may require the local industry to develop a sufficiently large critical mass for specialist skills to be viable.

2.3.3. Market Interactions

Market feedback is an important source of information for all businesses. Customers and suppliers provide a valuable source of new ideas for innovation. As Charles Leadbeater states:

> *"[In the UK], many innovative organisations have no formal R&D capability: they innovate in the job, often through interaction with clients and markets. Often innovation is highly networked and interactive, involving a wide number of players, not least of the ultimate consumers of products and services."*[31]

Customers, distributors and other industry expert feedback enable businesses to move with, and in some cases in advance of, market and customer trends. Knowledge obtained from these sources can stimulate new ideas and innovation. Furthermore, where the customer raises a specific problem, this can work to stimulate the development of new ideas and products or services.

Suppliers are also a source for ideas on new products and processes. This can involve a transfer of machinery or product embedded with world's best technology, or modified processes that are significantly in advance of those currently used in the business. Collaboration with suppliers can also be important more generally to gain competitive advantage.

2.3.4. External Knowledge: From Outside the Region

Information or ideas sourced from outside the local region, whether nationally or internationally, is also critical. The National Innovation Review Green Paper noted that:

> *"Australia's ability to generate strong productivity gains requires that we perform nationally important research and that we successfully adopt and adapt 98 percent of innovative ideas that are generated in the rest of the world."*[32]

Research by Professor Graham Hubbard into a 25-year study of the innovative practices of a selection of 11 high-performing Australian organisations found virtually no

[30] Howard Partners (2005), Knowledge exchange networks in Australia's innovation system: overview and strategic analysis, p.9.
[31] Cutler (2008) op cit, p.26
[32] Cutler (2008) op.cit. p.6

breakthrough innovations in products or services. However, it did find that many of the organisations engaged in innovative activity had had major effects on their performance. A number of these innovations were borrowed from overseas:[33]

> *"While taking an idea from overseas is not a breakthrough innovation, if the product, service or process introduced into Australia is a first, it will have the same effect in the local market as if it were a local innovation."*

The ability to access external knowledge is no less important for regional businesses. However, the ability of regional businesses to source this type of knowledge can be more difficult due to constraints in the size and scope of networks. Many regional business owners and managers identified the importance of overseas knowledge as a source of new ideas and innovation, though the method of obtaining this knowledge differed across industries.

2.3.5. External Knowledge: Cross-industry

With many industries in regional NSW affected by similar problems, there is scope for cross-industry training and skills to be shared and implemented in order to tackle and address common problems.

A particular area of opportunity exists around environmental constraints. A key feature of the Sustainability Advantage program (Section 2.1.3) is that it brings together companies from different industries to share knowledge to improve energy efficiency and water usage.

2.3.6. Research Institutions

Research by Cosh, Hughes and Lester[34] identifies four roles of universities in the UK and US:

- Educating people
- Providing public spaces
- Increasing the stock of 'codified' useful knowledge
- Problem-solving

The following table elaborates on two of these roles – providing public spaces and problem-solving:

Providing public spaces	Problem-solving
Forming and accessing networks and stimulating social interaction	Faculty consulting
Influencing the direction of research processes among users and suppliers of technology and fundamental researchers	Providing access to specialised instrumentation and equipment
Meetings and conferences	Cooperative research with industry
Hosting standard-setting forums	Technology licensing
Establishing entrepreneurship centres	Contract research
Promoting alumni networks and personnel exchanges (internships, faculty exchanges, etc)	Incubation services

[33] G. Hubbard (2008) *Innovation in Winning Organisations in Australia: Myths and Realities*, in Inside the Innovation Matrix, Australian Business Foundation
[34] A. Cosh, A. Hughes, & R. Lester (2005) UK Plc, Just How Innovative Are We? The Cambridge-MIT Institute

Of these roles, informal contacts are cited as the most common type of university-industry interaction contributing to innovation, with conventional modes of university output – such as graduates, publications and conferences – also frequently citied.

In separate research, Richard Lester at MIT supports a broader view of the university's role in local economies – as creators, receptors and interpreters of innovation and ideas; as sources of human capital; and as key components of social infrastructure and social capital.[35]

In Europe, the lack of flexible transfer of knowledge from the research environment into industry has been called the 'European Paradox' and is felt to be a major impediment to effective public-private cooperation and partnerships[36]. The 'European Paradox' refers to the conjecture that EU countries play a leading global role in terms of top-level scientific output, but lag behind in the ability of converting this strength into wealth-generating innovations.[37]

Research institutions have the potential to provide a range of tangible and intangible benefits to the local economy. In addition to the direct economic impacts from the presence of the institution, research institutions have the potential to make significant contributions to the regional innovation system, including through:

- conducting research focused on the needs of the local economy
- enhancing the ability of organisations in the region to adapt international research or products to local conditions
- enabling local organisations and researchers to link into international knowledge networks
- attracting leading edge researchers from across Australia and overseas
- facilitating the building of networks and clusters involving close linkages between the research community and industry
- enhancing the quality and relevance of training provided to graduates and postgraduates
- enhancing the international perception of a region.

However, while these institutions have the potential to play a significant role as a source of knowledge, the ABS *Innovation in Australian Business* survey reports that universities and other higher education institutions, commercial laboratories and non-profit research institutions or enterprises represent the three least utilised sources of ideas or information for innovation for innovation-active businesses.

[35] R Lester (2005) Universities, Innovation and the Competitiveness of Local Economies, MIT Industrial Performance Centre Working Paper
[36] TAFTIE: The European Network of Innovation Agencies (2007) Developing A Key Role For Research And Innovation Agencies In European Trans-National Collaboration, http://www.taftie.org/taftie.content.asp?ContentId=80
[37] Dosi et al (2005) 'Science-Technology-Industry Links and the "European Paradox": Some Notes on the Dynamics of Scientific and Technological Research in Europe', S.Anna School of Advanced Studies, Pisa http://ideas.repec.org/p/ssa/lemwps/2005-02.html

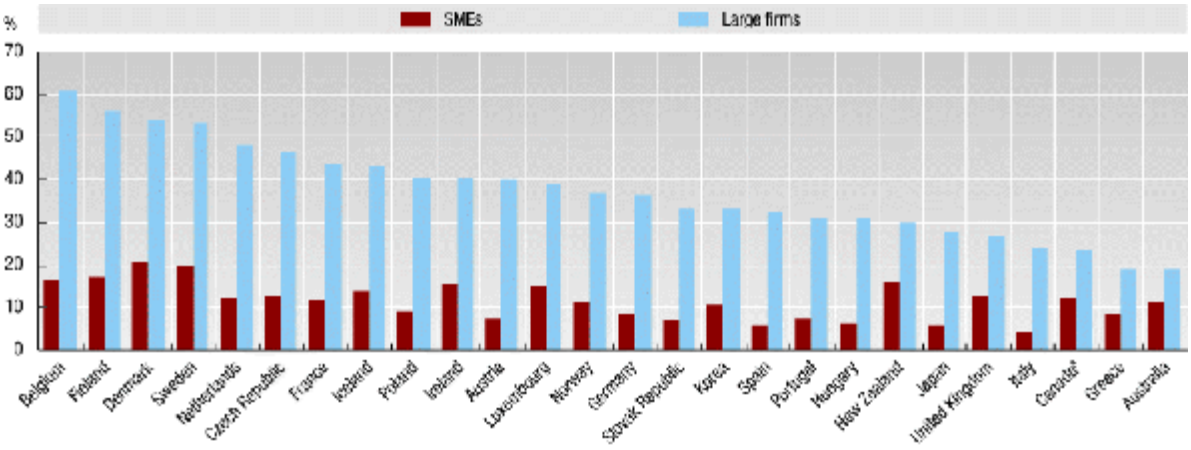
These results are consistent with data from the US and UK, which show that universities are ranked far down the list of all sources of knowledge in the UK and US. In both countries, the knowledge sources are dominated by 'industrial sources' (customers, suppliers, competitors and the internal pool of knowledge of the business itself).[38] Research by the Australian Innovation Research Centre shows that while a greater than expected 13 percent of innovative businesses in Tasmania collaborate with the local university, this form of collaboration is still ranked lower than suppliers, customers, competitors and consultants.[39]

The findings from the industry consultations confirm this. A number of possible reasons could contribute to this perception in regional NSW:

- Poor network linkages between industry and research institutions which inhibit the sharing of ideas between these two groups.
- Physical distance between the location of businesses and the research institution reduces the scope for contact and sharing of information.
- Outcomes of research by these institutions may be diffused by indirect means; that is, embedded in products, services or technology in a way that is not immediately obvious to the end user.

Regional consultations indicated that there was a potential to improve the level of interaction between research institutions and businesses. Furthermore, such a finding is not unique to regional NSW. A study by Howard Partners into networks in Australia noted that their research had not been able to identify many knowledge sharing networks that crossed the divide between industry, government and academia.[40]

Figure 2.3: Collaboration with Public Research Organisations by Innovating Businesses (as a percentage of all businesses, by size, 2002-04)



Source: OECD Science, Technology and Industry Scoreboard 2007

Figure 2.3 highlights that Australia's performance of business-research organisation collaboration is poor compared to other OECD countries, especially for collaborations

[38] Cosh, A. et al. (2005) op. cit.
[39] Smith, K. et al (2008) Innovation in Tasmania – An Innovation Census in an Australian State
[40] Howard Partners (2005) op.cit. p.10

involving large businesses (greater than 250 employees). However, an analysis of CRCs as a mechanism for linkage shows that the regional universities used this mechanism quite effectively to establish networks in the regions focused on regional specific issues.

2.4. Enablers of Innovation: Implementation Tools

This section identifies the other main enablers that support innovation activity in regional NSW. These allow the knowledge that has been accumulated to be applied and are extremely important factors which affect "absorption capacity" in a broader sense**.** However, the range of enablers used in local or regional areas or in industry sectors will vary and will be mapped as part of the development of each region's *Innovation Initiatives*.

The key implementation tools for businesses in regional NSW include:

- access to professional and technical service providers
- access to finance
- information and communications technology
- efficient operation of logistics network
- access to Government support.

2.4.1. Access to Professional and Technical Business Services

Professional and technical services are seen as critical agents in the innovation process, particularly as that process becomes more networked and non-linear in nature.[41] In academic literature these businesses also go by the names of knowledge-intensive service activities (KISA) or knowledge-intensive business services (KIBS). According to Spiller, these businesses provide a largely customised, problem solving service to other businesses, where the solutions in question require application of significant intellectual capital or effort. They include management consultants; specialised legal services; strategic financial brokerage and venture capital services; marketing; advertising; technical advice, design services; and human resource services.

According to Spiller:

> *"Less well understood is the fact that the effective delivery of [professional and technical services] is particularly dependent on the formation of trust-based relationships. Face-to-face contact, personal referrals and recommendations, and mastery of local business cultures and mores are essential ingredients in such relationships. Therefore, these factors inevitably play an important part in the client business successful engagement in an innovation project or process."*[42]

[41] Spiller, M. (2008) 'Innovation: Your Place or Mine', in Inside the Innovation Matrix, Australian Business Foundation
[42] Spiller, M. (2008), op cit

As such, the innovation catalyst effect of these services may be subject to rapid distance deterioration. A key issue for regional businesses is that these services tend to be overly concentrated in the main capital cities and may act as a brake on innovation in regions farthest away from main centres. One slight advantage for regional business in NSW in particular is that Spiller's analysis shows a clear concentration of services in Sydney compared with other capital cities.

2.4.2. Access to Finance

The 'cost of development or implementation' and 'lack of access to additional funds' have been identified as significant barriers to innovation in the national ABS *Innovation in Australian Business* survey. Periods of instability in global financial markets makes raising finance even more difficult.

The issue of finance was also raised a number of times as an important issue for regional businesses.

Businesses in regional NSW have long sought to minimise the cost of new technology or processes through a number of methods, including the use and refurbishment of second-hand equipment. Another pattern that has emerged is the iterative or gradual process of expanding into new products or services offerings, whereby positive feedback from a new venture directs additional investment.

2.4.3. Information and Communication Technology

Regional businesses identified information and communication technology (ICT) as a key enabler for the introduction of new processes and technology. Access to competitive and efficient ICT is a critical tool for many businesses as well as regional communities as reflected in the rationale behind the National Broadband Network. Effective use of ICT improves the productivity and profitability of businesses in a number of ways, including more efficient operational processes, facilitating access to new markets and information and reducing the importance of business location. For businesses selling in highly competitive markets, including exporting, the productivity benefits that ICT systems can provide are critical for their competitiveness. Regional businesses will also benefit from improved access to online services, including finance and banking, research and information.

The Standing Committee on Broadband in Rural and Regional Communities has reported that whilst telecommunications and broadband are available in some form throughout New South Wales, services are of poorer quality and more expensive in large parts of rural and regional New South Wales than in metropolitan areas. In particular, there are large gaps in the availability of "normal" mobile phone services and broadband through ADSL connections. Alternative delivery solutions are more expensive and of lesser quality.[43]

A key component of this is access to high capacity broadband. The NSW Rural and Regional Taskforce noted that:

[43] Legislative Assembly. Standing Committee on Broadband in Rural and Regional Communities. Beyond the Bush Telegraph. Meeting the Growing Communications Needs of Rural and Regional People. Report No.2/54 – March 2009.

"[P]oor broadband access and speeds (bandwidth) has serious implications for rural and regional communities:

- *Business competitiveness, and therefore the ability of regional NSW to attract and retain business investment.*
- *Reduced access to education and training (where online facilities and resources are increasingly being used).*
- *General communication and information disadvantage which will increasingly affect employment and loss of development opportunity for these regions over time.*
- *The increasing difficulty in attracting and retaining those with professional skills and training to rural and regional areas where skill shortages are most acute.*
- *Inequity of access to services, including those of government, where on-line service delivery is increasingly the norm in regional and capital cities.*
- *Opportunities for efficiencies and cost savings in infrastructure and asset management through the use of broadband will be missed."*[44]

2.4.4. Logistics

Improving road, rail and air transport to ensure efficient movement of goods to, from and within regional NSW has been identified as an area for improvement. These are critical for the economic development and international competitiveness of regional NSW.

An efficient logistics network enables regional businesses to supply remote customers, enter new markets and thereby increase the potential customer base of a business. This is important as it increases the opportunity for regional businesses to develop economies of scale. It also creates conditions for greater exposure to new ideas from other businesses, industries and customers.

The NSW Innovation Statement highlighted the role logistics plays in connecting the NSW economy and the Government is currently working to identify and address logistics industry challenges and opportunities.

2.4.5. Government Support

Both the NSW and Commonwealth governments provide significant support to the regional innovation system. These range from support for education and training, to research and associated extension.

Business Support Programs

There also exists a range of programs which, while having a broader economic or business development mandate, also work to support innovative businesses or innovative activities. The NSW Government operates a number of programs including: the Innovation Pathways Program, Australian Technology Showcase, Science Leveraging Fund, Business Innovation & Cluster Program, Stepping Up, New Market Expansion Program (including 'Travelling Experts'), Sustainability Advantage, Climate

[44] NSW Government (2008) Rural and Regional Taskforce, op.cit., p. 31

Change Fund, and support for Business Advisory Services and the Industry Capability Network.

The Commonwealth Government similarly has a number of business support programs which can also support innovative businesses or innovative activities. These include Enterprise Connect, Commercialising Emerging Technologies (COMET), and the Clean Business Australia initiative. It also provides an R&D Tax Concession[45]. In addition, the Commonwealth has announced the establishment of Commercialisation Australia, a program aimed at supporting the commercialisation of research.

The NSW Rural and Regional Taskforce identified that there was a general lack of knowledge of the range of government programs (at all levels of government) that could assist business growth and regional economic development.

The consultations identified that there was a general awareness that the Commonwealth and NSW Governments offer a number of programs that support and provide funding for innovative activity in regional NSW. However, there was some mention of the difficulty in finding information on these programs. Regional Entry Point, a Commonwealth Government website dedicated to regional programs, allows users to search Commonwealth and State Government programs devoted to regional issues.[46] However, businesses were not generally aware of this website.

Education and Training

Regional VET institutions, such as TAFE and Local Agricultural Colleges, partner with regional businesses to meet the skill needs of the rural and regional workforce by:[47]

- designing whole-of-enterprise workforce development initiatives in consultation with industry
- customising training products and services that represent whole-of-industry requirements and local or regional variations
- extending the availability of education and training beyond traditional delivery, especially in the workplace
- negotiating the training plans for apprentices and trainees with individual employers, so that students learn the skills the employer needs, and
- identifying sources of Commonwealth and State funding that employers can access to offset the cost of training for new or existing workers.

The Board of Vocational Education and Training is researching improvements in training models with a priority on improving the innovation skills in the creative industries, transport and logistics and financial services.

[45] In July 2010 the Commonwealth Government will replace the R&D Tax Concession with the R&D Tax Credit.
[46] Department of Infrastructure, Transport, Regional Development and Local Government (2008) 'Regional Entry Point'
[47] Mitchell, J. 'Improving the bottom line: Why Industry Values Partnerships with TAFE NSW', TAFE NSW, Sept 2008.

Regulation

Government regulation can act as an enabler for innovation when it is outcome based and allows flexibility. One of the goals of the NSW Innovation Statement is to reduce regulatory barriers to innovative NSW companies. The NSW Government has shown a strong commitment to reducing the burden of red tape on NSW businesses. Moving forward, government activity in supporting innovation will include identifying regulations that impede innovation in key sectors.

The NSW Government has established The Better Regulation Office to drive regulatory reform that will benefit the NSW economy and be an advocate for better practice regulation making across government. A *Guide to Better Regulation* has been prepared that outlines the requirements for best practice regulation making across government, and assists agencies apply better regulation principles to avoid the creation of red tape in new regulatory proposals and to reduce existing red tape as legislation is reviewed.[48]

National Broadband Network

The Commonwealth Government's National Broadband Network (NBN) aims to connect 90 percent of homes, schools and workplaces with optical fibre, providing broadband services to Australians in regional towns with speeds of 100 megabits per second and extending to towns with a population of around 1,000 or more people. The remaining 10 percent living in more remote parts of rural Australia will be connected with next generation wireless and satellite technologies that will deliver speeds of 12 megabits per second. The roll out of the program is expected to take eight years. In addition, in 2008 the NSW Government allocated $11.6 million for broadband development in regional NSW to complement the Commonwealth's network.[49]

The NBN will play a significant role in supply-chain management by allowing for increased integration between businesses and their suppliers, remote offices and customers at the same time as reducing the need for costly and time-expensive travel. The NBN will boost the attractiveness of regional locations which will have equitable access to broadband services. Flexible working arrangements will be more easily managed, allowing employees to work remotely or in multiple locations.[50] The NBN will also facilitate new methods of service provision in many industries,[51] allowing existing products to be accessed and distributed around the world by more people, more efficiently.

[48] Better Regulation Office (2009) Guide to Better Regulation
[49] Industry & Investment NSW (2008) 'Building the Country Package'
[50] Gome, A., 'A Broadband Revolution' available at www.smartcompany.com.au published 07/04/09, accessed 17/04/09
[51] Gottliebsen, R. 'Brave New Network' Business Spectator, available at http://www.businessspectator.com.au/bs.nsf/Article/Broadband-flood-pd20090408-QVT6H?OpenDocument&src=stf published 08/04/09, accessed 17/04/09

3. Case Studies

3.1. Wine Industry in the Riverina

3.1.1. Background

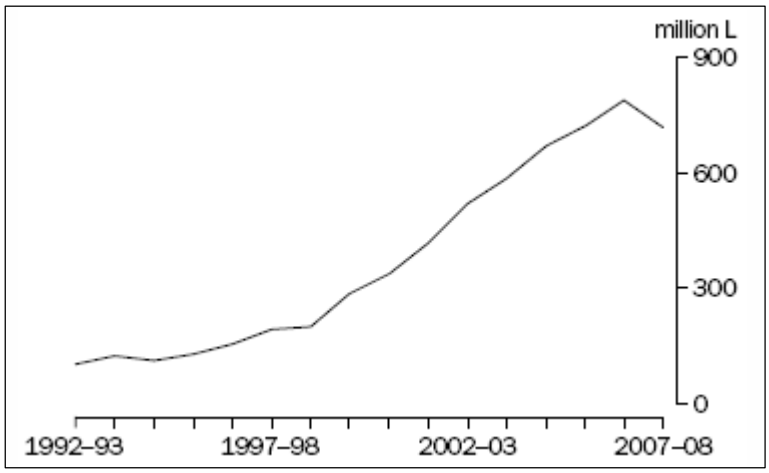
NSW has a long history of wine production and is home to a number of major wine regions, including the Hunter, Riverina, Murray Darling and the areas around Mudgee, Cowra and Orange in the Central West.[52]

The Hunter region is one of Australia's oldest wine growing regions, while the Riverina produces around 55 percent of NSW production and more than 15 percent of Australian production.[53] The Murray Darling produces 25 percent of the State's production.[54]

In addition to the major wine regions, there are a number of other regions growing in size, including the Mid-North Coast, New England, Shoalhaven Southern Highlands, Canberra, Hilltops and Tumbarumba.[55]

The Australia wine industry has grown steadily since the 1990s. In 1992-93 Australia exported more than 100 million litres for the first time.[56] Now, Australia is the fourth largest exporter of wine in the world.[57] However, in 2008 exports declined for the first time in 13 years[58] (Figure 3.1), after reaching a high of 787 million litres in 2006-07. [59]

Figure 3.1: Australian wine exports



Source: ABS (2009) 8504.0 - Sales of Australian Wine and Brandy by Winemakers, Nov 2008

[52] NSW Wine (2008) 'About NSWWIA'
[53] Australian Wine and Brandy Association (Wine Australia), (2007) 'Riverina Wine Industry Background Information'
[54] NSW Wine (2008) op.cit.
[55] Ibid.
[56] Australian Bureau of Statistics (2009) 'Sales of Australian Wine and Brandy by Winemakers', cat. no. 8504.0, Nov 2008
[57] Australian Wine and Brandy Association (Wine Australia), (2007), 'Wine facts'
[58] SMH (2008) op.cit.
[59] Australian Bureau of Statistics (2009) 'Sales of Australian Wine and Brandy by Winemakers', op.cit,

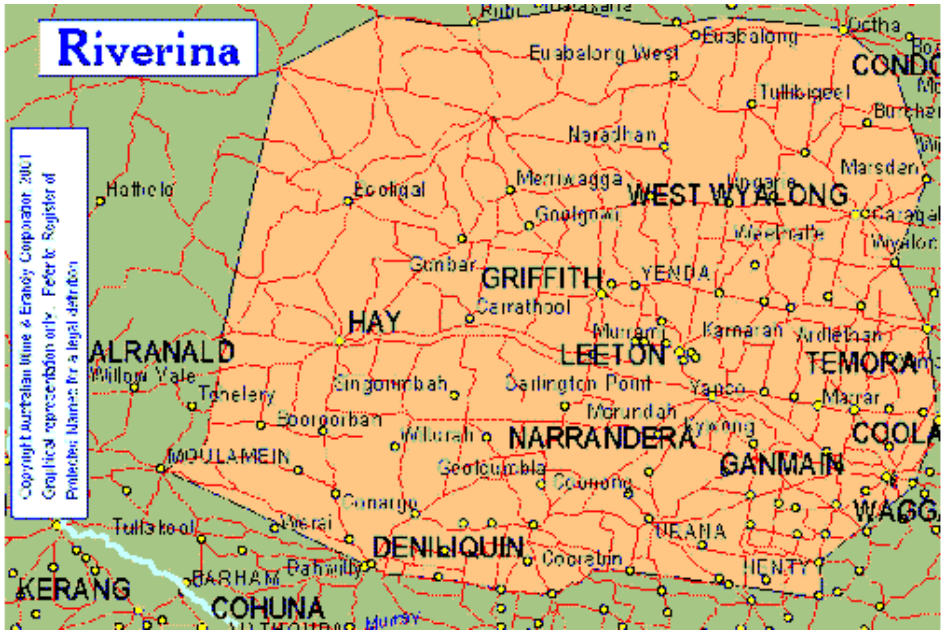
"Since 1995, wine production in NSW has trebled to more than 480 million litres in 2006. The area under vine has also increased from less than 15,000 to over 40,000 hectares over the same period"[60].

This growth has been supported by a highly innovative culture and approach to wine making.

However, the value of the industry's exports has fallen in the last two years as the industry faces the new challenges of evolving consumer preferences and increasing overseas competition. Further innovation within the industry is expected as it moves to face these and other challenges.

Due to its large production volumes and the presence of a diverse range of producers and major research and training organisations, the Riverina region was chosen to develop a detailed understanding of an innovation system specific to the wine industry.

Figure 3.2: Riverina Wine Region



Source: AWBC Wine Regions - Riverina

3.1.2. Drivers of Innovation

Innovation in the Riverina is driven by a number of pressures. These include the changing market demands of the wine industry, increased competition from both Old World and New World producers,[61] and environmental pressures.

These pressures have resulted in a number of innovative practices, ideas and products adopted by Australian businesses including:[62]

[60] NSW Wine (2008), op.cit
[61] The title 'Old World' is used to represent wine producers with a long tradition (many centuries) of wine producing. Typically this is used to describe traditional European producers such as France, Italy and Spain. 'New World' is used to represent wine producers with a relatively shorter history of wine production. 'New World' wine producers include Australia, New Zealand, USA, South Africa and Chile.
[62] Aylward & Turpin (2003) 'New wine in old bottles: A case study of innovation territories in new world wine production'. p.508

- new packing such as screw top bottles
- new varieties of grapes and new types of wines
- new methods of propagation and production
- new techniques for disease and pest control.

Adapting to evolving market demand

Changing consumption patterns is a key pressure driving innovation in the wine sector.[63] Industry consultations identified a number of factors underlying this:

- Evolving consumer tastes, which are being shaped by a range of factors including increasing sophistication of wine drinkers, desire for a differentiated product, and the desire for a product with positive health benefits.
- Large retailers seeking to develop and market their own branded product to create exclusivity and thus a point of differentiation within the retail market.
- Emergence of new markets, especially in Asia. China is Australia's fastest growing market.[64]

In addition to responding to the changing consumer preferences, businesses in the region are trying to take the initiative and shape consumer preferences. A number of businesses identified the need to focus their attention on developing a brand and marketing to change consumer perceptions of the region. For example, domestically, the Riverina is perceived as a region producing cheap bulk wine, but in the United Kingdom consumers are unaware of the wine regions of Australia and purchase wine based on quality and price. In order to combat the less favourable perceptions of the Australian consumer, the producers of the Riverina are working collaboratively to have a consistent message about the Riverina's product: *quality.*

[63] Ibid.
[64] Speedy, B. (2008) 'Wine exports a cause for sour grapes', The Australian, 12 January 2008, p. 23

SQ³ wine cubes

Beelgara Estate Wines has been innovative with the design of their packaging to differentiate their product and be adaptive to changing consumer preferences. In 2007, Beelgara released its *SQ³ wine cubes*, which stands for "superior quality 3 litres". These cubes package popular quality wines (such as Semillon Sauvignon Blanc, Chardonnay, Cabernet Merlot, and Rose) in a portable and distinctive way. The packaging is intended to attract new markets and consumers. The new packaging is the company's response to changing customer demands, such as space saving, decreased weight, and the environment (the wine in the carton has a carbon footprint that is 80 percent less than it would have been if the wine was sold in glass bottles).

Sources: www.sq3.com.au www.beelgara.com.au

Strength of industry competition

The Australian wine industry is heavily reliant on exports and is experiencing increasing levels of competition both domestically and globally, across a range of quality and price points.

The Australian and NSW industry faces strong competition as a result of an oversupply of certain wine varieties and a rapid growth in the number of vineyards.[65] There has been an increase in imports of wine into Australia and a decline in export volumes.[66] Wine imports were equivalent to 11 percent of domestic demand in 2007-2008, up from 6.4 percent in 2004-05.[67] The growth of imports has been influenced by exchange rates and the level of domestic production.[68]

[65] In Australia there were 2008 wine companies in 2005-06, which an increase of 125% over the previous ten years – Source: Australian Wine and Brandy Association (Wine Australia) (2007) 'Direction to 2025'
[66] Australian Wine and Brandy Association (Wine Australia) (2009) Australian Wine Sector at a Glance 2008
[67] IBIS (2009), 'Wine Manufacturing in Australia', C2183
[68] Ibid.

This increase in competition has resulted in many producers dropping the price of their wines. This has further intensified competition in the market for cheaper wines, which the majority of wines producers in the Riverina make. This has meant that businesses have needed to increasingly focus on improving their production processes to find ways to reduce their costs and remain competitive.

Environmental Constraints

A range of environmental constraints were highlighted including waste water treatment, water shortages and the need to improve energy efficiency.

The availability of water was a lesser issue in the wine industry than others, because of water allocations and actions already taken to address water shortages including crop management, water recycling and irrigation technology. However, there are some specific issues associated with water allocations for the region, including the sale of permits, temporarily or permanently, and the effect on input costs for producers. Industry consultations highlighted the need for the region to have a long term water management plan to ensure that water availability does not become a significant pressure.

3.1.3. Enablers of Innovation

A major finding of this case study was the importance of various pathways used to access knowledge. The sources of knowledge identified as important included internally generated ideas, informal and formal networks, and overseas knowledge. The other substantive enabler of innovation in the region was information technology.

Internally generated ideas

Consultations revealed the majority of ideas that led to innovation in business are developed from within the company. Businesses in the region all mentioned processes where staff had been the source of a new idea. These process improvements included changes to the flotation process,[69] and new ideas about how to undertake filtration.

The majority of staff in those Riverina businesses consulted had received their training and skills from Charles Sturt University or TAFE. These institutions provided training in areas including wine making, wine physiology, pests and diseases and water and soil management. The courses were generally viewed as providing the industry with a solid foundation.

In addition, employees also gained knowledge from older family members, by in-house training, or by attending workshops and seminars in the region. Businesses in this industry generally invested in the skills of employees because of the successful ideas generated and also because of the difficulty in attracting skilled labour to the region.

Networks

The sharing of knowledge via the Riverina networks, especially informally, was a major facilitator of innovative behaviour. This knowledge sharing has grown steadily in the

[69] A technique to remove 'contaminants' from grape juice

industry and there is recognition that a strong and consistent level of co-operation between all participants is essential in continued growth in the region.[70]

Informal networks are also used to source required knowledge as well as capital equipment. For example, one business in the Riverina was able to identify a second-hand bottling plant available for purchase in Mudgee through their informal groupings.

Formal networks, such as the Riverina Wine Makers Association, are utilised for sharing ideas on non-competitive issues like technical, occupational health and safety concerns, and industry-wide problems (e.g. binge drinking). The industry association also plays an important role in providing a platform for networking and knowledge sharing. Events such as wine shows and competitions were seen as useful in bringing together producers from other regions.

Overseas knowledge

Businesses reported that overseas knowledge was important in providing ideas about new processes, new varieties and evolving consumer preferences. Businesses accessed this via:

- Discussions with key global distributors and customers who provide knowledge on international consumer trends and preferences. Winemakers regularly visit overseas markets to promote their product and stay abreast of new developments.
- Employing a *flying wine maker* (a consultant who travels the world vintage to vintage and has current knowledge of the most innovative process and products).
- Sending staff to work for an overseas vintage or work as a cellar hand. When staff return from their overseas employment they are able to bring back ideas that can lead to improvements in local operations or products. In addition to the work they do overseas, businesses also send staff to visit overseas suppliers to gain an understanding of new machinery and equipment.
- Utilising the business migration program to employ skilled people from overseas.
- Hiring wine makers from overseas.

Research institutions

The main research centre for the Australian wine industry is located in Adelaide, where four public research organisations[71] have co-located as part of the Wine Innovation Cluster.

In the Riverina region there is the National Wine and Grape Industry Centre (NWGIC), a partnership between Charles Sturt University, I&I NSW (Primary Industries) and the NSW Wine Industry Association.

[70] Riverina Area Consultative Committee, 'Strategic Regional Plan 2007-2010', p.2
[71] The University of Adelaide, the Australian Wine Research Institute, the South Australian Research and Development Institute and the South Australian Department of Primary Industries and Resources.

Notwithstanding the reputation of the Australian wine industry as a highly innovative industry, the consultations revealed that many businesses did not see knowledge from large research institutions as a significant source of new knowledge for their operations.

There are a number of potential reasons for this. The research priorities of the NWGIC are focused on growers' needs rather than those of producers. It is possible that producers may not be as aware of the relevance of NWGIC activities as growers are. In addition, it is possible that the outcomes of research undertaken at the major research institutes are diffused in ways that are not obvious to the end user, either embedded in products or diffused via other businesses.

Concern was also raised in terms of distribution of national research activity. The majority of research providers, wine bodies and associations are located in South Australia, and available federal research funding has been concentrated accordingly. Data from the Australian Wine and Brandy Corporation show that NSW produces approximately a third of Australia's wine. However, the consultations indicated that a significantly smaller proportion of wine research activity was allocated to NSW research institutions.

There has also been academic research indicating that there may be a tendency for larger research bodies to focus their research on national wine priorities rather than regional ones. A limitation of providing funding and research based on national priorities is that it may inadvertently disadvantage the needs of individual regions. This is an issue of concern in this industry given the impact of local climatic and ecological variations to wine research.

> *"The Australian Wine Research Institute and the University of Adelaide carry out a significant amount of this R&D and are contracted directly through the Grape And Wine Research Development Corporation. Although they often sub-contract certain aspects of the R&D, such as vine and soil analysis, it usually remains within the 'epicentre' of South Australian institutions. This situation is feeding a 'cultural gap' in R&D knowledge"*[72]

The *Winegrowing Futures* program, run by the National Wine and Grape Industry Centre at Charles Sturt University, attempts to address this shortfall of the R&D funding system by providing more regionalised research.

Information and Communication Technology

Businesses in the Riverina reported using the internet as their first source for researching internally generated new ideas and as a key tool for locating staff, infrastructure (e.g. production facilities) and support services (e.g. mobile bottlers). Having an online presence, such as a website and integrated online ordering facilities, was reported as vital for sales and marketing, especially for boutique and speciality wines.

[72] Aylward, D. (2002), 'Diffusion of R&D within in the Australia wine industry', p. 5

3.1.4. Government Support

The NSW Government supports the wine industry in a number of ways and works closely with the NSW Wine Industry Association, regional wine associations and individual wineries to assist the development of the industry.[73]

Education is provided by government by holding wine workshops, training days and seminars through Industry & Investment NSW (Primary Industries),[74] in addition to offering TAFE courses in viticulture.

'NSW Wine of the Year award' is one of the ways the Government helps promote and support the industry.[75] Market development is supported through the biennial industry showcase, Wine Australia, as well as international trade missions, and support for major overseas buyers.[76] Feedback is that the networking opportunities presented by these activities are highly valued.

NSW Government also helps fund the industry and conducts research through investment facilitation and programs such as 'Winegrowing Futures' - a 5-year $30 million project and joint partnership between I&I NSW (Primary Industries) and Charles Sturt University, run through the NWGIC in Wagga Wagga.[77]

3.1.5. Conclusion

The case study of the wine industry has highlighted the wide range of sources of information that the industry uses to access new knowledge. These include:

- internally generated ideas
- formal and informal networks
- overseas knowledge
- interactions with distributors and customers.

The industry is a strong user of information technology, both in their operations and sales and also as a way of accessing knowledge (via the internet). A key opportunity is to improve the interaction between the local industry and research institutions and increase the amount of research undertaken to meet the needs of regional NSW.

[73] Industry & Investment NSW (2008) 'NSW Wine Industry Profile'
[74] Industry & Investment NSW (2008) 'Wine grape quality management - Research to Practice®' (PROfarm course)
[75] Industry & Investment NSW (2008) 'Celebrations for Hunter's wine industry'
[76] Industry & Investment NSW (2008) 'NSW Wine Industry Profile', op.cit.
[77] Ibid., Industry & Investment NSW (2006) 'Investment in the NSW wine industry'

3.2. Tourist Parks in the North Coast

3.2.1. Background

Tourist parks offer accommodation for visitors with caravans, motor homes and tents, as well as provide cabins and on-site caravans. This case study focuses on the market for temporary guests (tourists) and not permanent residents (people living permanently on-site).

Tourism is an important industry in the State, contributing $13.3 billion or 4.0 percent of gross state product in 2006-07. The industry directly employs 158,000 people in NSW, representing 4.8 percent of all jobs in the State.[78] Tourism encompasses a wide range of industries, including accommodation, transport and travel agencies, and impacts on retail, education, food manufacturing and recreational and cultural services.

The caravan, motor home and camping industry has been the fastest growing domestic tourism sector in Australia for the past 10 years.[79] It now accounts for 16 percent of employment in tourism accommodation and 23 percent of accommodation takings in regional NSW. The tourist park industry accounts for 45 percent of tourist accommodation takings on the South Coast and is also significant in the Northern Rivers and North Coast regions (30 percent and 28 percent of total tourism takings, respectively).[80]

Figure 3.3: Northern Rivers

Source: Tourism NSW

[78] Sustainable Tourism CRC (2008) Tourism satellite accounts, 2006-07, NSW
[79] Caravan and Camping Industry Association NSW (2008) 'Caravan and Camping Industry Profile'
[80] Australian Bureau of Statistics (2008) Tourist Accommodation Small Area Data NSW, cat. no.8635.1.55.001

The focus of this case study was tourist parks in the Northern Rivers tourism region (Figure 3.3). In the Northern Rivers there are 68 tourist parks, accounting for 13 percent of the State's total. The region also accounts for 13 percent of capacity but 15 percent of accommodation takings.

3.2.2. Drivers of Innovation

Adapting to evolving market demand

The supply of caravan and camping sites is limited, with significant barriers to entry as a result of the large amount of prime land required. Change within the industry is therefore focused inwardly, to incumbent park owners and managers. These individuals – and increasingly, corporations – have sought to respond to growing consumer demand over the last 20 years for a broader product offering and a wider range of facilities and services.

In turn, urban encroachment around many edge-of-town sites has increased the land value of many of these sites, prompting a need to extract a greater return from their chief asset: large blocks of land close to desirable tourism locations such as rivers, national parks and beaches. A further catalyst for change cited by some in the industry was the introduction of a uniform regulatory system for caravan parks in the late 1980s. This involved a new licensing arrangement, and set higher standards for accommodation facilities.

While ongoing regulatory reform – including in such areas as OH&S – has acted as a catalyst for change, the underlying driver has been evolving consumer demand for a mix of quality accommodation. In the late 1980s, the industry moved away from on-site caravans and basic cabins towards premium cabins in the most desirable part of the park (e.g. closest to the beach). At the same time, owners began developing on-site facilities targeting young families, including resort-style pools, children's play areas and novel play equipment such as jumping pillows.

Recently, the industry has begun to diversify. Existing caravan parks, particularly on the coast, have focused on the family market, and new parks and some inland caravan parks have catered for the growing number of recreational vehicle owners, predominantly retirees. A further niche in eco-tourism has also emerged with resort-style parks, sometimes without any camping or caravan facilities, also targeting the family market.

In the last five years there has been an increasing trend for corporations to buy and directly manage tourist parks (as distinct from existing chains such as 'BIG4', where parks are still individually owned). Discussions with the industry indicate that this in itself has not been a driver for innovation, as the acquired sites had typically already been previously transformed by an entrepreneurial owner.

The Department of Services, Technology and Administration (Land and Property Management Authority) is responsible for the management of 220 tourist parks on Crown land (representing one third of parks in the State). The Department has been active in fostering innovation in the industry and actively works with tenants to improve facilities.

Industry liaison indicates that not all park managers and owners are innovative, due in part to a conservative, risk-averse mindset and also the lack of necessary management skills among some small family-run businesses. Planning regulations have also been cited as an inhibitor, particularly in environmentally sensitive locations. Some inactivity can also be attributed to land banking activities – the acquisition of parks for on-selling for alternative uses. Prior to recent developments in the global financial system, access to finance has not been cited as a barrier to investment.

Innovation in the tourist park industry
BIG4 North Star Holiday Resort and Caravan Park, Hastings Point, Tweed Coast
The park includes modern cabins (some to a five star quality), a resort-style swimming pool and extensive children's entertainment facilities. The park has also diversified its activities by developing the *Marine Environment Research Centre* and the *Australian Caravan Park Training School*. The research centre caters for school groups and provides the park owner with off-peak accommodation occupancy and revenue from meals. The training school is run privately by the park owner and targets prospective managers and owners (around 6-7 one week courses are run each year). Again, the benefits to the owner include off-peak occupancy.

Strength of industry competition

The premium cabin segment of the tourist park industry, particularly in the Northern Rivers, faces competition from a range of other accommodation providers in the local area, such as apartments and resorts. The industry has focused on delivering a service that clearly differentiates it from alternatives. As one owner commented, holiday parks are the places "*where families reconnect*". In other words, by offering a range of accommodation options and activities in a communal setting, holiday parks provide young families a unique setting within which they can holiday together.

Environmental Constraints

The Northern Rivers region has not experienced significant pressures brought on by water shortages and has, in fact, had to deal with the effects of floods (floods in January 2008 caused serious disruption to the industry by cutting transport and access).

The industry – through its representative body the Caravan and Camping Industry Association of NSW (CCIA) – has adopted an environmental certification scheme known as the *Gumnut Awards*. The Awards reward park owners for developing environmentally sustainable practices relating to such things as rainwater capture, waste management, landscaping and energy efficiency. While effective in delivering environmental outcomes, as a marketing device it is unclear how effective this scheme is in attracting holiday-makers to Gumnut achieving parks.

3.2.3. Enablers of Innovation

Knowledge gained from outside the domestic tourist park industry

By far the most important enabler of innovation was the willingness of certain entrepreneurial owners to explore and incorporate ideas gained through travel, both within Australia and overseas.

According to the CCIA, the idea to develop premium cabins came from a park owner on the NSW South Coast who, in the late 1980s, thought the resort developments in the Queensland islands and in Asia could be incorporated into an existing tourist park. The rest of the local industry saw the success of this strategy (including the potential for higher yields) and followed suit. While this individual has been cited as a pioneer it is probable that some form of co-evolution occurred, with other owners having similar ideas. By the mid-1990s a number of players had incorporated resort-style cabins into their caravan parks as a way of capturing the premium end of the market. Collaboration with complementary tourist attractions in the area is also seen as a feature of innovative owners.

One common source of ongoing ideas is overseas markets. While the industry does not directly compete internationally, and the majority of customers are domestic, the industry has benefited greatly from monitoring trends in similar markets around the world. The CCIA runs study tours every three years for groups of around 40. Recent tours have included the US/Canada, UK/Spain/Italy and South Africa. The idea for the Gumnut environmental awards came from witnessing a similar scheme in the UK whilst on a study tour. The CCIA has also invited overseas experts to speak at their own conferences.

Networks

Informal, peer-group networks are a vital source of knowledge and ideas for the industry, particularly for sharing of solutions to problems. The industry as a whole has been categorised as being tight-knit, where participants keep a close eye on each other and their developments. It has also been described as open, with a collaborative attitude towards knowledge sharing and a desire to see the whole industry improve and expand.

The theme of improvement is also an important one for the CCIA. While the core role for the CCIA is to represent and lobby on behalf of its members, it also works to improve the overall service offering within the industry through training and knowledge sharing. It does this through formal training courses in park management, an annual conference held in Sydney, regional meetings and study tours. These are also cited as good networking opportunities.

Internally generated ideas

Innovative owners and managers are more likely to employ skilled people from outside of the industry to drive specific initiatives such as conference/wedding event planning and website design. Training of staff is an important aspect, with a positive attitude and willingness to learn often more important than pre-existing skills. Staff are encouraged to continue their development on the job.

A clear management system is also likely to be in place, facilitating delegation and ownership of roles and freeing up the owner or manager to concentrate on long-term planning. Many parks are also family run, and this combination often creates an environment of loyalty and openness where ideas can be floated and tried.

Other enablers

Research institutions including universities play a role in knowledge transfer within the holiday park industry, particularly in relation to environmental information. The CCIA works with the University of Western Sydney in the conduct of the Gumnut Awards program in addition to sponsoring academic research and disseminating tourism-related analysis. The TAFE sector is important for training in current practices.

Information and communications technology is important in terms of marketing innovation, but is not necessarily seen as a source of knowledge transfer. Integrated online booking (where a customer can view rates, occupancy status and then book a site or cabin) is becoming increasingly important. However, even highly innovative owners still seem to prefer a more personal level of contact with customers and a degree of control over the booking process. In part, this reflects the emphasis on service many independent owners see as their point of differentiation with corporate-owned groups.

3.2.4. Conclusion

The industry has undergone a rapid change since the late 1980s, transforming the image of caravan parks into a broader 'holiday park' concept whilst maintaining its underlying values of communal holidaying and freedom. The effective operation of a number of key enablers has been critical to this success:

- Industry lead, strong innovation focused industry body adapted to market drivers supported by clear and uniform government regulation.
- Effective formal and informal networks. The culture of the industry is one of openness and a willingness to improve the whole sector. The industry association is an active partner in facilitating this change.
- Improvements in the industry skills base. Courses operated by the CCIA and vocational training organisations are supporting a more modern approach to running individual businesses. This covers improved management capabilities (including strategic planning), up-skilling employees and hiring personnel with specialist skills to enter new markets.
- An entrepreneurial culture combined with risk management strategies.
- Willingness to adopt ideas and knowledge from a number of sources, but particularly from other tourism sectors and similar operations overseas. A number of operators are now trying to smooth out seasonal variations in occupancy and revenue by diversifying into new markets such as weddings, conferences and school trips.

However, a number of owners have not innovated. Reasons cited for such inaction include poor customer insight; inadequate management skills; a conservative, risk-averse mindset; planning restrictions; and land banking.

3.3. Manufacturing in Western NSW

3.3.1. Background

Manufacturing is an important sector of the NSW economy. NSW has the largest manufacturing sector in Australia and it is the second largest industry in NSW.[81] NSW accounts for 31.7 percent of all manufacturing businesses in Australia.[82] The manufacturing sector in NSW is highly developed and diverse and is a strong driver of the NSW economy in terms of GDP, employment, exports and cross-sectoral linkages.[83] The manufacturing industry employs about 310,000 people, about 10 percent of the NSW workforce.[84] In inland regional NSW, 9 percent of the workforce is employed in manufacturing, falling to 8 percent in coastal regional NSW.[85]

The sector is feeling the impact of increasing international competition, especially from new low-cost producers, but also from the rapid pace of technological change.[86] Regional businesses also have to manage the effects of:

- demographic trends
- changing business and consumer demand
- drought
- fluctuating interest rates
- skills shortages
- distance from major markets. [87]

The NSW Government, through Industry & Investment NSW (SRDT), supports the manufacturing industry in a variety of ways including: inward investment assistance, industry innovation support, export development support, and regional development programs and services.

The purpose of this case study was to examine regional specific pressures and drivers on a business's innovative capacity rather than an examination of a specific sector of the manufacturing industry. This is a change in focus from the two preceding case studies. Participants from a consultant-delivered lean manufacturing program held in Orange and Dubbo and involving around 15 businesses and 30 participants formed the basis of industry consultations. In the North Western and Central West ABS statistical divisions, where Dubbo and Orange are located, manufacturing is important to the local economy.

In the North Western region the manufacturing industry is concentrated around food and beverages, wood products, mineral products and fabricated metal.[88] The Central West

[81] Industry & Investment NSW, SRDT (2008) 'Industry Profiles Manufacturing'
[82] IBIS (2009) 'Manufacturing in Australia: C'
[83] Industry & Investment NSW, SRDT (2008) 'Innovation: Five Innovation Sectors – Manufacturing'
[84] Industry & Investment NSW, SRDT (2008) 'Industry Profiles Manufacturing'
[85] ABS, 2006 Census
[86] Industry & Investment NSW, SRDT (2008) 'Industry Profiles Manufacturing'
[87] IBIS (2009) 'Manufacturing in Australia: C', op.cit.
[88] Industry & Investment NSW, SRDT (2008) 'About Regional NSW'

region has a large food and beverage processing sector with major domestic, Asian and European markets, machinery and equipment manufacturing with major domestic and some limited specialist exports to the USA and South Pacific are also important.[89]

The lean manufacturing program was organised by local business development officers and funded by I&I NSW (SRDT) to assist regional businesses to improve efficiency and profitability. The lean course examined management and operational principles that help businesses improve their processes, and in many cases has resulted in a significant change in operational manufacturing process.

Lean production is a system for "organising and managing product development, operations, suppliers, and customer relations."[90] Lean enables businesses to produce goods and services with "less human effort, less space, less capital, and less time"[91] by eliminating waste along the value chain.

> *"[T]oday in a wide range of industries, non-profit organizations, government agencies, healthcare, and other areas are finding ways to apply the principles of lean as a means of producing goods and delivering services".*[92]

Lean for services focuses on transforming organisational assets, like technology, to meet customer needs.[93] By targeting inefficient and or redundant processes, services businesses are able to increase performance and continually improve service.

> *"Recognising what is valuable to the client and aiming to serve the underlying business need rather than simply carrying out the standard solution is a key benefit of lean thinking."*[94]

For example, in the past the time and cost of the call-outs for IT repairs have been greater than just replacing the damaged computer hardware.[95] Lean thinking enables this inefficiency to be addressed by identifying a solution even if it is outside the normal operating system and practices of the business.

[89] Ibid.
[90] Lean Enterprise Australia (2008) 'Lean Enterprises'
[91] Ibid.
[92] Ibid.
[93] Six Sigma Service (2006) 'Lean Six Sigma Methodology'
[94] Harvard Business Review (2009) 'lean service pursued brilliantly by Fujitsu'
[95] Ibid.

Challenges and Successes in Introducing the Lean Manufacturing Program

This course was initiated by business development officers in Orange who saw the potential for significant improvements in productivity for client companies. Since then, the course has also expanded to Dubbo and Bathurst.

A number of challenges emerged in holding the course. The main challenge was to encourage business managers to devote time and resources to attend. In order for the course principles to be effectively implemented within a business, it is recommended that a few employees in different parts of the business attend. It was difficult to get businesses to sign up due to the substantial staffing commitment.

Course participants also identified a number of difficulties in introducing lean principles into their businesses. The main ones were:

– Workplace cultural resistance – This highlighted the importance of management training to lead the implementation of new innovations. It also reinforced the need for process improvements to include staff at different levels of the organisation in order to be successful.

– Cost - especially in relation to software and or upgrading hardware, or new machinery used in the production process.

– Impact on staff - especially upon management time. In at least one case, an additional person was employed to free up staff time to allow the implementation of lean principles into the business operations.

A formal review of the overall impact of the program on participants' businesses has not been undertaken. However, informal participant feedback highlighted the positive impact it has had on their businesses. For example, one company has managed to increase output by around 35 percent, with the same number of total employees and minimal capital expenditure. Other participants noted a significant reduction in required inventory levels and manufacturing times.

The course's success appears to be due to its duration (initially 3, now 6 months), regular review points, including having the trainer visit individual premises to provide on-site advice, and in ensuring the company's key decision-makers attend. Participants realised the value of long-term involvement despite initial hesitance in joining the course. They also identified the importance of regular meetings with other course participants to reinforce what they had learnt and to motivate implementation of principles.

Key challenges remain - despite the benefits that past participants have gained, it has been difficult to recruit new participants.

3.3.2. Drivers of Innovation

Manufacturing businesses in Western NSW experienced a number of drivers of innovation both general and regionally specific. Industry competition and changing consumer preferences were shaped by broader regional and international trends. One driver, skills shortages, was a direct result of competition for labour with the mining industry.

Business owners' willingness to innovate drove participation in the lean manufacturing course. This also provided the catalyst for the majority of subsequent innovation which occurred.

Industry competition and evolving consumer preferences

The Australian manufacturing sector's share of the Australian economy has declined since the 1980s.[96] The manufacturing industry "now runs the risk of losing export markets to international competitors, especially in the area of metals and food".[97] Overseas manufacturers are increasingly competing with local companies. However, local manufacturers maintain a competitive advantage through their ability to work closely with their customers to deliver tailored solutions. Many businesses incorporate design and manufacturing capabilities to meet customer needs. These activities range from designing and constructing production lines, including providing solutions to key production process problems, to customisation of products.

Skills shortages

The issue of skills shortages arising from labour competition from the mining industry is a problem which has directly impacted the manufacturing businesses of Dubbo and Orange. Strong demand for labour and skills by the mining industry, and their profitability, enabled them to attract staff by offering significantly higher wages.

Companies have tried to overcome this by offering training incentives to employees. Some initiatives businesses are using to retain staff include:

- Up-skilling staff with in-house training. (e.g. on topics such as logistics, stores management, IT drafting software, or accounts management.)
- Allowing staff time either at work or time off work to complete their studies.
- Sending staff to external locations (typically Sydney or interstate, but also overseas) to participate in workshops or trade events.

Many companies saw the training benefits of the lean course and are applying to have additional staff trained in the lean principles and or undertake change management and training.

Regulations and standards

Businesses who exported overseas or manufactured products for large customers reported that consumers prefer that they produced their goods to certain internationally

[96] IBIS (2009) 'Manufacturing in Australia: C', op.cit.
[97] Ibid. p. 17

recognised standards. Gaining certification for certain standards was also seen as greatly facilitating the ability to bid for major contracts, including government contracts. Achieving ISO 9001:2000 (quality management[98]) was seen as beneficial by certain businesses, but also costly, in terms of both management and employee time, and financially.

Willingness to innovate

The strongest driver for innovation displayed by manufacturing businesses in Orange and Dubbo was willingness, normally displayed by the owner or a key manager in the business. This was the main reason that the businesses participated in the lean course; the owners or management were attracted to the possibility of improving their business' profitability and were willing to investigate new approaches to their operations to do so.

Interestingly, one of the key benefits of the course has been a change in attitude by many participants. These participants are now better able to identify inefficiencies and adapt solutions that not only improve business performance but also employee work conditions.

3.3.3. Enablers of Innovation

A major finding of this case study was the importance of internally generated ideas. Another enabler of innovation in the manufacturing sector was the importance of information and communication technology.

Knowledge

The predominant source of knowledge for participating businesses was internally generated by the skills of their management and employees. Because internally generated knowledge was viewed as vital to the success of the business, the majority of companies interviewed recognised the importance of training. Most companies participated in formal training programs (apprenticeships) and had supported their employees to undertake some form of more specialised vocational training. The majority of this training was provided through TAFE. Another important source of knowledge that was mentioned was Enterprise Connect. Value was particularly seen in its benchmarking services, and training management and operational skills.

Information and Communication Technology

Another enabler of innovation was ICT. The internet was a primary source of information for a range of issues such as industry trends, new products, and staff issues like OH&S.

Other ICT tools used included inventory management, design, and sales software. Significantly, the adoption of new sales tracking software and inventory management was a direct result of participation in the lean manufacturing course. A number of businesses had purchased Autodesk Inventor subsequent to their participation in the lean course to help with the design of their products.

[98] International Organisation for Standardization (2009) 'International Standards for Business, Government and Society'

Autodesk Inventor
Autodesk Inventor is a 3D mechanical design software package which provides a set of 3D mechanical CAD tools for designing digital prototypes. The software helps users view, simulate, and analyse how a design will work under real-world conditions before a product or part is built.

Source: www.usa.autodesk.com

Networks

In contrast to the other case studies, the presence of and involvement with networks was not as strong. Participants in the course realised the benefits networking offers. The Dubbo lean manufacturing course participants formed their own network after the course finished to support ongoing process innovation.

One formal network which companies had some participation in is the Orange-based RenWeld group (Regional Engineering Network for Work, Education, Logistics and Delivery) that has been in existence for a number of years. The group includes representation from industry, local government, TAFE and Group Apprentices. It focuses on addressing skills shortages in the region, as well as working co-operatively to overcome industry challenges and group tendering on large projects.

Apart from the above group there was only limited participation in formal associations or other network activity. A number maintain membership of state-based associations, but are not actively involved.

Similarly, informal networks did not appear to be an active mechanism of sharing knowledge, though there are some well-respected individuals and companies that were utilised as a source of knowledge.

3.3.4. Conclusions

In this case study, many of the participants were driven by their own desire to improve profitability or on the strong advice of local business development officers. There were difficulties in recruiting new businesses to participate in the course despite examples of local companies who made significant improvements in productivity after attending the course.

The case study also highlighted a number of important course features that could further support operational improvements. These include:

- The need to run such courses over a period of at least 6 months. It is noted that the Sustainability Advantage program (which has a broader purpose) operates over an 18 month period.
- Regular reviews and meetings with peers to encourage implementation of course principles.
- A more ‘hands-on’ and tailored approach by trainers visiting client businesses work sites.

- A supportive network of peers after the course has been completed.

The analysis highlighted the benefits of the lean manufacturing program for participating businesses. After the course, participants indicated that they were more open and willing to make business improvement a continuous process.

3.4. Integrated Pest Management Uptake in the Vegetable Industry

3.4.1. Background

NSW has one of the largest areas in vegetable production in Australia. At June 2008 there were 1,069 vegetable growers in NSW, representing 2.7 percent of all agricultural businesses in the State and 24 percent of the national total.[99]

Pesticide-based strategies, such as the routine application of broad-spectrum chemicals, have been used over the last 60 years as a simple approach to vegetable pest management. Attitudes started to change in the 1970s when a number of biological controls were successfully released, pest resistance to chemical treatment increased, old chemicals were de-registered and there was a growing awareness of pesticide's environmental impact. This resulted in the development of an integrated approach to pest management now known as the Integrated Pest Management (IPM) Strategy.

IPM draws on a range of management tools with the goal of using the least ecologically disruptive techniques to manage pests within economically acceptable levels. In practice, IPM growers fall within a continuum from 'integrated pest management' to bio-intensive IPM strategies that rely primarily on beneficial organisms for pest management. IPM involves routine crop monitoring to ensure that pesticides are only applied when needed, attention to good spray techniques and following pesticide resistance management strategies. A bio-intensive IPM strategy relies primarily on beneficial organisms to manage insect pests.[100]

IPM can be thought of as a cycle of five steps. The first step is to identify key pests and understand their lifecycles, including knowledge and impact of the management options available. The second step is to try to prevent the pest from attacking the crop or increasing to damaging numbers. The third step is to monitor the crop so you know what pests and beneficials are in the crop and at what numbers. The fourth step is taken when pest numbers are high enough to be causing economic damage and active intervention or control is needed through mechanical, chemical or biological methods. The fifth step is to evaluate the immediate effectiveness of direct controls and the overall success of the program, including potential areas for improvement (Figure 3.4).[101]

The benefits of IPM include avoiding problems with secondary pests, pesticide resistance and residues, and addressing environmental and OH&S concerns. IPM is specific to an industry or region requiring different management strategies.

However the definition of IPM is not always clear, even to the grower. In NSW, 68 percent of horticultural growers self reported that they were using IPM. However on

[99] Australian Bureau of Statistics (2008) 'Agricultural Commodities 2007-08' cat no. 7121.0
[100] McDougall, S. & Pilkington, L., 'Vegetable Integrated Pest Management', in I&I NSW (Primary Industries), *Primefacts,* August 2008
[101] McDougall S.,(2008) 'Lettuce IPM', in I&I NSW (Primary Industries), Primefacts, March 2008

analysis, only 28 percent were using it well.[102] This case study examines the key drivers and enablers of innovation on a grower's capacity to adopt IPM.

Figure 3.4: IPM Cycle

Source: McDougall et al 2008

3.4.2. Drivers of Innovation

Ecological and Human Health

Pests and diseases are the key pressures that threaten to undermine productivity and competition through reducing yields, damaging crops and through the costs associated with attempts at control. Pest control is therefore crucial to sustainable horticulture. Yet pesticide residuals pose continuing threats to ecological and human health, particularly grower safety, by increasing overall levels of environmental toxicity. Developing technologies to reduce pesticide use and impacts on non-target organisms and the development of resistance and residues is a priority science and research outcome for I&I NSW (Primary Industries).[103]

The use of pesticides also has the potential to alter predator-pray relationships. Traditional broad spectrum spraying can decimate natural pest predators and disrupt the natural balance, resulting in less natural predators to control existing or new pests.

[102] Page, J., & Horne, P. (2007) 'Final Report HAL ProjectVGO6086: Scoping study on IPM Potential and Requirements'. IPM Technologies Pty Ltd
[103] I&I NSW (Primary Industries), (2005) 'Primary Industries Science and Research Strategy 2005 -2008'.

Failure of Traditional Methods

Often it is a crisis such as the development of chemical resistance in a pest to a certain pesticide, the unavailability of a pesticide (withdrawn from sale, or not registered for use in Australia), and/or a new pest/disease that triggers growers to adopt IPM. When pests develop resistance to traditional chemicals, limited chemical control options remain as few new pesticides are being registered, and the time required for registration is increasing. Growers are then forced to use IPM tools such as crop monitoring for early detection, selective application of soft chemicals and biological controls to deal with pest resistance. This pressure is expected to increase over time.

Market Specification

Adapting to evolving consumer preferences is a critical driver of innovation in the industry as growers compete to become preferred suppliers. Market specification for product that is, for example, insect, disease and blemish free is a major driver of innovative pest and disease management when the market is competitive and oversupplied (85-90 percent of the year).[104] However, when product is in short supply and competition is low, market specifications are relaxed significantly and prices increase.

Currently, customers such as supermarkets are only interested in the final product meeting food safety standards and market specifications, not in the pest and disease management strategies used to achieve this end. However market demand for 'clean food' is increasing, both in Australia and overseas, and moving forward will present a strong incentive for the adoption of IPM.

During the early stages of IPM adoption, markets can occasionally act as a barrier when beneficial insect levels in product can increase and the market demands insect-free product. This demand can cause 'day before broad spectrum spraying' that negates the benefits of IPM.

Willingness to Adopt

Growers experience cycles of pest infestation. Most of the time pests are not a major problem, so growers believe chemical sprays are working effectively and there is little willingness to change the status quo, particularly amongst older generations. However, a survey of horticultural growers and advisors around Australia found that there was good awareness of IPM and no fundamental opposition to the concept but that the benefits and practicality of IPM needed to be demonstrated before change would occur. Once IPM is adopted there are high rates of retention indicating that the benefits of IPM are valued[105]

In areas where there are no existing commercial scale IPM growers to act as champions and sources of local expertise, adoption tends to remain at crop monitoring

[104] Per comm. McDougall
[105] Page, J., & Horne. P.,(2007), 'Scoping study on IPM Potential and Requirements', Final Report HAL ProjectVGO6086,IPM Technologies Pty. Ltd.

and the use of some new chemistry. Amongst some growers, the benefits of IPM are not sufficient motivation for change on their own. There is a perception that it is risky compared to current methods, especially when there are high insect pressures from neighbouring crops.[106]

Often growers will label themselves as IPM users, but still use broad-spectrum insecticides, potentially killing all beneficial species at times. If these insecticides fail, for example, due to resistance, then the grower will regard IPM as a failure and bad news stories on IPM circulate. Such growers are unlikely to move forward unless there is a major crisis in control using existing practices.[107]

In an on-line survey of vegetable researchers, specialists, consultants and growers that use IPM, the most commonly noted attributes for adoption were that growers work together and are generally well educated, and in most cases the industries are competitive, with IPM adoption supported most by the availability of skilled consultants and crisis. [108] IPM support groups and having an IPM culture were also important enablers of adopting IPM. Having adequate current control practices was the major barrier to IPM adoption, with lack of available consultants, too few soft options and market requirements also being important. Another barrier was that IPM adoption was seen as too complicated or risky and there was no perceived advantage.[109]

[106] Ibid
[107] McDougall et al. (2008) 'Further developing integrated pest management for lettuce', Final Report VGO5044. I&I NSW (Primary Industries)
[108] McDougall, S. (2007) 'Benchmarking vegetables integrated pest management systems against other agricultural industries' Final Report V505043, I&I NSW (Primary Industries)
[109] Ibid

Adoption of IPM by Lettuce Growers

Lettuce IPM has been developed since 1998 when lettuce growers were able to manage the key pest, Helicoverpa spp., with a range of integrated control options. I&I NSW (Primary Industries) has been involved with Horticulture Australia Limited (HAL) in conducting research into IPM strategies for lettuce production since this time. A survey of lettuce growers conducted by the Department in 2006 revealed that 61 percent of growers used IPM strategies, whilst the remainder did not (although most of these growers used some of the tools of IPM).

Several benefits of adopting IPM were identified, such as the reduction in the use and cost of insecticides. Challenges were also identified, such as lack of confidence in IPM where the pest pressure is high. However growers indicated that educational workshops would increase their confidence. Local barriers identified included high insect pressures from neighbouring crops through to local council regulation.

Adoption of biological based IPM systems has been slow. Factors influencing adoption include: the cost of crop monitoring services; the availability of trained crop scouts and crop consultants in lettuce growing areas; the additional time required by the lettuce growers to undertake training to enable them to monitor their own crops; the time required on a regular basis to carry out crop monitoring; and the cost and time involved in modifying/calibrating spray units.

When consultants to the vegetable and lettuce industries were surveyed they identified grower education and technical and market issues as factors that promoted or increased grower adoption of IPM. Showing how IPM works through on-farm demonstrations was considered necessary to build confidence in IPM. Having IPM explained, demonstrated and proved successful on their own farms led to greater understanding and acceptance. The reduced availability of pesticides and the increased incidence of resistance or threat of resistance were drivers of adoption, while improvements in the availability of soft pesticides made the switch more likely.

The most important IPM tools were new softer chemistry, the availability of biologicals and crop monitoring protocols. Other important tools included IPM guidelines, endemic beneficials, training courses, water and nutrition management, post harvest cultivation and best-bet thresholds with all the important tools being used by more than 50 percent of the industry. Training courses are the only tools deemed important that were not rated as being used by many growers.

3.4.3. Enablers of Innovation

Knowledge

IPM technologies have a large knowledge-based component which growers cannot so easily acquire by "looking over the fence."[110] A multipronged approach is used for information diffusion through publications, field days, on-farm research, individual enquiries and problem solving, working with local agronomists/consultants, formal and informal networks, small targeted meetings, broad conferences and case studies. Information tools such as field guides and CDs assist those already wanting to adopt.

Collaboration

In many horticultural industries, regular group meetings or industry conferences/workshops are considered important for developing and maintaining expertise and interest in IPM.[111] Informal networks are particularly effective amongst growers from Languages Other Than English speaking backgrounds (LOTE).

On farm demonstration trials form an important way of tapping into the already existing informal networks and lend the trial credibility. It is seen as a peer-to-peer learning opportunity. Trials and demonstrations which occur at a research station do not always tap into these informal networks in the same way. Networks between consultants are also important to improve confidence in IPM as a sound means of pest management and to reduce risk aversion amongst growers.

Collaboration between growers, intermediaries and researchers often leads to the identification of specific issues that, if widespread, are taken up by grower associations such as AUSVEG, the national peak industry body for vegetable and potato growers, in collaboration with government if the environmental or economic benefit of a particular solution or innovation is recognised.

Knowledge Intermediaries

Intermediaries play an important role in the adoption of IPM by growers. They provide an important service in simplifying the adoption process for growers, increasing the chance of adoption. Intermediaries such as agrichemical resellers (e.g. Elders or LandMark) and crop consultants are increasingly being relied on as knowledge wholesalers and even educators through which skills are transferred and knowledge is distributed to growers. For smaller growers, resellers often act in some capacity as crop consultants providing knowledge and advice to growers that is often product specific. For larger growers, crop consultants are employed and provide some degree of independence, selling services rather than products.

[110] Orr, L. et. al. (2008) 'An Evaluation of the Economic, Environmental and Social Impacts of NSW DPI Investments in IPM Research in Lettuce', Economic Research Report No. 40, I&I NSW (Primary Industries)
[111] McDougall, S. (2007) 'Benchmarking vegetables integrated pest management systems against other agricultural industries', Final Report V505043, I&I NSW (Primary Industries)

Education and Training

Training in IPM for growers and consultants is an important enabler but is sometimes lacking.[112] A certain level of skill is required by the grower to identify beneficial insects as well as pests and to know the appropriate strategies to apply. Where improved knowledge and awareness of IPM exists amongst growers, crop consultants are able to focus on the details of the IPM strategy with the grower, rather than educating the grower on IPM concepts.

Across all vegetable producers, the level of education of growers is not high, with very few at tertiary level.[113] This makes training on technical details, such as pest life style stages, difficult.[114] Language barriers for knowledge transfer relate more to specific crops, for example language and high staff turnover are major training barriers for new Chinese immigrants working in Chinese vegetables.[115]

Given the level of complexity of IPM and the generally low education of growers, it is important for independent consultants with practical experience in IPM to work on a day to day basis with growers. However, there are very few experienced IPM consultants. Technical support and training is needed for existing consultants or those interested in offering an IPM service.[116] Where there is lack of consultant training, IPM maintenance rather than adoption of new technologies and research is the norm.

Research and Development

IPM is a strategy of continuous improvement based on continuous research into, for example, biologic controls and alternative soft chemicals. Horticulture Australia Limited (HAL), one of the Research and Development Corporations, is the major national research, development and marketing organisation for IPM. HAL collaborates with organisations such as I&I NSW (Primary Industries), CSIRO and universities to undertake R&D activity.

HAL is primarily funded by statutory levies, such as the National Vegetable Levy, from member industries, voluntary contribution funds received from grower associations, commercial enterprises and individuals, and Commonwealth Government dollar for dollar funding for expenditure on R&D.

AUSVEG is a member of HAL and ensures the National Vegetable Levy is invested in R&D that best meets the needs of the industry.

I&I NSW (Primary Industries) is often the successful bidder for HAL research, sometimes subcontracting some of the work to other states. This allows different perspectives or environmental factors to be recognised and makes the applied research

[112] Brunton, V. (2006), 'IPM Consultants Survey Summary', I&I NSW (Primary Industries)
[113] Pers comm.. Mike Titley, Applied Horticultural Research.
[114] Per comm. McDougall
[115] Per comm. McDougall
[116] McDougall, S. (2007), 'Benchmarking vegetables integrated pest management systems against other agricultural industries', Final Report V505043, I&I NSW (Primary Industries)

more likely to be taken up. The Department is a vital information point for R&D dissemination.

3.4.4. Conclusion

IPM is an important strategy to address the environmental and health concerns of pesticide usage and provides a larger range of tools for dealing with pesticide resistance compared to traditional methods. Whilst the concept of IPM appears to be well accepted by the industry, there has been a relatively low rate of implementation of a fully integrated IPM. There appears to be a lack of motivation to change from existing simpler pesticide-based strategies that still work to a more complex IPM strategy unless there is a crisis of pesticide resistance or secondary pest problems. However the benefits of adopting an IPM, such as avoiding secondary pest and pesticide resistance problems and environmental and OH&S concerns, are valued once adopted.

The challenges that need to be overcome to increase adoption of IPM include addressing the lack of motivation by local demonstrations and peer learning and providing access to trained intermediaries who have access to continuous R&D.

The primary enablers for adoption include a strong knowledge and skill base continuously developed in collaboration with government, research institutes and growers in response to changing grower conditions. Intermediaries such as crop consultants are key to knowledge diffusion at grower level.

3.5. The Coal Industry in the Hunter

3.5.1. Background

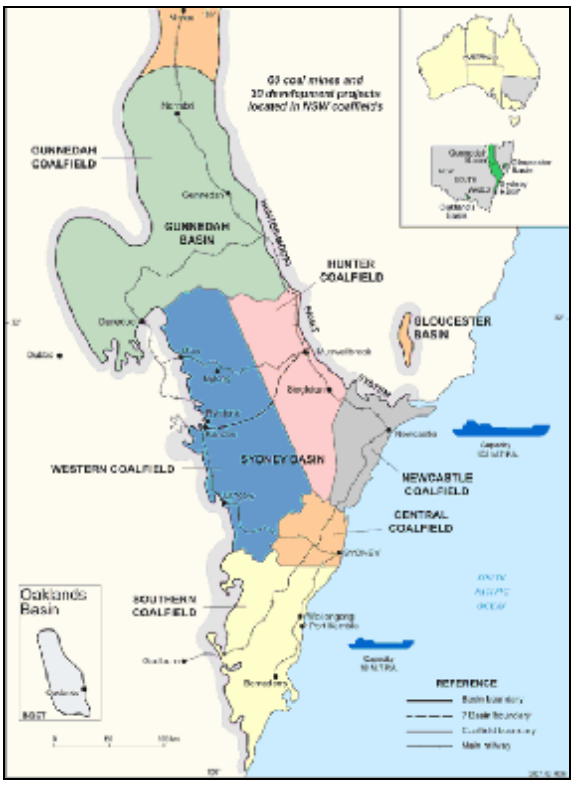
The coal industry is a significant contributor to the economy of the Hunter region. In 2006-07 almost 15,700 people were employed in the mining industry in NSW. Coal mining generates approximately 7,000 direct jobs and approximately 21,000 indirect jobs in the Hunter.[117]

This case study looks at the coal mining operations within the Hunter and Newcastle coalfields (see Figure 3.5) and the related engineering, manufacturing and services sector that supply these operations.

The Hunter and Newcastle coalfields collectively account for 56 percent of the State's coal reserves. The Hunter coalfield – the largest coal producing area in NSW – is predominantly made up of large-scale, multi-seam open cut mining operations.

Coal mining in NSW is gradually shifting away from the Hunter Valley with increasing activity expected in the Gunnedah Basin. Mining operations co-exist in the region with urban development, national parks and prime agricultural land.

Figure 3.5: Coalfields of NSW



Source: 2008 NSW Coal Industry Profile

[117] Hunter Economic Development Corporation , http://www.hunterprospectus.com/Industry/Coal/

Over 12 percent of coal mine operators in NSW employ 200 or more people. This compares with 0.3 percent for all industries (Table 3.1). Compared with the broader NSW economy, there are more mining and construction original equipment manufacturers (OEMs) in the medium sized band (employing between 20 and 199 people). According to IBIS World, these firms tend to concentrate on low technology-based products and do not invest significantly in R&D.[118]

Table 3.1: Businesses in the coal and related industries by number of employees, NSW, 2006-07

NSW, 2006-07	<20	20 to 199	200+	total	No. of businesses
Black coal mining	71.4%	16.3%	12.2%	100.0%	147
Mining services	93.5%	6.5%	0.0%	100.0%	459
Mining & Construction Machinery Mfg	87.3%	12.7%	0.0%	100.0%	354
All industries	**96.1%**	**3.6%**	**0.3%**	**100.0%**	**680,739**

Source: ABS, Count of Business, 2006-07

3.5.2. Drivers of innovation

Responding to industrial change

The region has undergone significant manufacturing decline, culminating in the closure of the BHP steel works in Newcastle in September 1999. At its peak in 1980 the steelworks employed 12,000 workers. When the closure was announced in 1997, the labour force had fallen to less than 3,000. By the time it closed, the steel works employed 1,450 people.

The closure of the steel works provided a catalyst to transform the region from one that had below average innovative activity and R&D expenditure. The NSW Government Hunter Advantage Fund helped drive the diversification of the industry base to other areas including mining and defence. Around this time, rising demand for coal stimulated activity in the region for mining engineering and consulting services as well as mine operators. There are a number of successful businesses today that predominantly service the mining industry and yet in the late 1990s were mainly focussed on steel making.

Another challenge is competition from outside the region and overseas. However, many companies overcome this challenge by focussing on building and strengthening relationships with clients.

[118] IBIS World, (2008), 'Mining and Construction Machinery Manufacturing - Market Characteristics'

Logistics

Today, one of the main challenges facing the region is the logistical issue of getting coal out of the port quickly enough. Newcastle is the largest coal export port in the world. For the 2008-09 financial year, Newcastle Port Corporation reported a record 90.5 million tonnes of coal exports valued at $14.3 billion.[119] Export capacity is expected to double to 180 million tonnes by 2015.[120] Challenges in the near future revolve around the impact of ongoing global instability and how this will translate into ongoing demand for coal and related equipment and services.

Regulation and community concerns: OH&S and the environment

Local environmental concerns: the NSW Government sets stringent requirements on mine operations to reduce pollution such as noise and dust, and to rehabilitate mines. This has led to a number of innovations in the industry such as modifying beepers on on-site trucks to make them less intrusive and using real-time monitoring of noise. For instance, at BHP Billiton's Mount Arthur coal mine near Muswellbrook in the upper Hunter, noise suppression techniques for trucks were developed on-site and have been taken up by Caterpillar for general application.

Greenhouse gas reductions*:* According to the Australian Coal Association:

> *"Transitioning Australia to a low carbon future and maintaining the long-term sustainability of the global coal industry represents perhaps the biggest innovation challenge facing the coal sector over the past century"*[121]

The Carbon Pollution Reduction Scheme White Paper acknowledges the effect of the Scheme on coal producing regions and proposes adjustment assistance for the coal sector to address impacts on coal mines with high fugitive emissions.[122] The coal mining industry, in conjunction with State and Federal governments, have established research funds to develop initiatives to reduce carbon emissions. The Coal21 fund is financed by a voluntary levy on coal production and government contributions. The Hunter-Central Coast region is benefiting from this research, for instance through the post combustion capture (PCC) technology pilot project at the Munmorah power station.

Elsewhere, Rio Tinto has moved to capture fugitive emissions from its open cut mines and instead of venting off methane from its underground mines, BHP uses it for energy generation. Equipment manufacturers in the Hunter such as Banlaw actively promote their fuel management products to the mining industry as energy efficiency tools, for which many mine operators now have clear internal guidelines.

OH&S: the mining industry is extremely focussed on safety and is responsive to legislative requirements. Meeting the safety needs of its workers has stimulated significant innovation in the industry. The NSW Minerals Council established the

[119] NSW Government (2009) Minister for Ports and Waterways, Media Release, 24 July 2009
[120] NSW Government (2010) Minister for Ports and Waterways, Media Release, 1 January 2010
[121] Australian Coal Association, (2008), 'Submission to the National Innovation System Review'
[122] Australian Government, (2008), 'Carbon Pollution Reduction Scheme: Australia's Low Pollution Future', p.89

Occupational Health & Safety Innovation Awards to recognise the innovative ways the mining industry finds solutions to OH&S challenges.

A recent winner was a self-locking heavy equipment jack, designed by the engineering and maintenance teams at Mount Thorley Warkworth Coal Mine, near Singleton in the Hunter Valley. The jack's inventors were the mine's maintenance team leader and a reliability engineer who were looking for an equivalent product on the market which was not available.

The awards act as an extremely effective means of spreading good news stories and the ceremony itself provides a good networking opportunity. They also highlight to the industry the key role of including operational staff in the idea generation and development phases of OH&S innovations.

Willingness to innovate

OH&S and environmental regulations and the mining companies' own responsiveness to these concerns have led to the adoption of new work practices and technology in this sector. However, there was some evidence that mine operators have been less responsive to other process innovations such as operational efficiencies. The underground coal mining sector was described as being very conservative in adopting new equipment and processes. However, they exhibit a preference for Australian based innovation and operators are willing to copy successful developments in other mines.

The equipment manufacturing sector in general in the region was seen in the early 2000s to have a low level of innovation and R&D. Although this has changed in recent years,[123] it was suggested that there are still a large number of manufacturers who are unwilling to engage in innovation. This may be in part due to inertia from the company owner but is also a factor of limited time to look strategically at the business. It was felt that once the message of the benefits of innovation was understood, the concept would be embraced by a greater number of businesses.

3.5.3. Enablers of Innovation

Knowledge

Within the mine operation sector there is an attitude of cooperative knowledge sharing between operators. This is predicated on a strong desire to improve the overall safety and environmental record of the industry. Amongst the mine engineering and services sector there is also a strong sense of cooperation. Previously there was separation between companies in the upper Hunter and those in Newcastle but this appears to have dissipated, partly as a collective response to the closure of the BHP steel works in 1999. It was commented that other regions are trying to emulate the Hunter's success in bringing competing businesses together. Importantly, the features of this success are seen as being cultural and behavioural – and therefore transferable – and not specific to the geographic or industrial make-up of the region. For instance, an interesting observation was that Hunter businesses are more likely to present themselves outside

[123] HunterNet, (2005) 'Innovation in Engineering-Based Manufacturers in the Hunter Region'

the region as a single, cohesive group. This applies to trade missions and applications for Commonwealth funding programs.

Networks

HunterNet operates as a cooperative network of over 100 manufacturing firms in the region. The network regularly holds it annual general meeting at member sites. It is seen as having an important knowledge sharing role, particularly in respect to new markets and emerging trends.

Industry associations for mining OEMs and services do not appear to provide significant assistance for innovation in the Hunter. This may reflect the disparate nature of these firms and the niche markets they occupy. For mine operators, industry bodies such as the NSW Minerals Council lobby governments on behalf of their members and take on a best practice knowledge sharing and network facilitating role.

Internal knowledge

A great deal of innovation within the Hunter coal industry occurs within organisations. Despite the level of cooperation in the region, solutions to business problems are often developed throughout the business, including operational staff and intermediaries. Similarly, NSW coal producer Centennial Coal runs internal competitions between its nine mines for the best innovations relating to the environment, safety and productivity. It hosts a number of conferences for its mines to provide a platform to promote and showcase innovation and cross-pollinate successful ideas and facilitate networking. The company believes that the awards help create a culture of innovating and thinking differently. However, they also feel that there is room to improve the communication of ideas across their network of mines.

Overseas knowledge

While many innovations are sourced domestically, the industry benefits from the presence of a number of multi-national mining companies who can spread best practice around their global networks. Even smaller mine operators can access the global stock of knowledge relating to safety and the environment. There is also evidence of knowledge sharing to and from countries. For instance, the NSW coal industry shares its best practices with operators in China and Chinese owned mines in NSW have incorporated their own technology, developed overseas.

There are a number of successful exporting mining OEM firms in the Hunter who receive information on industry and technology trends from their overseas clients and representatives. Companies also value the contribution that Industry & Investment NSW and Austrade provide in terms of market knowledge and trade missions.

Cross-industry knowledge

Equipment manufacturers in the Hunter benefit from a growing defence industry sector. Many of these companies have diverse operations that include general manufacturing,

mining, rail and defence. This allows for cross-industry pollination of ideas and from the company's perspective spreads the risk of concentrating on just one sector.

Innovation in the Mining Equipment Manufacturing Sector: DSI Mining Products

The Australian division of this large German multi-national engineering company started life in 1970 providing roof support products for underground coal mines. It was acquired by DSI in 2000 and was the parent company's first foray into mining. It currently has a dedicated R&D team, prototype testing and manufacturing facilities based in the division's headquarters near Newcastle.

The organisation's product and service innovation comes through its one-stop shop approach to solving mines' strata support needs and its ability to provide solutions for different types of mines, including metalliferous. As a medium sized company it has the capacity to undertake extensive R&D (as well as collaborate with universities around Australia) and conduct broad analysis of market trends. Yet it prides itself on its small business culture of openness and collaborative problem solving.

Around 30 percent of the division's sales come from exports and the technology developed in the Hunter has been distributed around the global parent's network to solve construction-related engineering problems. The Newcastle division is also active in process innovations through its use of materials requirements planning (MRP) and forecasting tools. Again, this innovation has been adopted around the parent network.

Collaboration with research institutions

The Barlow report into NSW universities cited an example of a flotation technology developed at the University of Newcastle in the 1980s and 1990s as delivering hundreds of millions of dollars of coal products to the industry.[124] The University continues to collaborate with local industry and commercialise intellectual property emerging from research, although it was noted that such collaboration was easier with medium and larger sized businesses who have a greater ability to strategically evaluate their own needs.

An interesting finding from consultations with both the mining operations and engineering and service companies was the broad engagement with numerous universities, not just the University of Newcastle. The University of Wollongong featured strongly as a source of collaborative research and business problem solving. Other universities included UNSW, the University of WA and the University of Queensland.

[124] Barlow, T. (2008) 'NSW Universities – capability statement'

Contacts with these universities tend to be established over a long period of time and typically originated from some form of personal contact. Where such personal contacts exist, the collaboration was seen as productive and responsive. However, it was noted that the collaboration would have been less effective if the business had to approach the university cold. Among mining companies, collaborative research tends to occur at the site level and is also facilitated by engagement in the ACARP process (see box).

The Australian Coal Association Research Program (ACARP)
Australian black coal producers contribute 5 cents per tonne to fund a program of collaborative research for the benefit of the coal mining industry in areas including greenhouse gas mitigation, OH&S, local environmental concerns and productivity.

The collaboration typically takes the form of universities partnering with a mine operator and possibly an original equipment manufacturer (OEM) or service provider, with the technology trialled on-site. The goal of the collaboration is to produce practical research that can be applied to business problems and is distinct from alternative models such as AMIRA International which focus on fundamental research (AMIRA also predominantly focuses on non-coal mining). Industry consultations revealed general support for the program in terms of the output of research and the nature of the collaboration. One services company commented that ACARP was their sole R&D activity and it gave them wider exposure to markets as a result. One mine operator commented that they are actively involved in the ACARP process and that key to its success was the focus on the needs of the industry.

Project findings are disseminated openly throughout the industry and an evaluation of the program found significant measured benefits in excess of the initial investments.

Skills

According to a report from SkillsDMC – the Resources and Infrastructure Industry Skills Council – there are indications from the coal sector of projects under threat of not commencing due to skill shortages, even during variable economic conditions. For instance, the ageing of statutory officials, particularly in underground coal operations is expected to cause problems in the next five years, as open cut mining operations go deeper.[125]

There is evidence of the mining sector implementing innovation in management practices. For instance, research by Professor Graham Hubbard showed how Rio Tinto responded to concerns over industrial relations and the consequent effects on costs and profits by fundamentally reshaping managerial roles and responsibilities. According to Hubbard, Rio changed the nature of employment practice and relationships and gained

[125] SkillsDMC, (2009), Environmental Scan 2009, 'Building for the future, preparing today'.

great productivity benefits and profit improvements.[126] They did this through the adoption of decision-making principles developed by a UK academic and by moving away from industry standard ways of operating to one based on greater internal managerial control.

Managers from innovative firms in the mining equipment manufacturing and services sector tended to have dedicated teams involved in product innovation, with the managers themselves less likely to be involved in development work. However, their companies' relatively small size enabled them to remain close to the product development process through their connection with customers. There was evidence of some businesses cutting staff numbers in the face of the slowing economy, particularly those involved in product innovation.

Locally, the University of Newcastle provides numerous graduates to the mining sector with the engineering faculty in particular well regarded. The Hunter TAFE is seen in the region as a very responsive, flexible organisation that seeks to maintain links with industry and adapt its activities to reflect local needs. It is seen as a key source of vocational skilled labour in the region along with a number of registered training organisations who specialise in entry level training for the coal industry.

Other enablers

The Hunter regional office of I&I NSW (SRDT) hosts the Hunter Regional Development Australia, HunterNet, the Hunter Export Centre, the Industry Capabilities Network and Austrade. These complementary services help businesses access government and other assistance, however, it was still commented that a one-stop shop was required for general assistance and referrals. It was felt that such a service could help businesses – particularly older, more established businesses – increase awareness of the services they need to become more innovative.

Access to finance was raised as an issue, particularly in relation to Commonwealth funding of R&D activities (concern was raised over the closure of the Commercial Ready program and the restricted access to the R&D Tax Offset for loss making businesses[127]). Access to ICT was not an issue amongst those interviewed and many Hunter businesses use sophisticated software to plan and manage their operations. The region is adequately served by professional and technical services and its relative proximity to Sydney means that services unavailable locally can still be accessed.

3.5.4. Conclusion

The coal industry is vital to the prosperity of the Hunter regional economy. Coal producers and the related equipment manufacturers and service providers have proven themselves adept at responding to changing market conditions and community concerns.

[126] Hubbard, G., (2008), 'Innovation in Winning Organisations in Australia: Myths and Realities, in Inside the Innovation Matrix', Australian Business Foundation

[127] In July 2010 the Commonwealth Government will replace the R&D Tax Concession and Offset with the R&D Tax Credit. This new program should overcome some of these concerns.

Within the coal producing sector, knowledge of successful innovations is transmitted within company mine sites and, especially with environmental and OH&S innovations, outside the company to be shared among other operators. Importantly, companies are willing to invest in the ideas generated by their front-line operational staff. R&D is conducted collaboratively for the benefit of the whole industry, with ACARP providing a good model for funding, implementing and disseminating sector specific research.

The mining equipment manufacturers also show high levels of collaboration and the culture of cooperating in the Hunter is seen as one to emulate by other regions. Importantly though, when firms collaborate with universities, linkages are formed across the country not just with the University of Newcastle.

Where innovation does not occur, this may be due to inherent conservatism and constraints on business managers' time to look strategically. A need exists, therefore, for a broad-based process of educating business owners of the benefits of innovation.

4. Key Drivers and Enablers for Innovation

Innovation in regional NSW is driven by a combination of pressures – some unique to regional areas or industries and some universal – and the willingness to innovate.

The research and case studies identified key drivers and enablers to innovation for regional businesses and also identified areas where their performance needs to be improved. Specifically, the importance of the various mechanisms of accessing knowledge, the skills of staff and managers to develop and implement innovations, and a range of broader issues including access to professional and technical services, finance, ICT and logistics have been identified.

4.1. *Drivers of Innovation*

The main pressures driving innovation in regional businesses are:

- The need to adapt to evolving consumer demand and the increasing range of competing goods and services on offer. Related to this is the need to respond to changing demographics such as declining population in inland NSW and an ageing population on the coast.
- The impact of industry competition.
- Environmental sustainability, centred specifically on the need to reduce fresh water usage and energy, and to respond to local environmental concerns.
- The requirement to meet new standards and regulations, which in certain cases can act as a catalyst for change.

To be relevant, the regional innovation system needs to be able to provide knowledge and implementation tools to be able to assist regional businesses to meet these challenges.

Recognition of the pressures that can lead to innovation is an important first step. However, for innovation to occur there must be a corresponding willingness on the part of the owner/manager and employees of a business.

In all the case studies, management and leadership skills emerged as critical in both supporting the investigation of new ideas and being able to implement innovation within businesses. In the case of tourist parks, professional managers were responsible for undertaking risk assessment, restructuring their operations and ensuring that staff were trained and able to provide a level of service that was critical in allowing parks to move into new, and higher value, accommodation markets. In addition, the development of vocational training for prospective tourist park managers was seen as a critical component in upgrading operating standards.

Management and leadership skills, such as improved leadership capability, risk assessment and management, in isolation are insufficient for business innovation.

Innovative management skills involving knowledge flows and connectors are needed for business transformation from within.

These skills must be complemented by business innovation training that leads to production and operational improvements, such as sustainable and lean manufacturing. These are important in-house skills and capabilities for the generation, research, development and implementation of new ideas.

It is recognised that management training programs and business innovation programs are much more readily available in metropolitan areas than regional areas, and knowledge flows and connectors are also more difficult to establish and maintain.

4.2. *Enablers of Innovation*

The research shows that a number of factors combine that underpin an effective knowledge generation and diffusion system. The key features can be summarised as:

- Informal networks are important as a mechanism to build trust and as a sounding board of ideas, as well as a mechanism to share new ideas.
- Formal networks (such as industry associations) provide access to knowledge, contact with peers and facilitate commercial collaborations, as well as provide an organisational structure to guide, promote and organise research and education activities significant to the industry.
- Ideas from outside the region, including national and international sources, can act as a catalyst to thinking about operations and activities in new ways. Industry associations or networks actively supporting industry development and education activities can be an important facilitator of this.
- Management and technical skills within an individual business are vital to generating and implementing new innovations.

Universities and other higher education and research institutions have an important role in transferring knowledge. However, poor linkages between businesses and research institutions were identified. There are a number of challenges which could affect perceptions of usefulness of research activities by end users:

- distance between (even regionally-based) research institutions and industry
- poor network links between the two, and
- indirect methods of knowledge diffusion (such as intermediaries)

Notwithstanding these challenges, these linkages need to be strengthened to enable regional NSW industries to be better informed and access emerging technical knowledge. While this problem is not unique to regional NSW, the factors affecting these interactions are complex and are likely to cover a range of issues that could include legal, administrative and cultural issues. These need to be assessed in greater detail.

Other key enablers include:

- Access to professional and technical business services. In order to realise the potential of new ideas or products, innovative businesses typically need the assistance of various business services. The accessibility of these to regional businesses tends to reduce with distance from the main centres. Lifestyle oriented regions are still able to attract a variety of business services, whereas those away from the coast may struggle to gain adequate access.
- ICT is important in improving processes and systems, product development, for entering new markets and new marketing techniques. In particular, broadband was identified as important as a research tool and facilitating access to new marketing channels.
- An efficient logistics network minimises the costs of servicing distant markets and enables competitive businesses to build scale and develop a diverse customer base.
- Government support plays an important role in the innovation system, though knowledge of where to access available government programs could be improved.
- Financial constraints can conversely act as a barrier to innovation activity in two ways. This can be due to the difficulty in accessing debt or equity. There are also financial implications for a business when management and employee time is reassigned to learn how to develop new products or processes.

5. A Regional Innovation Strategy for NSW

This section outlines a series of NSW Government actions that aim to increase the innovative capacity of regional businesses as a means of addressing the ongoing challenges facing regional NSW. A set of guiding principles inform two overarching components to the strategy:

1. A series of recommendations for the **immediate expansion** of innovative capacity in regional businesses. These recommendations will enhance the viability of businesses, allowing them to maintain and create jobs.
2. The development and implementation of ***Innovation Initiatives*** for each major region in NSW to increase the level of innovative business activity in the medium to long term.

Both components will be implemented simultaneously. The series of recommendations are aimed at increasing the level of innovative activity in regional NSW to tackle some of the generic innovation-related needs of businesses and to position them to survive volatile economic conditions. The recommendations provide a clear road map to meeting the needs of businesses to create and maintain jobs in regional NSW while positioning for future growth through innovation.

An analysis of the effectiveness of the series of recommendations will feed into the development of *Innovation Initiatives* and will allow for a refinement of the options available to increase innovative activity at the local level. The *Innovation Initiatives* are a medium-term solution for sustainable job retention and creation, providing regions with a platform for increased prosperity.

5.1. *Guiding Principles*

Extensive academic research, coupled with industry specific case studies, have led to the development of a set of guiding principles that articulate the Strategy's framework for action:

Guiding Principle 1: Innovation is an important strategy for businesses to adopt in order to overcome the challenges they face. It is a fundamental driver of economic prosperity, and sustainable job creation and retention in regional NSW.

Guiding Principle 2: Innovation is a broad-based process which includes but is not confined to R&D and its commercialisation or diffusion. Innovation does and can occur in every segment and every sector of a business and the economy, regardless of the level of technology.

Guiding Principle 3: Innovation is an active process that requires full engagement by business owners, managers and employees. Being willing and able to absorb knowledge for innovation is a key driver for change and for the development of a culture of innovation.

Guiding Principle 4: Access to knowledge is a key enabler for innovation to occur. Low levels of innovative activity can arise when:

- Businesses cannot access information from within their region or industry about successful innovations.
- Businesses have a limited insight into industry trends from outside the region and overseas, or from other industries.
- Businesses cannot access research and other services from research institutions that can help them in their innovation process.

Guiding Principle 5: Levels of innovative activity can increase where there is access to enabling services and facilities, such as finance and professional and technical services.

Guiding Principle 6: The innovative capacity and viability of regional businesses is strongly enhanced by the ability to access new markets, allowing the development of scale and a diverse customer base; effective broadband, efficient logistics networks and access to new market information are critical.

5.2. *Recommendations for Immediate Enhancement of Innovative Capacity*

The guiding principles form the foundation for the following recommendations which will provide an immediate boost to the innovative capacity of regional businesses:

1. Expand access to management and leadership training programs in regional areas.
2. Expand the roll-out of business innovation training (such as Lean).
3. Develop a pilot program to enhance knowledge sharing and the development of both formal and informal networks.
4. Leverage the transformative capacity of the National Broadband Network to enhance regional business innovation.
5. Promote the transfer of external knowledge to the regions by sponsoring experts to visit regional NSW and share knowledge with local businesses on innovation and industry trends. This could be via seminars, workshops, complemented by small group sessions or site visits.
6. Develop a scheme to enhance and increase the transfer of knowledge from the State's research institutions to the business community.
7. Develop a communications strategy to improve the awareness by regional businesses of I&I NSW's role in providing information on various NSW and Commonwealth funding programs.

Additionally, the NSW Government is proceeding with a number of initiatives to improve the underlying infrastructure that supports innovation in regional NSW, including:

- The NSW Government's Community Broadband Development Fund to support development of broadband infrastructure in remote regional areas.
- The NSW National Broadband Network Taskforce to accelerate and facilitate rollout of the network in NSW.
- I&I NSW initiatives to identify and address logistics industry challenges and opportunities.
- NSW and Commonwealth Government programs designed to assist businesses to access finance, including training programs aimed at strengthening business plans to support access to non-government sources of finance.

5.3. *Innovation Initiatives*

The findings from the analysis of the drivers and enablers of innovation, the guiding principles and recommended actions combine to develop a broader flexible methodology for developing localised innovation policies over the medium term. *Innovation Initiatives* provide a mechanism for responding to the varied and changing priorities of regional economies.

The *Innovation Initiatives* instil the principle that innovation is a critical component of regional economic development and long-term job creation and retention. As such, they will be integrated into existing and future regional growth and economic development plans.

The key components of each set of *Innovation Initiatives* are:

1. The development of an economic profile of the region. As I&I NSW (SRDT) is the lead agency, the regions to be used are the existing SRDT ones[128]
2. An examination of the innovation capacity of the region
3. Agreement between key stakeholders on the issues and actions
4. A plan to implement the agreed Initiatives
5. Ongoing monitoring and evaluation of the Initiatives.

This structure is similar in nature to the guide developed by the European Union for creating individual regional innovation strategies.[129] Landabaso and Reid support the view that regional innovation strategies should develop policy instruments suited to the needs of SMEs and hence not focus solely on technological innovation. They also argue

[128] The boundaries of these regions are closely aligned to ABS statistical divisions
[129] EU Innovating Regions in Europe Secretariat (2007) Regional Innovation Strategy Methodological Guide, Stage 2

that the regional level is the most appropriate for developing and delivering services to enterprises with a view to increasing the level of competitiveness of the region.[130]

Similarly, the findings of Jerry Courvisanos are informative in this regard:

> *"A regional strategy must be put into place once the [innovation] requirements are identified and appropriately adapted to the local needs. A plan must be forged that aims to develop embryonic competitive strengths that provide transition from vulnerability to sustainability."*[131]

The Initiatives should reflect the region's competitiveness against others in the State. In this sense, 'competitiveness' refers to the determinants and dynamics of a region's longstanding prosperity, rather than the more restrictive notion of competing over share of markets and resources.[132]

Innovation Initiatives will be integrated into the existing Regional Business Growth Plans. These provide a blueprint for working collaboratively with local government, Regional Development Australia Committees, and other government and business stakeholders to achieve sustainable business growth in each region.

[130] Landabaso, M., & Reid, A., (1999), 'Developing Regional Innovation Strategies: The European Commission as Animateur', in *Regional Innovation Strategies: The Challenge for Less-Favoured Regions*
[131] Courvisanos, J., (2003), 'Innovation for Regional Communities: A Research Framework', SEGRA 2003 Conference
[132] Kitson, M. et. al., (2006), 'The Regional Competitiveness Debate', Programme on Regional Innovation report, Cambridge-MIT Institute

Consultation List

AMIRA International	I&I NSW (Primary Industries): Yanco Agricultural Institute
Angowrie Rainforest Resort	I&I NSW (SRDT): Tourism; Enterprise, Small Business and Regional Development; Investment Attraction; Science & Medical Research
Applied Horticultural Research	Illawarra Regional Development Board (Chair)
Atlex Stockyards	Industry Capability Network
Australian Business Foundation	Integrated Site Design
Australian Regional Tourism Network	Jeff Hort Engineering
Banlaw	McWilliams
Beelgara Estate	National Wine and Grape Industry Centre
Bidgeebong Wines	North Coast Holiday Parks
Bowen Engineering	North Star Holiday Resort
Business Central Coast	Northern Inland Regional Development Board (Chair)
Capital Regional Development Board (Chair)	Northern River Tourism
Caravan & Camping Association NSW	NSW Minerals Council
Casella	Orange Precision Metalcraft
Casino Motor Home Village	Professor David Aylward (UTS)
Centennial Coal	Professor Ian Marsh (UTAS)
Central Western Regional Development Board (Chair)	Regional Development Advisory Council
Charles Sturt University	RenWeld
Country Kitchens	Richmond Valley Council
De Bortoli Wines	Riverina Area Consultative Committee
Department of Services & Administration: Crown Lands	Riverina Regional Development Board (Chair)
Don Scott-Kemmis (University of Sydney)	Riverina Winemakers' Association
DSI Mining Products	Simulation Modelling Services
Dubbo City Welding Works	TradeStart (Austrade)
Far Western Regional Development Board (Chair)	Transtank
G& C Manufacturing	Tweed Coast Holiday Parks
Hunter Economic Development Corporation (Chair)	University of Newcastle
HunterNet	Warrick Moppett (Ex-Gilgandra Mayor)
I&I NSW (Primary Industries): Griffith Centre for Irrigated Agriculture	Westend Estate
I&I NSW (Primary Industries): Science and Research, Extensive Industries Development	Winemakers' Federation of Australia

Glossary

ABS	Australian Bureau of Statistics
AWRI	Australian Wine Research Institute
CCIA	Caravan and Camping Industry Association
CPRS	Carbon Pollution Reduction Scheme
DECCW	Department of Environment, Climate Change and Water (NSW)
DET	Department of Education and Training (NSW)
I&I NSW	Industry and Investment NSW
ICT	Information and Communication Technology
NBN	National Broadband Network
NWGIC	National Wine and Grape Industry Centre
R&D	Research and Development
RIS	Regional Innovation Strategy
SRDT	State & Regional Development and Tourism (I&I NSW)
UTS	University of Technology, Sydney
UTAS	University of Tasmania

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