

# **The contribution of VET to innovation in regional industry**

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## **Abstract**

There has been considerable policy interest, discussion and a range of VET related research projects into the actual and potential contribution of VET to the Australian National Innovation System. The paper draws on the authors' current field research in regional Australia that is investigating the relationships between skill formation, knowledge transfer and the innovation process. The organizations under study in this research were deliberately selected for their known innovative features. They include a range of small to medium enterprises that supply the domestic market, those which export directly into international commodity markets as well as not-for-profit groups that supply services to the domestic and international tourist markets. They draw on local labour markets for the majority of their workforce and therefore rely to a large extent on the existing education and training infrastructure for skilled workers.

Preliminary findings suggest that to conflate 'innovation' with 'technological innovation' is problematic. The organisations under study, in general, have not relied on capital intensive large scale technological innovation. The role of the VET contribution can be best understood as part of a broader development of social and technical infrastructure.

## **Introduction and outline of the paper**

The aim of this paper is to describe some of the skill formation needs and practices of an identified innovative enterprise/organizations and industry sectors in the Riverina region of New South Wales. The discussion is a preliminary report only of an ongoing research project. The project has involved a series of site visits, document analysis and interviews with organizations known within the region to exhibit (Bamerry, 2001). The project will result in a range of reports and papers to individual stakeholders and the VET community. At this stage, to preserve confidentiality of informants (and subject to Ethics Committee guidelines), we have only referred to data available in the public domain. Nonetheless, we believe the broad trends identified are indicative of more general aspects of the specific Australian innovation system.

The paper has four main parts. Part 1 provides an overview of the origin of contemporary discussions of the importance of innovation. In part 2 we provide some definition of innovation. Part 3 briefly describes the individual firms and organisations that are the subject of this research project. Part 4 discusses the innovative practices and skill formation needs of the study organizations. This is summarised in Appendix A. In the concluding sections we discuss the implications for the VET system, and conclude a whole of government approach which would assist the VET sector to diffuse innovative practices through networks with local industry.

## **Part 1: Origins of the contemporary innovation debates**

There has been considerable international (OECD 1996; 1997; 1999;) and national policy interest and discussion (Marceau, Manley & Sicklen, 1997; Marceau, &Manley 2001,

Commonwealth of Australia, 1999; 2001) regarding the centrality of 'innovation' to contemporary economic development. In Australia this has led to range of VET related research projects into the actual and potential contribution of VET to the Australian National Innovation System (Docherty 2001; Ferrier et.al, 2003; Dawe [ed] 2004; Curtin, 2004; Callan 2004; Toner et.al. 2004), combined with some recent reviews and critiques of the role of educational research in assisting policy development (Kearns, 2004). This interest reflected the international discussions which triggered the federal government's initial (1999) discussion paper *Shaping Australia's Future: Innovation - Framework Paper*, but gained momentum following the release of the formal Report (2001) *Backing Australia's Ability*.

This most recent interest in 'innovation', as a key to economic success (often in conjunction with claims about the arrival of a qualitatively new 'knowledge economy') can be interpreted as a *continuation* of a longer term post-war debate about the function of skill development in underpinning national economic development. We have previously suggested that this debate itself arose in the particular historical circumstances of a production crisis in Western industrial societies following the OPEC oil crisis of the 1970's and the associated failure of the post-war Bretton Woods system (Pickersgill, 2001). This debate, which underscored the whole Dawkins era, attempted to integrate European inspired skill-based classification systems into the award restructuring process from the mid 1980's. This was replaced in the early 1990's with a quasi-market based and purportedly new 'demand-led' national training system symbolised by the establishment of ANTA in 1993.

At the international level from the late 1970s through the 1980s discussion focussed on the role of skill formation in supporting new production systems in the development of value added manufactures. In Australia, the flexible specialisation thesis, influenced by models of northern Italian light manufacturing (see Piore and Sabel, 1987), were developed in the Australian context by Curtin and Mathews (1992) and, at the time, were thought to have the potential to introduce a new era of industrial democracy (Mathews 1988, 1989).

In the UK in particular, 'high skill' and 'low skill' trajectories were identified, along with a concern that a 'low skill equilibria' might become the norm in the UK (see the classic formulation by Finegold & Solstice, 1988). The influence of these discussions of the development of industrial and training policy, and the implicit assumptions which underpinned policy is quite clear in contemporary discussion such as the ACTU/TDCs (1987) *Australia Reconstructed*. This debate was again recently revived in the UK in the context of 'left wing' critiques of New Labour's 'Third Way' educational policies (Keep, 1990; Keep & Mayhew, 1990, Green 1999, Lauder, 2000). In Australia, the 'high road/low road' distinction was also revived by Marceau, Manley & Sicklen (1997) and Marceau & Manley (2001) who argued that innovation offered nations (and regions) the choice of pursuing a high skill, high wage growth strategy or succumbing to low skill low wage growth strategies, and is noted as a background feature by Toner et.al (2004).

The brief summary above suggests that proposals which take an uncritical view of 'innovation' as *the* key to short and long term economic and social development need to be seen in somewhat greater perspective, and taken with some degree of caution. Fashions come and go. This paper takes the position that innovation, or any other aspect of development, is best analysed into historical and social context, and that policies which merely assert ideological positions are less likely to lead to effective outcomes than those which take a more critical and analytical view of evidence based research.

## **Part 2: Theories of innovation and development**

Innovation' may, in general, be defined as introducing something new. Despite varying interpretations of the reasons and exact timing of changes in Western society, economic

historians and developmental analysts as diverse as, for example, Adam Smith in the 18th century, Marx in the 19th century, Schumpeter (1934), Polyani (1944), Rostow (1960), Wallerstein, (1974), Gerschenkron, (1968) and Williams (1987) in the twentieth century have all identified structural changes in society that have combined scientific and technological development with market forces, originating somewhere between the Renaissance and the establishment of Newtonian science in the 17th century. For some four hundred years at least, market expansion together with scientific and technological development, *that is to say 'innovation'*, has been typical of Western society. It is not a recent phenomenon. However, in the narrower context of identifying innovation in a contemporary commercial environment, the OECD provides a standard definition. This identifies innovation as

'... technologically new products and processes and significant technological improvements in products and processes. An innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). Innovations therefore involve a series of scientific, technological, organisational, financial and commercial activities. An innovating business is one that has implemented technologically new or significantly technologically improved products or processes during the period under review'. (OECD, 1997, p.47)

The definition distinguishes between *product innovation* and *process innovation*, but the definitions used are *for purposes of data gathering and comparative analysis*. It is noticeable that the OECD has recognised the limitations of simple technological or science based criteria to identify innovation, and it is significant that the essentially technological definitions used in the original *Frascati Manual* of 1963 have been supplemented in the definition above by the more Human Resource and social orientation of the *Oslo Manual* of 1996 (OECD, 2002a; 2002b). In the Australian context the Australian Bureau of Statistics (2002) has discussed comparative measurement difficulties (in the context of a discussion of the criteria of a 'knowledge based economy'), a fact also commented on a recent NCVER sponsored research project (Toner et. al., 2004). While common criteria are needed for data collation and for international comparisons, difficulties with cross sectoral analysis suggest that 'international league tables' (eg; Dawkins, 2001) and exaggerated claims of training failures based on them (eg; Latham, 2000) should be treated with great caution. As the Business Council of Australia (BCA) remarked in the early 1990s, most innovation, particularly in Australian industry, is *incremental* and *process oriented* rather than that measured by the appearance of new, radically different products. At that time the BCA rejected as too 'narrow and misleading' the

'... conventional wisdom...that innovation equals invention plus commercialisation... Innovation is not science. Nor is it technology or the ownership of invention' (Carnegie et al 1993, p.3)

In this research the BCA understanding of innovative products and processes is taken as a starting point for the reality of the Australian innovation system and provides the focus of interest.

### **Part 3: Description of our study sites**

The process of regional development in Australia, unlike of the denser populated national and sub-national regions of Europe, face significant challenges of geography and its attendant transport and communication infrastructure. In the Riverina for example, major population centres may be separated by three or four hundred kilometres and several hours by road. The population density is low and the largest regional centre, Wagga, has a population of only 67,000. The nearest world-class cities (and export hubs) of Sydney and Melbourne are each over 400 kilometres and around five hours distant by road and an hour by plane.

These geographical and demographic constraints are balanced to a significant extent by a well-developed education, transport and communications infrastructure. Australia has a comprehensive primary and secondary school education system and, in addition, a long

standing technical and further education system. School, technical and further education as well as adult and community education institutions are widely dispersed across the region. In addition, a multi-campus regional university provides tertiary courses in most areas, with a particular expertise in applied agricultural sciences. Wagga is a major road, rail and air transport hub, with direct access to Sydney, Melbourne and Adelaide. All major population centres have ready access to high standard telecommunications. Notwithstanding these attributes of a modern technologically sophisticated social structure, the Australian historian Geoffrey Blainey's well-known comments on the 'tyranny of distance' still provide challenges. The low population base places limits on the extent and distribution of skills in local and regional labour markets while the agricultural base yields household incomes lower than the urban Australian average.

Notwithstanding these limitations a range of small to medium enterprises and organizations are known to have developed which not only provide traditional export substitution products and services for local markets but also export directly into the world market. These organizations range from producers of tangible products such as metal and plastic manufacturing, food processing, agriculture and inland aquaculture to service industries such as national and international tourism.

For the purposes of this paper we have limited ourselves to a discussion of three enterprises, a regional industry and one not-for-profit organization that each exhibit characteristics associated with the broad understanding of the Australian system of innovation noted above. That is, they feature significant but *incremental* process or product improvement, rather than radical technological breakthroughs (Carnegie et. al. 1993). The sites were initially identified at a seminar for regional industry sponsored by the former *Group for Research in Employment and Training* at Charles Sturt University in August 2001 (Bamberry 2001) and supplemented in subsequent discussion with local stakeholders, in particular with the Riverina Regional Development Board.

#### *Regional innovative enterprises, sectors and organizations*

(i) Cargill Abattoirs, Bomen ([www.cargill.com.au](http://www.cargill.com.au))

Cargill Abattoirs at Bomen, in the industrial outskirts of Wagga, is a subsidiary of an international US owned multinational. It is a major local employer and specialises in beef processing. The major customers are major grocery chains and retail outlets in the Australian market, export bulk beef markets and a significant and very lucrative export line of processed offal for the Japanese market. This was somewhat dryly described by one line manager as 'getting more for the guts than we do for the beast'. There is virtually no wastage, with by-lines in hide and rendered carcasses.

The innovation and training drivers for Cargill include the requirement of its large retail customers for standard grades and cuts. This has led to vertically integrated networks with its beef suppliers and downstream customers. In addition, the Australian Quarantine Inspection Service (AQIS) imposes rigorous process control standards while legislative requirements for food handling and OHS have stimulated the need for formal training across the workforce. Cargills has therefore developed relationships with a number of private RTOs, and TAFE, to provide both formal accredited and informal non-assessed training. In conjunction with the introduction of an on-going quality improvement system, product market competition provides pressure to make continual improvements in handling speed and wastage control.

(ii) Flavourtech, Griffith ([www.flavourtech.com.au](http://www.flavourtech.com.au))

Flavourtech is a private company that developed from an engineering supply company which specialised in (mainly) stainless steel products for the local wine industry. Problems with flavour contamination led to a partnership with the CSIRO to eliminate unwanted flavours from wine. A unique 'spinning cone' technology was developed which was able to remove and store unwanted contaminants. This technology has been improved so that it now is able to separate, store and reconstitute a range of flavours across a diverse range of food products. (Interestingly, the original science on which the technology was based was developed in the Manhattan Project to separate radioactive metals from ore for the World War 2 atomic bombs, although the development and application of this technology now bears little relation to its origins - a not unfamiliar experience with applied technology). Flavourtech has two related divisions. The first involves research and refinement of its spinning cone technology. This is primarily the province of its professional and engineering staff. The second is the production of individually designed machinery for its international customers. This involves both engineering and trade qualified staff.

For Flavourtech, the drivers for innovation are from two sources. The first is the need to continue to extend the technology to increase market share against competing systems. The second is to refine and therefore reduce costs in the production of its specialised equipment.

(iii) Precision Parts, Wagga Wagga ([www.precisionparts.com.au](http://www.precisionparts.com.au))

Precision Parts is a medium sized private company that was set up by a former RAAF technician to supply replacement parts to the automotive industry. Over the last 25 years it has developed into a major automotive supplier of OEM and replacement parts, specialising in harmonic balancers for local market. It has major markets in the United States and is expanding in Europe. The production process involves the machining of castings into a range of standard products. There is a high performance line developed for automotive racing engines, although this is primarily a marketing exercise rather than a profit making line.

The main driver for innovation (featured prominently on its website) comes from the need to lower marginal production costs, in particular labour costs, to compete in world markets. This has been achieved through a rationalisation of the component inventory, and the introduction of computerised production control, inventory and administration systems. There is significant networking with its computer equipment and material suppliers and developed relationships with other manufacturers to smooth production peaks and troughs. The emphasis in skill development is on trade level skills, supplemented by formal skill upgrading of 'second class' machinists. A developed TQM system which involves production has been introduced. There are strong relationships with a local not-for-profit Group Training Company, and communication links with the engineering trades section of the local TAFE.

(iv) Temora Aviation Museum (Temora: [www.aviationmuseum.com.au](http://www.aviationmuseum.com.au))

The Temora Aviation Museum is a not-for-profit organization that maintains a range of vintage and veteran propeller and jet aircraft. It has developed an international reputation and attracts a range of vintage aircraft enthusiasts from within Australia and overseas. Temora was originally selected by aviation enthusiasts because of its wartime airfield and its suitability for gliding. The museum is controlled by voluntary board that includes high profile Australian business leaders, and has a small employed management and aircraft maintenance staff. Voluntary staff, from the senior experienced pilots employed international airlines (eg; Qantas) and the general aviation sectors through to tour guides recruited from local residents and organizations such as the fire brigade and sporting bodies underpin the success of its range flying exhibitions, displays and day to day tourist visits (eg; Temora Independent, 2004).

The key innovative characteristic of the Temora Aviation Museum is how it has integrated with local government and community and volunteer organisations. This has led to a range of community benefits (ie; social capital formation; Fountain, 1989) such as an increase in tourist income to the town, which unlike the experience of most small country towns, has seen a growth in population and increased demand for building and other services.

- (v) Regional Wine Industry (Griffith and Yenda: [www.winediva.com.au/regions/riverina](http://www.winediva.com.au/regions/riverina); [www.casellawine.com.au](http://www.casellawine.com.au); [www.debortilis.com.au](http://www.debortilis.com.au))

The Australian Wine industry has an international reputation for innovation in production and marketing. It depends for its success on effective integration of controlled viticulture through to the consistent application of winemaking techniques. The Australian wine industry is known for the consistent quality of its products across vintages. This is primarily achieved by careful blending of grape types, supported by agricultural and microbiological research in a number of centres across the wine producing areas in all states. This is combined with sophisticated production control methods in its large-scale production plants, with its major brand names owned by relatively few major corporations. For around 95% of Australian wine production, it is the application of large-scale industrial process control techniques (albeit guided by individual winemakers skill, preferences, experience and corporate niche marketing) rather than highly variable craft or boutique production, which guarantees consistent quality of its output. Wine production in the Riverina is primarily from irrigated grapes. The drivers for innovation are primarily domestic and international markets for quality wine. One major producer, Cassellas under the Yellowtail label has recently become the largest selling wine brand in the United States. The skill formation needs of the industry are met at the professional level by tertiary level training in winemaking, while the labour needs in viticulture and in the winemaking process is supplied by formal and informal training, only some of which is assessed to national standards.

### **Part 3: Nature of innovation found in the study**

Although as noted above, this research is in its preliminary stages, considerable consistency was found across all areas. The primary type of innovation identified was incremental, and involved refinements to processes and products rather than exhibiting major technological breakthroughs. This in itself hardly surprising, given that examples of incremental innovation was what was explicitly sought. A study of organizations involved in, for example, biotechnology or some areas of photonics might lead to different conclusions. However, notwithstanding examples of research in both pure and applied sciences in the region (eg; see [www.csu.edu.au/research](http://www.csu.edu.au/research)), the commercial and industrial application of breakthroughs in these areas (other than in the agricultural and mining industries) tend to be a feature of urban environments, where a critical mass of professionals, product suppliers and capital opportunities exist. These are not common features of regional Australia.

Even in the case of Flavourtech, which manufactures and sells a unique 'high tech' product into international markets, the original technological breakthrough came from research into specific quality problems associated with the wine industry. It drew upon scientific infrastructure via the CSIRO to address quite practical problems. The development of the spinning cone process and the application of it from wine to other new and quite different food-lines was the result of incremental development, guided by science trained professionals who engaged in experientially based learning and development processes. These developments were backed by a manufacturing capacity that combined solidly grounded engineering principles with the generic trade skills developed by the TAFE system in the metal fabrication and electrical trades. It is perhaps redundant to note that as in all cases noted in this paper, very effective management teams and clearly developed business strategies underpinned subsequent market success.

A second common characteristic of each organization was its involvement with local organizations and infrastructure. The expansion of Cargills, an international multinational, was greatly facilitated by its engagement with local government. Capital investment by the company at its plant was aided by local government investment in road, water and sewerage facilities (these investments also had a flow-on effect to another major food processor at the same industrial site). The Temora Aircraft Museum benefited, and continues to benefit from the involvement of the local council, through upgrades of the airfield and joint marketing of the facility to their mutual benefit. The close involvement of local voluntary organisations (a form of social capital development; Fountain, 1989) has been prominent. In the case of Precision Parts, there has been significant local government and local business recognition of its success. More significant from a production perspective has been its involvement with the local VET training infrastructure through both a regional RTO and Group Training company for the recruitment and training of non-trade qualified machinists and the local TAFE college for its apprentice training. A superficial exception may appear to be Flavourtech, although even here the initial involvement with the CSIRO was important for the development of the technology, as was management initial and continuing involvement with the wine research centre at Wagga. The local wine industry has seasonal problems with the recruitment of skilled labour in both the viticultural and the winemaking sides of the industry, but it too has benefited from national level engagement with Wine Centres, its regional involvement with the Wine Centre at Wagga, and the provision of a range of qualifications and training programs provided by the public and private VET sectors. The tourist potential of the industry (and associated specialised food products) is heavily promoted through festivals and other activities run by a combination of local government, community and industry associations.

### **Implications for the VET system**

The apparent neglect of VET with the release of the Commonwealth's initial innovation action plan was severely criticised across the entire VET sector (see summary by Pickersgill & Walsh, 2003). Subsequently a range of projects on the relation between innovation and VET have been produced, funded largely through the NREC program managed by the NCVER. A common theme in Australia and internationally is the important role of VET level trained skilled workers in sustaining the production and process improvement of innovative products and services (see Toner et.al., 2004 for ASCO definitions relevant to Australia). Two broad themes have emerged, the first investigating the 'cultural' features of innovative organizations, primarily derived from learning organisation literature. The second involves a more economic analysis of innovation systems. An example of the first is a recent commissioned study on innovation within the Australian VET system itself (Callan, 2004). Based on a review of past research designed to identify the key practices or habits of innovative organizations the report concluded that '... truly innovative organizations:

1. create learning cultures which promote innovation as a core organisational capability
2. have leaders who are 'failure-tolerant'
3. identify their innovators
4. reward people who propose innovative ideas
5. use partnerships
6. promote innovation through teams.'

Of the six identified characteristics, the VET organizations studied were found to be good at only three of the six characteristics (identifying their innovators, at developing partnerships, and using teams) although other aspects were found to some degree. Interestingly this approach contrasts with another recent published commissioned research (Toner et.al, 2004), which, from a more economic and historical perspective suggested that;

'The broader literature on innovation and the case studies identified an interrelated set of factors that are strongly associated with high-innovation intensity. The factors include:

1. large firm size
2. regular upgrading of capital equipment
3. strong linkages between producers and suppliers of capital equipment and other inputs
4. competition within the respective industries and product markets based on product differentiation, reducing cycle times for introducing new products to markets, customisation, reliability, quality, design and integrating products and services
5. well-functioning linkages between external research and educational institutions and firms
6. customers who require continuous product improvement from suppliers
7. regulatory requirements which allow for novel solutions in meeting prescribed standards
8. high expenditure on training.'

Our research, although incomplete, would suggest that the second of the two approaches, which is grounded in empirical research and data, has more to offer VET policy makers than strategies developed around the somewhat dubious and empirically ungrounded 'learning organization' literature. With the exception of firm size (all our studies were of what, in the international literature are considered small to medium enterprises) and a *high* expenditure on training (all our study sites were however involved in training to some degree) confirmed the general conclusions of points 2 to 7 summarised above.

## Conclusion

In this overview of innovation in a regional environment some general conclusions may be tentatively drawn. The first is that recognition of the specific incremental and process oriented nature of the Australian innovation system should be acknowledged. This system is, to a significant extent, integrated with local and national infrastructure, and is manifested in a range of local, regional and national networks. In so far as skilled workers are a necessary (if not sufficient) input into maintaining and expanding product and process innovation, the VET system has a significant role. In our investigation the VET system provided skills and training at two levels. The first was in the generic skills developed in the traditional trades, specifically in manufacturing and maintenance areas. These skills are by no means redundant in the purported new 'knowledge economy'. The second was in the AQF 2 levels where a range of formal credentials, and importantly, informal on-the-job training (frequently unassessed) conducted by organizations themselves to the AQF standards, appears to be providing greater consistency and recognition of skill levels within and across important industry sectors. Flexible delivery, *specifically in non-traditional and non-trade areas* appears to assist this process. However, it would be a mistake to conclude that development is primarily responsible for innovation. Innovation is a complex, multiple dimensional process that involves scientific and technical expertise, technical and educational infrastructure, integrated product and supplier networks and effective management and marketing strategies and government support. In terms of policy development, no one single approach is sufficient. The strategy likely to be most effective is one that, as Richard Curtain has recently remarked (Curtain, 2004) incorporates a 'whole of government approach' that involves *all* levels of government.

This would enable the VET sector to diffuse business innovation and enhance its links ... particularly with small and medium-sized enterprises in general and especially those in regional areas. This requires appropriate funding support as part of a more diverse set of performance targets for VET providers.

The arrangements amongst the enterprises, organizations and industry sectors that are the subject of this on-going study demonstrate just these features.

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**Appendix A : Summary of Innovation, infrastructure and skill formation**

Organization & product or service	Form of innovation	Infrastructure and other institutional issues	Skill formation processes	Available Education and VET institutions
<p><b>Cargills</b> Abattoir and meat packaging plant for domestic grocery chain and other retail markets.</p> <p>Specialised high value international markets for prepared offal.</p>	<p>Change of work organisation from vertical to table processing.</p> <p>Incremental improvements to workflows and attention to skill gaps.</p>	<p>Substantial council support for capital works programs.</p> <p>Transport hub for product distribution.</p>	<p>In-house for process workers. Some on-site training and assessment to relevant national standards (mainly Cert 1 &amp; 2).</p> <p>Most non-accredited in-house training uses national standards for skill based classification.</p> <p>Trade training for maintenance staff.</p>	<p>Variety of local RTOs for assessment and accredited on-site training.</p> <p>TAFE for maintenance trades.</p>
<p><b>Flavourtech</b> Food technology developed from needs of wine industry but now generalised across most processed food types.</p> <p>Unique product for global markets One-off / jobbing production of individual units of specialised machinery based on core design. Primarily Global market.</p>	<p>Unique process. Original applied science &amp; technology but now depends on incremental development.</p> <p>R&amp;D using in-house developmental experience and expertise.</p>	<p>Technology originally from CSIRO and further developed at regional university wine centre.</p> <p>Manufacturing side developed from the supply needs of regional wine industry.</p>	<p>University engineering and chemistry graduates.</p> <p>Trade training (via apprenticeships) in the production workshop.</p> <p>Substantial experiential learning at both professional and trade production levels.</p>	<p>No relevant university courses in region.</p> <p>TAFE trade training for workshop/production facility.</p>
<p><b>Precision Parts</b> Light manufacturing. OEM Automotive</p> <p>National and Global Markets.</p>	<p>Process/production engineering.</p>	<p>Location at transport hub.</p>	<p>In-house for process workers Traditional apprenticeship.</p>	<p>TAFE training through Group Apprenticeship for trades. Other skilled recruitment organised and formally trained as required by Group Training &amp; Employment Services RTO.</p>
<p><b>Temora Aviation Museum</b> Tourism site to support vintage aircraft maintenance and restoration.</p> <p>National, state, local and international specialised tourism.</p>	<p>Primarily entrepreneurial and marketing.</p>	<p>Significant local support from council and community groups.</p> <p>Volunteers at all levels (pilots and guides).</p>	<p>Engineering &amp; aircraft trades recruited outside region. Apprentices now taken.</p> <p>Substantial experiential learning for old airframes and engines.</p>	<p>Reliance on recruitment of experienced skilled staff from general aviation.</p> <p>Recent use of TAFE apprenticeship for aircraft trades.</p>
<p><b>Wine industry (Riverina general)</b> Beverage/Wine Local and global markets Generally high volume production by large 'brand names'.</p> <p>Almost exclusively irrigated vineyards.</p>	<p>Quality and consistency of product in high volumes based on applied science and technology in both viticulture and winemaking.</p>	<p>Transport hub-advantage for high volume production.</p>	<p>Mobility of qualified winemaking staff; qualifications plus experience.</p> <p>Mixture of in-house and on-the-job training</p> <p>Seasonal labour and on-the-job training in viticulture. Some use of national credentials.</p>	<p>Local wine science centre at regional university. Other interstate colleges at TAFE level and above.</p> <p>Nationally recognised training packages available.</p>

