Economic Development Study – Murray Region

Final Report

Professor Mark Morrison, Professor John Hicks,
Associate Professor Tom Murphy

31 May 2018

Contents

Executive Summary

Researchers from Charles Sturt University were commissioned by Federation Council, working with four other Local Governments Areas (LGA) in the Murray Region – Berrigan, Edward River, Greater Hume and Murray, to undertake a regional development study to support the development of operational and strategic plans for improving the regional economy. The work was supported by Regional Development Australia, Murray Region. The research has received co-funding from the NSW Government through its Energise Enterprise Fund, and also from Charles Sturt University.

The project involved a number of components:

- A literature review of the entrepreneurial ecosystem and regional economics literatures to identify the factors relevant for evaluating ecosystems, and the factors influencing regional economies;
- An analysis of Australian Bureau of Statistics employment and population data;
- A regional economic analysis conducted with assistance from the Western Research Institute. This included a shift-share analysis, a critical industries analysis, analysis of changes in specialisation, and identification of location quotients;
- An analysis of business innovation based on Regional Australia Institute data;
- A survey of n=148 respondents who are knowledgeable of the ecosystems in each LGA;

Literature review

The literature review has two main components. First is a review of the entrepreneurial ecosystems literature. The elements of a rural entrepreneurial ecosystem are explained which include institutions; culture; infrastructure; demand; networks; leadership; finance; talent; knowledge; and support services. We explain how a number of these elements can be developed through entrepreneurial method leadership. The second component is a review of the regional economics literature, including traditional theories of regional development and new regional development paradigms. For both the entrepreneurial ecosystems literature and the regional economics literature, we explain how these literatures inform the design of our survey questionnaire.

Analysis of Australian Bureau of Statistics employment and population data

An analysis of Australian Bureau of Statistics employment and population data was conducted to show changes in the five LGAs between 2011 and 2016. Concerningly, this analysis revealed declines in employment based on *place of work* of between 15.9% to 22.1% across the five LGAs, in contrast to a 5.6% growth in employment across the state. Employment based on place of work refers to workers employed in the LGA regardless of where they are a resident. An alternative measure, employment based on place of

residence, refers to employed workers resident in the LGA regardless of the region in which they are employed. Employment based on *place of residence* has declined in all LGAs apart from Murray, and by not nearly as much as the place of work data indicates (from -1.5% to -5.8% per LGA). This suggests that people are finding work elsewhere (e.g. in Victoria) and/or that more people used to travel to the LGAs studied for work from other areas but this has now declined. Unemployment is increasing in all areas apart from Murray, overall up from 4.3 to 4.7%. The decline in employment appears to parallel changes in the working age population. Between 2011 and 2016 there has been a decline in the population of those aged 30-54 years in Berrigan, Edward River and Federation of between 4-8%, with corresponding decreases in those below 19 years of age, suggesting an outward migration of households with dependent children.

Regional economic analysis

The most important industries in terms of employment were Agriculture, Forestry and Fishing; Health Care and Social Assistance; Retail Trade; Transport, Postal and Warehousing; Construction; Public Administration and Safety; Accommodation, Food and Beverage Services; and Education. The industry with the greatest decline in employment was Agriculture, Forestry and Fishing. A range of other industries also had job losses of at least 50 employees per LGA. *The components of employment decline* as established through shift-share analysis indicted that local competitive factors exacerbated the decline in employment in all industries in all regions except for the Federation Council LGA where positive local factors mitigated the decline in Food, Beverage and Tobacco Manufacturing that was occurring because of negative industry mix factors. *Examination of location quotients* indicated that across the five regions the majority of employment losses over 50 were in industries that primarily served the LGA. *Both backward and forward linkages, and their spread,* were important in exacerbating employment declines in most LGAs. That is, employment losses in one industry were multiplied because of that industry's interactions with other industries. *Specialisation in employment* across the LGAs studied is low.

Business innovation

Four traditional research and development (R&D) and science based measures of innovation were reported for each LGA as well as four other "business dynamo" measures of innovation and entrepreneurship. These results produced some positive findings, including the moderate to high percentage of owner-managers, moderate to high IP protection, and the proportion of R&D managers in some areas. However, the results highlight several issues, including low to moderate access to knowledge resources to support innovation, low to moderate availability of technical expertise, and significantly low rates of business start-ups.

Survey

A survey of n=148 people who were knowledgeable of the business ecosystem in each Local Government Area (LGA) was conducted. The results indicated that irrigated agriculture, tourism, engineering and food manufacturing were seen to be the industries that the region is most known for. The main sources of comparative advantage noted by respondents were being a good place to live, the natural environment, irrigated agriculture, and having a secure water supply. Various forms of traditional infrastructure such as schools, medical care and hospitals, professional support services, and the road network were seen to be reasonably adequate or better, and infrastructure was overall not seen to constrain business or innovation. In addition, a modestly positive culture in relation to entrepreneurship was noted.

However, the operating environment for businesses overall rated on average as 5.4 out of 10. Businesses on average report that they are not going through a strong growth phase, and unemployment is perceived as rising. This is consistent with the findings reported from ABS data and the regional economic analysis.

A number of factors were identified as negatively affecting the business operating environment. These were:

- A lack of local entrepreneurial leadership, deal brokers and mentors to support the development of entrepreneurship and start-ups;
- Limited business networks;
- Limited cooperation between businesses and realisation of value chain opportunities, or other opportunities to work together;
- Significant skills shortages, particularly people with strong technical and managerial skills;
- Low awareness of business support opportunities, and a perceived lack of support programs;
- Lack of warehouse and factory space in some LGAs;
- Poor mobile phone and internet access in some LGAs;
- Lack of political capital such as access to politicians, government institutions and industry associations;
- Lack of access to innovative forms of finance.

Further, it was noted that there were few migrants working in the region, as well as few people moving to the region for work.

Local government was seen as limited in its ability to assist investment and doing business in the region and civic leaders were generally regarded as only moderately supportive of business.

Two different statistical analyses that examine the factors most closely related to perceptions of the quality of the business operating environment are presented in Appendix 1. The first analysis highlights the importance of encouraging positive attitudes towards

entrepreneurship, developing the supply of skilled employees, encouraging strong business networks, improving perceptions of civic leadership, developing access to innovative finance and developing a critical mass of experienced and supportive entrepreneurs to assist new entrepreneurs. The second analysis highlights the importance of developing value chain infrastructure (i.e. businesses that non-core activities can be outsourced to, complementary business and/or potential value chain partners, warehouse and factory space) and secondly skills infrastructure (i.e. availability of people with strong managerial and technical skills)

To assist in developing the operational plan for regional development, respondents evaluated 17 different development strategies. The two most popular were creating and strengthening business networks and assisting businesses with digital readiness. However, there was not much difference in average ratings for the top 15 rated options, suggesting that respondents were generally supportive of most of the proposed strategies, but were collectively unable to differentiate the most preferred alternatives. Consequently, as the operational plan for regional development was created, this was based on the analysis of which aspects of the ecosystem need strengthening, which are most important in terms of overcoming constraints on growth, and the cost and ease of implementing the strategies.

Operational Plan and Community Meetings

A draft operational plan for improving regional development in the region was developed based on the findings of this report. The operational plan was discussed in two community meetings held in Corowa and Deniliquin, and changes were made to the plan based upon that feedback, as well as separate feedback received from project partners. The feedback received from the community meetings is presented in Appendix 2 of this report. The final operational plan is provided in a separate document that accompanies this report.

Acknowledgements

The support of Dr Paul Forbes in providing research assistance for this project; Dr Gary Saliba from RDA - Murray in helping to develop and conceptualise this project; and the help provided by staff from each of the participating local councils – including Kim Parker, Jane Reynolds and Greg Aplin from Federation, Merran Socha from Berrigan, Michelle Cobb from Edward River, Margaret Killalea from Greater Hume, Rebecca Hayward and Stephen Pykett from Murray; is all gratefully acknowledged.

The support of the NSW Government and Charles Sturt University in assisting with funding for this project is also gratefully acknowledged.

Abbreviations used in this report

ABS – Australian Bureau of Statistics

BL – Backward Linkage

BS – Backward Spread

CARS – Coefficient of Absolute Regional Specialisation

CoE – Compensation of Employees

CRRS – Coefficient of Relative Regional Specialisation

CSF – Competitive Share Factor

CV – Coefficient of Variation

EML – Entrepreneurial Method Leadership

FL – Forward Linkage

FS – Forward Spread

FTE – Full Time Employed

GOS – Gross Operating Surplus

IMF – Industry Mix Factor

IO – Input Output

LGA – Local Government Area

LQ – Location Quotient

NEG – New Economic Geography

RDA – Regional Development Australia

RIS – Regional Innovation System

SA4 - Statistical Area Level 4 region

VC – Venture Capital

WRI – Western Research Institute

1. Literature Review

1.1 Introduction

A literature review has been undertaken to provide a summary of background knowledge pertinent to stimulating economic activity and jobs growth. The literature review draws on both entrepreneurial ecosystems literature and the regional/economic development literature.

The entrepreneurial ecosystems literature relevant for classifying and developing rural ecosystems has been summarised in Miles and Morrison (2016, 2017). Here the authors describe the elements of an entrepreneurial ecosystem, evidence for their importance, and strategies that can be pursued to develop ecosystems in small rural communities such as exist in the current context. The framework developed for these papers was used as the basis for the development of the majority of the questions included in the business survey used in this project. The questions were designed to understand the current state of each of the elements of the entrepreneurial ecosystem, and preferences for various policy options that emerge from this literature. The second of these papers is included as an appendix to this report.

This report also reviews the regional/economic development literature as it is relevant to understanding how to stimulate economic activity and encourage jobs growth. This literature review draws heavily from Paul Collits' 'Approaches to Regional Development'. The findings from the Collits' literature review are used to derive additional questions for the questionnaire that forms the key component of this study.

This review follows Collits in dividing the literature into two categories. These are:

- Traditional Theories of Regional Development.
- New Regional Development Paradigms since the 1980s.

Each of the theories/paradigms will be discussed in turn and will be linked to the questions related to that theory in the survey.

1.2 Entrepreneurial Ecosystems Literature

Miles and Morrison (2016 and 2017) summarise the entrepreneurial ecosystems literature relevant to supporting the growth of rural communities. In doing so they propose a conceptual model showing the actions that can be undertaken to support growth in jobs and economic activity in rural communities, and the mechanisms through which these outcomes are achieved (see Figure 1). The following represents a brief summary of the content from Miles and Morrison (2017) to which the interested reader is directed for further detail.

Miles and Morrison (2017) take the position that the challenges faced by entrepreneurs in rural locations sometimes can be overcome by entrepreneurial leadership implemented by

enterprising individuals. This style of leadership proposed in their model is based on the principles of entrepreneurship and is termed entrepreneurial method leadership (EML). EML suggests that leadership follows a process whereby the enterprising leaders use effectuation logic to either create or discover attractive opportunities to proactively exploit by leveraging innovation and risk. EML occurs when leaders first consider what means they can control – who they are; what are the region's community capitals; who they know (not what they wish to achieve) and who they can partner with to mutual advantage; what they can afford to risk; perceive and exploit contingencies and serendipity as opportunities; and create some form of entrepreneurial ecosystem that helps constructively shape the region's future. Examples include the creation of North Carolina's Research Triangle science park, the development of regional areas of Kansas using Sirolli's enterprise development model; the transformation of the tourist centre of Cairns into an Australian start-up hub, and Australia's Barrosa Valley's rural ecosystem.

Rural communities face various constraints – geographic, social, market, finance, and knowledge proximity are related to the ability to discover, access and exploit rent generating opportunities. The challenge for rural communities is to devise effective ways to access or develop these systemic ecosystem conditions, as well as take advantage of their community captials, which can and often do include natural resources and the primary industries that they support. This type of development requires a different approach than leadership simply organizing to exploit the resources (e.g. mineral or agricultural resources) that are currently present; it requires EML.

Rural entrepreneurial ecosystems are critically *place-based* and often more like the 19th century frontier entrepreneurial ecosystems where wealth is based largely on natural capital endowments, *and the effective application of technology,* such as Australia's meat and livestock industry, or its Barrosa Valley's wine and food sector. The notion that a rural entrepreneurial ecosystem is primarily situated in place is useful in understanding how it should be managed and developed.

Therefore, the purpose of the Miles and Morrison (2016 and 2017) papers is to articulate the key place-based contextual issues and interrelationships relevant for rural entrepreneurial ecosystems, and the policy implications that result. In doing so, Miles and Morrison (2016 and 2017) adapt Stam's (2015) model of entrepreneurial ecosystems to better reflect the diversity and challenges of a rural context.

Stam (2015) suggests that the factors that make up an entrepreneurial ecosystem remain largely the same at all levels of analysis, from a national level to a metro/urban area, to a rural region and include: (1) ecosystem elements – inputs of framework and systemic conditions – that are the antecedents to entrepreneurial activities; (2) outputs – that are the antecedents to system wide value creation; and (3) outcomes – that renew and revitalise the ecosystem's framework and systemic conditions. Exogenous framework conditions include: (i) institutions; (ii) culture; (iii) infrastructure; and (iv) demand; while the

endogenous systemic conditions include: (i) networks; (ii) leadership; (iii) finance; (iv) talent; (v) knowledge; and (vi) support services.

While Stam's (2015) offers a typology offers a generalised typology of entrepreneurial ecosystems, there are four deficiencies when using it in a rural context. First, and most critical, some framework conditions such as market demand, entrepreneurial culture, and infrastructure in rural entrepreneurial ecosystems are largely taken as exogenous to an ecosystem; that is, they are fixed and cannot be altered. However, in practice these are often endogenous and can be created or developed and therefore are more usefully classified as systemic conditions.

Second, for entrepreneurship to occur in any context there also must be an *enterprising individual*, the entrepreneurial actor who sees opportunities either as: (1) recognising the opportunity to innovate through making businesses more efficient, effective and profitable; or (2) recognising opportunities to disrupt the existing market through radical innovation. While Stam's model incorporates various framework conditions such as culture and demand that encourage entrepreneurial activity, it does not explicitly include this essential actor who may be less abundant in rural contexts, thus requiring focused efforts to develop the number of active entrepreneurs.

Third, Stam's (2015) model fails to incorporate what it is often the most distinct factor that in the 19th century enabled productive entrepreneurship in rural regions (and which in the rapidly urbanised 21st century, and when leveraged with knowledge and technology, may be critical again) – that of regional *natural capital endowments*. These include: (1) sub-soil capital (i.e. mineral resources and water); (2) soil/above-soil capital that includes (a) timber and non-timber forest watershed and recreational resources; (b) arable land; (c) rivers, lakes, and seacoasts; (d) renewable energy resources; and (3) protected natural and heritage areas.

Fourth, and most critical is that Stam's (2015) model understates the most necessary, but most insufficient condition required for a rural entrepreneurial ecosystem to facilitate productive entrepreneurship – that of leadership. With the challenges previously discussed, rural regions need the impetus of EML to create and develop an entrepreneurial ecosystem. Rather than being a fixed systemic factor, as in Stam's (2015) model, Miles and Morrison (2017) argue that it is the primary exogenous driver of the condition of rural entrepreneurial ecosystems.

Thus the Miles and Morrison (2017) conceptual model, which is presented in Figure 1, incorporates two missing elements in Stam's (2015) model: natural capital and enterprising individuals. In addition, the rural entrepreneurial ecosystem development model reflects that while local systemic and framework conditions may be fixed, certain systemic conditions can be developed via EML through external linkages. This is true even if the relevant actor is not principally located within the region. Hence in the model, one framework condition (demand) and three systemic conditions (networks, knowledge, and

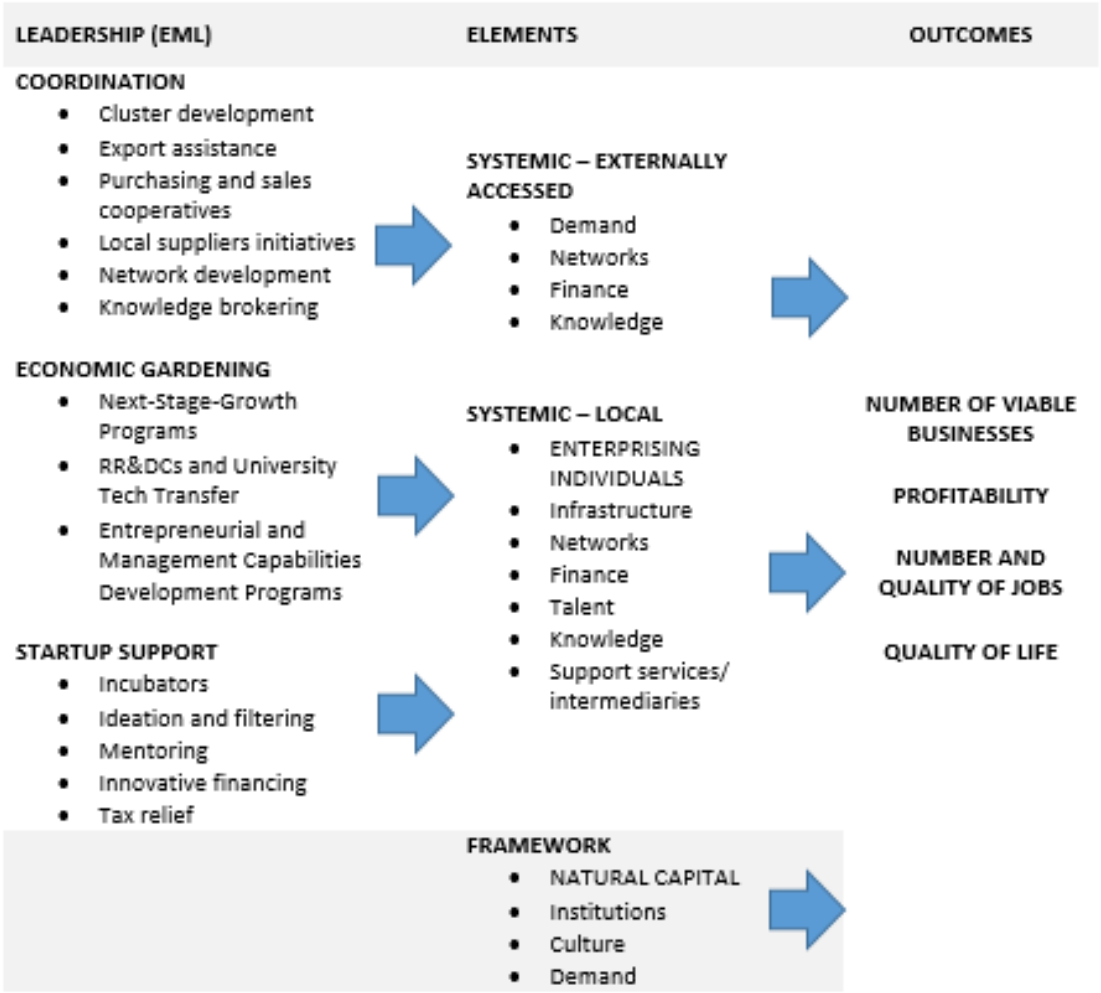
finance) are identified as systemic – externally accessed conditions. These framework and systemic conditions lead to outcomes such as viable businesses and jobs and can be influenced by a range of development activities that Miles and Morrison (2017) describe later in their paper, and can also be seen in Figure 1. The model emphasises the importance of leadership and specifically EML to rural entrepreneurial ecosystem development.

Survey Questions Drawn from the Entrepreneurial Ecosystems Literature

Many of the questions in the questionnaire draw on the recommendations from this literature. The questions consider factors critical for influencing the success of entrepreneurail ecosystems – especially in rural areas. Specifically:

- Question 1, 7 and parts of 9 focus on the availability of entrepreneurial leadership;
- Question 2 and parts of 9 and 10 examine the availability of support services;
- Question 5 considers the availability and adequacy of traditional infrastructure;
- Question 6 and parts of 10 focus on the availability of human capital and skills;
- Question 9 and parts of 10 examine networks and social capital;
- Question 9 asks about the availability of finance;
- Question 12 draws out factors constraining growth, which are based on key aspects of an entrepreneurial ecoystem;
- Question 13 considers the effect of various capitals, which include key elements of an ecosystem.

Figure 1: Model of Rural Entrepreneurial Ecosystem Development



Source: Miles and Morrison (2017)

1.3 Traditional Theories of Regional Development

Traditional theories are extensions of location theories into regional development theories. Location theories are concerned with business choices to locate in a particular place. By extension regional development theories can then suggest ways to influence businesses to locate in particular places. The main traditional theories are:

1.3.1 Transport Costs

Transport cost theory maintains that businesses choose a location for their operation which minimises their transport costs. For example a business which uses bulky raw material inputs to produce much smaller weight/volume outputs will minimise transport costs by locating near the raw material inputs. This theory can be developed into a regional development theory by, for example, proposing constructing transport infrastructure which reduces the transport costs of a particular location.

1.3.2 Agglomeration Economies

Agglomeration economies theory maintains that businesses choose to locate in close proximity to other businesses because there are a range of economies to be gained even without overt co-operation between those businesses. For example, customers for one business may also be customers for other proximate businesses so a sale for one business may also result in a sale for other proximate businesses. The regional development implications of this theory could be, for example, establishing business parks where firms can locate together.

1.3.3 Growth Poles

Growth poles are lumpy nodes of growth that can have both positive and negative effects for the regional development of the surrounding region. A growth pole has a positive "spread effect" if the growth of the node stimulates growth of the surrounding region through, for example, multiplier effects. The positive spread effects are achieved purely by businesses being located close to each other. There is no suggestion of collaboration or linkages between businesses. A growth pole can also have a negative "backwash effect" if the growth node sucks economic activity away from the smaller centres in the surrounding region. This leads some growth nodes to be labelled "sponge cities". The economic development extension of this theory is identifying ways to tap into the dynamism of any growth poles while developing strategies to manage the backwash effects.

1.3.4 Central Place Theory

Central place theory maintains that the growth of an urban centre or of a business is in part determined by the demand for goods and services by its hinterland and surrounding centres. In the case of an urban centre the hinterland and surrounding centres also determines its industry mix. The regional development extension of this theory is firstly to determine how much of the hinterland/surrounding centre demand is currently captured by the centre or business. If it is found that a significant proportion of this demand is not captured then the regional development strategy is to recommend ways to increase the captured proportion by, for example, setting in train a buy local campaign.

1.3.5 Supply Side Theory

Supply side theory maintains that the growth of a region is determined by its factor endowments or competitive advantage. The factor endowments of a region are its relative mix of resources such as land, labour and capital. Competitive advantage is a more modern concept and refers to an advantage that a business has over its competitors, allowing it to sell more or secure better margins than its competitors. The regional development extension of this theory is to identify any under-utilised factor endowments and then develop strategies to more effectively utilise the endowments and enhance the competitive advantage of local businesses. This could be achieved by for example support programs for local business.

1.3.6 Basic Industries

Basic industries are industries that derive the majority of their income from outside the region. Earlier regional development theory argued that basic industries underpinned the local economy and were the reason that economic activity occurred in the region at all. While this view is no longer widely held, basic industries do bring additional money into a region so that supporting basic industries can be part of a regional development strategy.

1.3.7 Cumulative Causation

Cumulative causation theory is a more dynamic version of growth poles theory. Essentially the theory maintains that a region can have a virtuous cycle of upward momentum where most businesses are expanding or there can be a vicious spiral of downward momentum where most businesses are contracting. The regional development extension of this theory is to identify what cycle a region is in and then develop strategies to either take advantage of an upward cycle or arrest a downward spiral.

1.3.8 Innovation

In traditional regional development theory innovation does play a role. However, the emphasis is on technological innovation and is measured in technology terms such as the number of patents produced by a region.

1.3.9 The New Economic Geography

The so called “New Economic Geography” (NEG) theory provides an explanation for the observed phenomena of increasing economic activity in larger centres. In Australia economic activity is concentrating in capital cities while in the rest of Australia economic activity is concentrating in larger urban centres at the expense of smaller urban centres. The NEG explains this phenomena by linking agglomeration economies with transport costs. For regional development theory the NEG identifies a phenomena that must be acknowledged when developing strategy.

1.3.10 Summary

Traditional theories have typically generated regional development strategies that are:

- Based on physical assets such as building a new road to reduce transport costs.
- Are top down in the sense that they are driven by the government agency that prepared the strategy.
- Expensive because of the emphasis on providing new physical assets and the administrative cost of running a centralised top down strategy.
- Identify drivers of regional development that are difficult to do anything about. For example an isolated region may not be able to do much about its transport costs or demand from its hinterland and agglomeration economies may be impossible to achieve.

Overall development strategies based on traditional theories have been typically assessed as expensive with under-whelming results. However, traditional theories may contribute to

an overall strategy and so question 11 and some parts of questions 16 in the Murray Regional Development Survey are derived from traditional theories.

1.4 New Regional Development Paradigms since the 1980s

The new regional development paradigms maintain that regional development is determined by less tangible assets such as knowledge, creative people, shared norms, entrepreneurship, collaboration, clusters, access, connectivity and pipelines to brain hubs. The main new paradigms are:

1.4.1 Globalisation and the Knowledge Economy

Drucker, Gilbert, Romer and others see knowledge, innovation, personalised market offerings and adaptive capacity as the drivers of regional development in the global economy. These qualities may arise from the local economy or may be secured by establishing links with brain hubs from other regions. In this paradigm innovation to enable more cooperation and collaboration within and across regional boundaries is generally more important than technical innovation.

1.4.2 Endogenous Growth Theory and Human Capital

Endogenous growth theories also focus on the link between growth and knowledge but extend this link to human capital so that human capital is seen as a key driver of regional development. Applying these theories to regional development requires the assessment of education in the region as well as assessment of the links between education and regional jobs and the extent to which the community is engaged in lifelong learning. Enhancing these aspects of education, according to this theory, would enhance regional development.

1.4.3 Human Capital and the Creative Class

Richard Florida's theories specify the type of human capital that enhances regional development. It is creative human capital which can be linked to the arts in all of its forms such as music, painting, writing and new technology. Extending these theories to regional development suggests that regional strategies should aim to develop a good "people climate" rather than a good "business climate". The good people climate that will attract creative people is one based on "3 Ts" technology, talent and tolerance. The theory maintains that businesses will thrive in regions that exhibit the 3Ts and have creative people and that such regions will also attract new businesses.

1.4.4 The New Regionalism

New Regionalism specifies the type of knowledge that enhances regional development. According to this theory it is the dense network of informal, tacit knowledge that is important. Examples of this knowledge include "who supplies the best quality and cheapest inputs" and "who provides the most reliable demand for particular products". Most important of all is the knowledge of national and international supply chains and a presence in those supply chains. This theory leads to the concept of the "global city region" where a

region is not a bounded territory but exhibits sets of relationships that may extend throughout the nation or even the globe. The regional development implication of this theory is to support businesses extending their horizons and profile beyond the local region.

1.4.5 Social Capital and Institutional Theories

Social Capital and Institutional theories maintain that social capital and regional institutions impact on regional development. Social capital includes tacit knowledge, networks, norms, including non-codified norms, civic entrepreneurship such as building an entertainment centre and collaboration between government agencies both within and between regions. Regional institutions include chambers of commerce, regional development organisations and industry groups. The regional development implication of these theories is to increase regional social capital and strengthen regional institutions.

1.4.6 Clusters

The concept of "Clusters" is an extension of the "Growth Pole" concept. With growth poles, businesses passively gain competitive advantage by co-location with other businesses. With clusters, businesses work closely together with other like businesses, with their customers and with their suppliers. Specifically in a cluster, businesses gain competitive advantage by developing strong formal and informal sideways, backwards and forwards linkages. It is further argued that businesses outside the cluster cannot match the competitive advantage that members of the cluster have secured. The regional policy implication of this concept is that turning growth poles into clusters or strengthening the linkages of an existing cluster will enhance regional development. There is some consensus that working with an existing cluster is more likely to achieve positive results than trying to create a new cluster.

1.4.7 Regional Innovation Systems

Regional Innovation Systems (RIS) extends the concept of innovation beyond simply patents and inventions. RIS provides a means of assessing the extent to which innovation permeates businesses and community in a particular region. Issues considered in this assessment include:

- Currency of local professionals.
- Local council administrative and managerial capacity.
- Platforms for the internal exchange of ideas.
- The proportion of younger people in the population.
- Extent of overseas travel by residents.
- The overall level of qualifications.
- The proportion of residents who have lived elsewhere.
- The proportion of creative people in all fields including arts, computers, science etc.

The regional development extension of this concept is to use the RIS assessment to identify ways that the RIS can be enhanced thus resulting in additional regional development.

1.4.8 Economic Gardening and Higros

Economic Gardening refers to assisting existing businesses in a region. It is contrasted with "hunting" or "smokestack chasing" which is trying to attract business from outside the region. The latter approach is generally regarded as old regional development thinking. Once gardening is the chosen strategy the next question is which local businesses should be assisted. There are two separate theories here. One favours new start-ups. The other supports existing fast growing, often young, businesses called "gazelles" or "higros". The regional development extension of these theories is to set up mechanisms to assist either local start-ups or higros.

1.4.9 Community Economic Advantage

Community economic advantage is an added dimension to economic gardening in that the local community is involved in developing strategies and actions to assist local business to further economic development. The ownership and collaboration that can be achieved through local community involvement can mean that local assets are more effectively mobilised to achieve regional development.

1.4.10 Summary

The new regional development paradigms since the 1980s suggest regional development strategies that are:

- Based on less tangible assets such as knowledge, collaboration and innovation.
- Typically bottom up in the sense that they are driven by local business and communities rather than government agencies.
- Based on assets that can be changed within a reasonable budget and timeframe.
- Based on research to effectively use scarce regional development resources.
- Typically in need of funding that is consistent with the more limited funding that government typically offers for regional development.

Overall economic development strategies based on the new paradigms are generally seen as more successful than those based on traditional theories. However, no one theory is always successful and usually a combination of approaches is required with the selection dependent on the current situation of a region and its community preferences. In the Murray Region Survey some of questions 12, 13, 14, 15 and 16 are derived from the new regional development paradigms.

References

Miles, M. and Morrison, M. (2016). The Elements of Entrepreneurship Ecosystems in Regional Areas and Options for their Development. *Paper prepared for the Startups and Regional Ecosystems Challenge at the Sustainable Economic Growth for Regional Australia (SEGRA) Conference, Albany, WA, 24-26 October 2016.*

Miles, M. and Morrison, M. (2017). An Entrepreneurial Method Leadership Model for the Development of Rural Entrepreneurial Ecosystems. Under review (revised and resubmit) at *Journal of Small Business Management*.

Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique, *European Planning Studies, 23*(9), 1759-1769.

A full bibliography concerning the regional economics theories discussed above can be found in Paul Collits' "Approaches to Regional Development – A Much Longer Review of the Literature" in https://www.academia.edu/28382414/Approaches_to_Regional_Development_A_Much_Longer_Review_of_the_Literature.

2. Employment Changes Between 2011 and 2016

2.1 Summary

In this section of the report the changes in employment and unemployment across the five LGAs between 2011 and 2016 are detailed.

There has been a decline in employment based on *place of work* of between 15.9% to 22.1% across the five LGAs. This combines full time employees and part time employees, and assumes that two part time jobs equals one full time job (ABS standard assumption). Employment based on place of work means people surveyed are employed in the LGA. This contrasts with employment based on *place of residence* where the issue is whether or not the resident is employed regardless of the location of their job.

The 2016 data for change in employment based on place of work uses ABS Labour Force Survey data and not 2016 Census data as the latter is not available. The place of residence data are all from the 2011 and 2016 censuses, so have greater correspondence.

Employment based on *place of residence* has declined in all LGAs apart from Murray, and by not nearly as much as the place of work data indicates (from -1.5% to -5.8% per LGA). This suggests people are finding work elsewhere (e.g. in Victoria) and/or that more people used to travel to these LGAs for work but this has declined.

Unemployment is increasing in all areas apart from Murray, overall up from 4.3 to 4.7%.

The total labour force is declining (down 0.8%) and the participation rate is declining – total not looking for work has increased by 3.5%.

The decline in employment appears to parallel changes in the working age population. Between 2011 and 2016 there has been a decline in the population of those aged 30-54 years in Berrigan, Edward River and Federation of between 4-8%, with corresponding decreases in those below 19 years of age suggesting an outward migration of households with dependent children (see Figure 2). However, in these areas there has been substantive increases in the population aged 20-29 years.

Note:

* The data on employment based on place of work was provided by the Western Research Institute and is based on 2011 ABS Census data and on the ABS 2016 Labour Force Survey. As two different approaches were applied to collect these data, there is the prospect that some inaccuracies have been introduced. However, these sources represent the best available data. In addition, a process to concord 2006 and 2011 LGAs to represent newly merged 2016 LGAs of Edward River, Federation Council, Murray River and Snowy Valleys was undertaken. See Section 4 for additional details.

Table 1: Employment Changes

		Berrigan	% Change	Edward River	% Change	Federation	% Change	Greater Hume	% Change	Murray	% Change	Total	% Change
Using ABS Census for 2011 and *ABS Labour Force Survey data for 2016* - based on place of work *													
Full Time Equivalent Employed	2011	2472		3262		4589		3198		3493		17014	
	2016	2079	-15.9%	2706	-17.0%	3838	-16.4%	2694	-15.8%	2721	-22.1%	14038	-17.5%
From 2011 and 2016 ABS Census data - based on place of residence													
Total Full Time	2011	2076		2393		3202		1982		3008		12661	
	2016	1895	-8.7%	2306	-3.6%	2936	-8.3%	1869	-5.7%	3080	2.4%	12086	-4.5%
Total Part Time	2011	1071		1184		1570		372		1442		5639	
	2016	1132	5.7%	1270	7.3%	1648	5.0%	442	18.8%	1582	9.7%	6074	7.7%
Total Full Time equivalent employed (=FT + 0.5*PT)	2011	2612		2985		3987		2168		3729		15481	
	2016	2461	-5.8%	2941	-1.5%	3760	-5.7%	2090	-3.6%	3871	3.8%	15123	-2.3%
Total Unemployed	2011	158		156		247		193		118		872	
	2016	165	4.4%	200	28.2%	257	4.0%	223	15.5%	113	-4.2%	958	9.9%
Total Labour Force	2011	3570		4011		5372		4753		2752		20458	
	2016	3450	-3.4%	4011	0.0%	5222	-2.8%	4835	1.7%	2767	0.5%	20285	-0.8%
Unemployment Rate	2011	4.4%		3.9%		4.6%		4.1%		4.3%		4.3%	
	2016	4.8%		5.0%		4.9%		4.6%		4.1%		4.7%	
Total Not Looking for Work	2011	2687		2491		4016		2571		1521		13286	
	2016	2864	6.6%	2520	1.2%	4049	0.8%	2695	4.8%	1629	7.1%	13757	3.5%

Figure 2: Population Changes by Age Group, from 2011 to 2016

3. Results from Economic Analysis of Australian Bureau of Statistics Data

3.1 Statistical measures

In examining the employment performance of the six LGAs in this study we adopt a number of measures conventionally employed when examining the dynamics of change operating across geographic regions. The measures include: location quotients (LQ); the coefficient of absolute regional specialisation (CARS); shift-share analysis and indices of backward and forward linkages and their spread of these linkages.

3.1.1 Location quotient (LQ)

Location quotients are given by the ratio of an industry's share of employment in the region to that industry's share of employment in the state or

$$LQ_{ij} = \frac{E_{ij}/\sum E_{ij}}{E_{is}/\sum E_{is}}$$

Where *E* = employment; *i* = an industry sector; *j* = the region and *s* = the state. Thus LQ is a measure of concentration of the industry in the region relative to the concentration of the industry in the state. Blackwell et al. (2017, p.330) argue that, as a general interpretation, an LQ of greater than 1.25 indicates that employment in the industry in the region is 'increasingly driven' by exports from the region. The logic of this is that if all regions were only meeting their own needs from all industries then the concentration of any the industry in any region would be the same across all regions and this would be the same as for the state. Under these circumstances, LQ for each industry would equal one. This implies that where LQ is greater than one in a region, the region must be more than meeting its own needs and thus exporting. (By the same analysis, an LQ of less than one implies that the region relies on imports from a given industry.)

3.1.2 Coefficient of absolute specialisation (CARS)

There are a number of measures of employment specialisation including the coefficient of absolute regional specialisation (CARS), the coefficient of relative regional specialisation (CRRS) and the coefficient of regional specialisation (CRS). For a discussion of each see Hicks et al. (2014). The first of these, CARS, provides an indication of whether or not employment in the region has become more or less specialised relative to what the structure of employment in the region had previously been (regardless of any change in the distribution of employment in the state as a whole). The measure is an absolute measure of specialisation for the region which can be compared over time and across regions and is given by

$$CARS = \frac{\left[\sum_{j=1}^{n}\left(E_{ij} - \bar{E}_{ij}\right)^2/(n-1)\right]^{1/2}}{\bar{E}_{ij}}$$

Where n = number of industries. An increase in CARS over time for a region indicates that the region has become relatively more specialised in its employment structure. Similarly, a higher value for CARS in one region compared with another indicates that employment is specialised in the first region. Previous analysis (Hicks et al., 2014) has shown that, in Australia, increased specialisation is associated with more favourable labour market outcomes.

3.1.3 Shift-share analysis

Employment growth in an industry in a region can be divided into a number of component parts

$$G_{ij}^{t} = G_{0s}^{t} + (G_{is}^{t} - G_{0s}^{t}) + \left(G_{ij}^{t} - G_{is}^{t}\right)$$

where G = growth rate, *t* = time and *0* = all industries. This equation tells us that the growth rate in a particular industry in a region is given by the sum of (a) the state growth rate for all industries plus (b) the difference between the specific industry growth rate in the state less the growth rate for all industries in the state – known as the industry mix factor (IMF) and (c) the difference between the growth rate in the specific industry in the region and the growth rate in that industry in the state – known as the competitive share factor (CSF). Importantly, CSF indicates the extent to which the growth performance of an industry in a region is being impacted by local factors. Where CSF is positive, the industry is performing better in the region than in the state because of local factors, however, a negative value for CSF indicates the reverse – that is, the industry in the region is performing less well than the industry in the state because of local factors.

3.1.4 Linkages

An extensive discussion of the following material is found in West (1999). For any industry (*k)*, we can calculate the magnitude of its backward linkage using the formula for the backward linkage index (BL)

$$L_{kjt} = \frac{n \sum_i b_{ikjt}}{\sum_i \sum_k b_{ikjt}}$$

where *b* = coefficients of the Leontief Inverse and indicate the impact of a unit change in employment in industry *k* on employment in each industry, *i,* supplying industry *k*. If $L_{kjt} > 1$, investment in industry *k* yields above average multiplier effects in the region *j* and where $L_{kjt} < 1$ below average multiplier effects result from investment in industry *k* in the region *j*.

By analogy, a forward linkage index (FL) is given by

$$\vec{L}_{ijt} = \frac{n \sum_k \vec{b}_{ikjt}}{\sum_i \sum_k \vec{b}_{ikjt}}$$

The FL indicates the employment increase in those industries *k* whose employment increases as the result of an increase in employment in industry *i.* Above average multiplier effects are experienced for $\vec{L}_{ijt} > 1$ and below average effects are experienced when the index is less than one.

In addition to the values of BL and FL, the impact that changes in employment in a particular industry (*j*) will have in the region will be influenced by the spread of the linkages. For any industry *k*, the backward spread index (BS) is given by

$$V_{kt} = \frac{nCV_{kt}}{\sum_i CV_{kt}}$$

where *CV* is the coefficient of variation. The lower the value of V_{kt} the greater the industry spread of the linkage impact. A forward spread index can also be developed.

3.1.5 Data sources

The data on which this report is based was provided by the Western Research Institute for the Local Government Areas (LGAs) within the NSW SA4 Murray Region and the following discussion is based on the approach they reported.

Linkage Analysis

The linkage analysis was conducted using regional models represented by input-output tables. The input-output tables for this project were created from the Australian Bureau of Statistics (ABS) national input-output table using the Generation of Regional Input-Output Tables (GRIT) technique. This required three steps: (1) the construction of the Australian input-output table as at 2015-16; (2) the construction of the NSW state table from the Australian national table; and (3) the generation of 6 LGA tables from the state table.

Australian Input-Output Table 2015/16

The National Input-Output table and Full-Time Equivalent (FTE) Employment by Industry for 2014-15 was downloaded from the ABS and aggregated to WRI's 32 sector model (ABS Cat. No. 5209.0.55.001 release date 16/6/2017). Employment was updated to 2015-16 using the Australian Labour Force Survey applying the ABS convention that one part-time is equal to 0.5 full-time. (ABS Cat. No. 6291.0.55.003 release date 22/6/2017). Compensation of Employees (CoE) and Gross Operating Surplus (GOS) data for 2015-16 was extracted from the Australian National Accounts (ABS Cat. No. 5220.0 release date 18/11/2016). CoE and GOS data for mining and manufacturing was further disaggregated into lower level sectors based on the Australian Industry data for 2015-16 (ABS Cat. No. 8155.0 release date 26/05/2017). The Australian National IO Table was validated against the Australian National Accounts for 2015-16 (ABS Cat. No. 5220.0). Minor adjustments to sectoral parameters were made where necessary to ensure correspondence with superior data.

State Input-Output Tables

FTE employment data for the states was calculated using a combination of: (a) place of work employment data sourced from the 2011 ABS Census for each of the LGAs; (b) the proportion FTE and growth rates calculated using the most appropriate Labour Force Region data (ABS Cat. No. 6291.0.55.003 release date 22/6/2017); and (c) mining sector adjustments based on average weekly earnings (ABS Cat. No 6302.0 and 6306.0 release date 19/1/2017). An iterative 3 step process was applied to calculate the growth rates applied to the LGA data. Step 1 required the selection of the appropriate Labour Force Region for each LGA. Step 2 required the determination of an aggregate growth rate based on 4 quarter averages for the relevant periods. Step 3 required the identification of abnormally high or low growth rates and adjustments based on an analysis of other Labour Force Region data in the time series. The updated census data for each of the states and territories were aggregated and compared to the total Australian Labour Force data.

It should be noted that the Australian Labour Force data is collected using a household survey whilst data in the IO table reflects place of work. As a result the Australian Labour Force data will not correspond to the updated census data for the states. Therefore, the Australian Labour Force data was re-apportioned to the states based on the employment weighting of each state. The new state employment data was re-apportioned to each of the LGAs based on the employment weighting of each LGA. Following the procedure for Australia, the state CoE and GOS data for 2015-16 was extracted from the Australian National Accounts: State Accounts (ABS Cat. No. 5220.0 release date 18/11/2016). CoE and GOS data for mining and manufacturing was further disaggregated into lower level sectors based on the Australian Industry data for 2015-16 (ABS Cat. No. 8155.0 release date 26/05/2017).

Intermediate sector output per FTE from the 2015-16 Australian IO table was used to calculate the state intermediate sector outputs. The IO Table for NSW was validated against the Australian National Accounts: State Accounts for 2015-16 (ABS Cat. No. 5220.0). Minor adjustments to sectoral parameters were made where necessary to ensure correspondence with superior data.

LGA Input-Output Tables

Employment for each of the LGAs was estimated when calculating the state employment data. Using the place of work 2011 Census data, CoE for each of the LGAs was estimated using the ratio of CoE for LGA compared with the state CoE. Intermediate sector output per FTE from the 2015-16 State IO table was used to calculate the LGA intermediate sector output. Tables were validated against higher order state tables.

Shift-Share Analysis

A shift-share analysis separates employment growth between the state economy, industry mix and local components and identifies industries that have grown at a faster or slower rate than state and industry averages. Shift-share analysis was performed to determine the relative strengths of the Local Government Area (LGA) economies as defined within the

Murray Statistical Area Level 4 (SA4) region, based on the past and current employment growth performance of the respective LGAs. The shift-share analysis has been conducted by place of employment using Census data for 2011 and Labour Force Survey detailed quarterly data for 2016. Industries at the two digit ANZSIC code were examined and aggregated to WRI 32 Sector level. A process to concord 2006 and 2011 LGAs to represent newly merged 2016 LGAs of Edward River, Federation Council, Murray River and Snowy Valleys was undertaken.

3.2 Findings

3.2.1 Overview

The statistics described above were applied to ABS data drawn from each of the six LGAs. In order to focus on the key issues, the data reported here is confined to the following:

(a) The change in total employment in the region which indicates the extent of the problem with which the LGA is confronted. In each case there were significant falls in employment levels between 2011 and 2016 (compared with a 5.6% growth in state employment over the period) which ranged across the LGAs investigated from -15.76% to -22.12%.

(b) The top ten employing industries in the LGA, and their employment levels in both 2011 and 2016, are reported in order to ascertain the important industries in the LGA. The importance of Agriculture, Forestry and Fishing is obvious as this industry ranks first in all LGAs except Edward River where it ranks second (and then only because of the decline in agricultural employment over the period). The rankings of other industries across the LGAs is mixed, however, the following industries ranked in the top ten for each LGA: Health Care and Social Assistance; Retail Trade; Transport, Postal and Warehousing; Construction; Public Administration and Safety; and Accommodation, Food and Beverage Services.

Education was in the top ten for each LGA except Federation Council.

Industries that made it into the top ten for at least one LGA were: Food Beverage and Tobacco Manufacturing (in 3 LGAs); Electricity, Gas, Water and Waste Services (1); Wholesale Trade (3); Petroleum, Coal, Chemical and Rubber Product Manufacturing (1); Fabricated Metal Product Manufacturing (1); Professional, Scientific and Technical Services (1); and Arts and Recreation Services (1).

Thus, only about half of the 32 industry sectors available to us placed in the top ten employers in any LGA.

(c) The largest declines in employment is what we next turned our attention to in order to identify the industries which accounted for the largest declines in employment in each LGA. As might be expected, Agriculture, Forestry and Fishing dominated – accounting for the largest, or second largest fall in employment in each LGA.

Other industries which accounted for the loss of at least 50 jobs in an LGA were: Food Beverage and Tobacco Manufacturing (in 1 LGA); Education and Training (5); Professional, Scientific and Technical Services (1); Health Care and Social Assistance (2); Retail Trade (2);

Other Services (4); Accommodation, Food and Beverage Services (3); Administrative Support Services (1): Finance and Insurance Services (1).

Employment increases were observed in Construction and in Transport, Postal and Warehousing in all LGAs.

(d) The components of employment decline as established though shift-share analysis indicated that local factors exacerbated the decline in employment in all industries in all regions except for the Federation Council LGA where positive local factors mitigated the decline in Food, Beverage and Tobacco Manufacturing that was occurring because of negative industry mix factors. Interestingly, the major regional industry of Agriculture, Forestry and Fishing exhibited a decline in all LGAs notwithstanding the fact that the industry was growing in the state and important in terms of the industry mix. That is, in this industry factors providing for growth were swamped by negative local factors in every LGA.

(e) Industry types can be identified on the basis of shift-share analysis and doing so emphasises the point made above. Type I is an industry in which all the growth components are positive. Type II is an industry in which only the CSF growth component is negative. Type III is an industry in which both the CSF and IMF components are negative. Finally, type IV is an industry in which only the IMF growth component is negative. Of the industry declines that exceeded 50 or more, 15 were in type III industries, 10 in Type II industries and one in a Type IV industry. Thus more than a third of the observed falls in employment across the LGAs resulted from local factors.

(f) Examination of location quotients indicated that across the five regions the majority of employment losses over 50 were in industries that primarily served the LGA. Of the observations of declines in employment above 50, only 11 were in industries that have a substantial export component.

(g) Both backward and forward linkages, and their spread, were important in exacerbating employment declines in most LGAs. Only 7 of the observed declines in excess of 50 took place in an industry that did not have both above average backward and forward linkages with a broad spread.

(h) Specialisation in employment across the LGAs studied is low. It is also rising in all but one LGA. However, this should not be regarded as a good thing (as would normally be the case) as it is resulting from declining employment across the board rather than growing employment in industries in which the LGAs are specialising.

3.2.2 Berrigan

Data on the major employers for Berrigan are presented in Table 2 (Part B). Data on a variety of other aspects for Berrigan are presented in Table 2 (Part A).

(a) The change in total employment in Berrigan is around the average for the communities we are looking at. However, at a decline of over 15% over five years, it must be a concern for the region.

(b) The top ten employing industries in the LGA is headed by Agriculture, Forestry and Fishing. This industry is the largest employer in 5 out of the 6 LGAs studied (it ranks second in Edward River). Underscoring the similarity of the economies of these regions is the fact that all of the top 10 industries in Berrigan are also ranked in the top 10 in most of the other LGAs.

(c) The largest declines in employment for Berrigan have been in Accommodation, Food and Beverage Services (which is the industry with the largest employment decline in 5 out of the 6 LGAs). The second biggest decline was in Agriculture, Forestry and Fishing. The decline in Education and Training is also significant and may reflect a number of worrying factors – including the loss of young people from the region. Of the four industries recording a loss of 50 or more jobs in Berrigan, three were in the list of Berrigan's most important employers.

(d) The components of employment decline indicate that CSF is dominant. However, in two industries growing strongly at state level (Construction and Transport Postal and Warehousing) Berrigan performance is stronger than it is at state level.

(e) Industry types in decline are primarily Type III where the industry in the LGA is performing even worse than the same industry at state level. However, the one Type II – an industry in which regional growth is negative notwithstanding growth of the industry in the state – is the major industry of Agriculture, Forestry and Fishing.

(f) Examination of location quotients indicate that one of the industries performing well in the LGA (Transport, Postal and Warehousing) has an export orientation and can therefore support other activity in the region. However, unfortunately the two largest industries in decline are also export oriented and one can expect their decline to be associated with reasonably strong multiplier effects.

(g) Both backward and forward linkages, and their spread support the second point made in (f) have large backward and forward multipliers with a broad spread. Thus the decline in these industries spread readily to other industry in the LGA.

(h) Specialisation in employment has declined in Berrigan. It would be good to see this reversed – provided the reversal reflected the acquisition of new and vibrant industry in the LGA.

Table 2: Berrigan

Part A

	2011-2016	No.	Gi0	IMF	CSF	Type	LQ	BL	BS	FL	FS	Rank
Industries experiencing falling employment												
Accommodation, Food and Beverage Services	-33.33 %	-108	-9.76%	-15.38%	-23.57%	**III**	*	*		*		4
Agriculture, Forestry and Fishing	-16.58 %	-90	10.62 %	4.99%	-27.20%	**II**	*	*		*		1
Education and Training	-41.19 %	-78	-3.15%	-8.78%	-38.04%	**III**		*		*		7
Other Services	-56.50 %	-61	4.99%	-0.63%	-61.49%	**III**		*		*		
Industries experiencing rising employment												
Construction	56.03 %	67	29.46 %	23.84%	26.56%	**I**		*				6
Transport, Postal and Warehousing	65.86 %	101	16.34 %	10.71%	49.52%	**I**	*	*		*		2

NSW Growth = 5.62%
Regional Growth = -15.91%
CARS 2011 = 0.072
CARS 2016 = 0.05

Part B Major Employing Industries

	2011	2016
Agriculture, Forestry and Fishing	545	455
Transport, Postal and Warehousing	153	254
Health Care and Social Assistance	287	242
Accommodation, Food and Beverage Services	324	216
Retail Trade	241	193
Construction	119	186
Education and Training	189	111
Public Administration and Safety	86	78
Food, Beverage and Tobacco Manufacturing	62	62
Wholesale Trade	61	51

3.2.3 Edward River

Data on the major employers for Edward River are presented in Table 3 (Part B). Data on a variety of other aspects for Edward River are presented in Table 3 (Part A).

(a) The change in total employment is a slightly greater percentage fall than has been recorded in some of the other LGAs.

(b) The top ten employing industries in the LGA is similar to other LGAs except for the inclusion of Electricity, Gas, Water and Waste Services and the fact that the highest ranked employer is Health Care and Social Assistance.

(c) The largest declines in employment have been in Education and Training and in Agriculture, Forestry and Fishing – although larger percentage declines have been experienced in the services sector (a pattern common to all LGAs with the possible exception of Murray Shire). Of the 7 industries that have experienced a decline of at least 50 jobs, 5 were among the 10 largest employers in the region.

(d) The components of employment decline indicate that local factors are important – especially in the services sector.

(e) Industry type analysis indicates that there are three industries contributing a loss of 50 or more jobs in the LGA which are growing at the state level.

(f) Examination of location quotients indicates that only 3 of the industries with losses in excess of 50 jobs are export oriented. The other 4 are primarily servicing the local community.

(g) Both backward and forward linkages, and their spread tend to be important in all of the major employment loss industries with the exception of Finance and Insurance Services which has a low backward linkage and a high forward linkage with a narrow spread.

(h) Specialisation in employment has increased in this LGA over the period. But this is not a result of the establishment of new exporting industries, but rather the result of a decline in the employment levels of support industries whose activities can no longer be supported by the economic structure of the area.

Table 3: Edward River

Part A

	2011-2016	No.	Gi0	IMF	CSF	Type	LQ	BL	BS	FL	FS	Rank
Industries experiencing falling employment												
Education and Training	-42.19%	-102	-3.15%	-8.78%	-39.04%	**III**		*		*		6
Agriculture, Forestry and Fishing	-19.49%	-99	10.62%	4.99%	-30.10%	**II**	*	*		*		2
Retail Trade	-20.48%	-86	-7.64%	-13.27%	-12.84%	**III**	*	*		*		3
Accommodation, Food and Beverage Services	-30.32%	-68	-9.76%	-15.38%	-20.57%	**III**		*		*		7
Other Services	-60.46%	-67	4.99%	-0.63%	-65.45%	**III**		*		*		
Health Care and Social Assistance	-11.24%	-55	8.57%	2.95%	-19.81%	**II**	*	*		*		1
Finance & Insurance Services	-59.85%	-51	8.30%	2.68%	-68.15%	**II**				*	*	
Industries experiencing rising employment												
Construction	22.16%	38	29.46%	23.84%	-7.30%	**II**		*				5
Transport, Postal and Warehousing	76.81%	98	16.34%	10.71%	60.47%	**I**	*	*		*		4

NSW Growth = 5.62%
Regional Growth = -17.06%
CARS 2011 = 0.016
CARS 2016 = 0.086

Part B Major Employing Industries

	2011	2016
Health Care and Social Assistance	493	438
Agriculture, Forestry and Fishing	510	411
Retail Trade	420	334
Transport, Postal and Warehousing	128	226
Construction	173	211
Public Administration and Safety	223	197
Accommodation, Food and Beverage Services	223	155
Education and Training	242	140
Food, Beverage and Tobacco Manufacturing	134	114
Electricity, Gas, Water and Waste Services	100	100

3.2.4 Federation Council

Data on the major employers for Federation Council are presented in Table 4 (Part B). Data on a variety of other aspects for Federation Council are presented in Table 4 (Part A).

(a) The change in total employment in Federation Council is a little greater than that experienced in Berrigan and Greater Hume Shire, but generally less than that experienced elsewhere. However, it is still far too high to feel comfortable about the future of the LGA.

(b) The top ten employing industries in the LGA are similar to those of other LGAs in the study with the exception of the role played by Petroleum, Coal, Chemical and Rubber Product Manufacturing. This industry is the seventh ranked in the region and has exhibited comparatively stable employment levels over the period.

(c) The largest declines in employment have been in those industries that have also ranked high in other LGAs. However, Federation Council recorded the largest number of industry sectors to lose 50 or more workers.

(d) The components of employment decline again point to the role played by local factors which in all but one case have contributed more to employment loss. The exception is Food, Beverage and Tobacco Manufacturing.

(e) Industry type analysis shows that Food, Beverage and Tobacco Manufacturing is a Type IV industry with the regional performance being one of growth as opposed to the general decline across the state.

(f) Examination of location quotients however indicates that only 3 of the industries experiencing the loss of 50 or more jobs were industries which had an export orientation. Five of the industries primarily served the local region.

(g) Both backward and forward linkages, and their spread indicate that the results in part (f) can be attributed to the high and significant spread of linkages (both backward and forward) of those export oriented industries that have experienced significant declines in employment.

(h) Specialisation in employment has increased in Federation Council, but this is clearly due to the decline in non-core industries rather than a rise in core – or exporting – industries.

Table 4: Federation Council

Part A

	2011-16	No.	Gi0	IMF	CSF	Type	LQ	BL	BS	FL	FS	Rank
Industries experiencing falling employment												
Accommodation, Food and Beverage Services	-35.00%	-216	-9.76%	-15.38%	-25.24%	III	*	*		*		4
Agriculture, Forestry and Fishing	-18.51%	-136	10.62%	4.99%	-29.13%	II	*	*		*		1
Education and Training	-46.99%	-111	-3.15%	-8.78%	-43.84%	III						
Other Services	-60.49%	-80	4.99%	-0.63%	-65.47%	III						
Retail Trade	-19.30%	-77	-7.64%	-13.27%	-11.65%	III						5
Food, Beverage and Tobacco Manufacturing	-13.00%	-69	-22.25%	-27.88%	9.25%	IV	*	*		*		2
Administrative & Support Services	-65.69%	-60	10.44%	4.81%	-76.13%	II						
Professional, Scientific & Technical Services	-41.69%	-51	31.57%	25.95%	-73.27%	II						
Industries experiencing rising employment												
Construction	46.03%	88	29.46%	23.84%	16.57%	I		*				6
Transport, Postal and Warehousing	54.05%	149	16.34%	10.71%	37.71%	I	*	*		*		3

NSW Growth = 5.62%
Regional Growth = 16.37%
CARS 2011 = 0.014
CARS 2016 = 0.101

Part B Major Employing Industries

	2011	2016
Agriculture, Forestry and Fishing	737	601
Food, Beverage and Tobacco Manufacturing	533	464
Transport, Postal and Warehousing	276	425
Accommodation, Food and Beverage Services	618	402
Retail Trade	398	321
Construction	191	279
Petroleum, Coal, Chemical and Rubber Product Manufacturing	291	273
Health Care and Social Assistance	301	252
Wholesale Trade	168	168
Public Administration and Safety	171	159

3.2.5 Greater Hume Shire

Data on the major employers for Greater Hume Shire are presented in Table 5 (Part B). Data on a variety of other aspects for Greater Hume Shire are presented in Table 5 (Part A).

(a) The change in total employment for Greater Hume Shire is among the lowest of the LGAs studied. But at over -15% it is still very large and of concern.

(b) The top ten employing industries in the LGA include, in first position, Agriculture, Forestry and Fishing. Of the 6 LGAs, Greater Hume Shire employs more people in this industry than any of the others. Indeed the industry makes up a greater proportion of the region's employment than is the case for any other LGA. As a consequence, employment in other industries tends to be lower than is the case for the other LGAs. It is most unusual for an industry employing less than 100 workers to make it into the region's top 10 employers, but in Greater Hume Shire this is the case for both Fabricated Metal Product Manufacturing and Professional, Scientific and Technical Services.

(c) The largest declines in employment have taken place in Agriculture, Forestry and Fishing and in Education and Training.

(d) The components of employment decline data indicates that local factors have played the greatest role employment decline.

(e) Industry type analysis indicates that this is especially true for Agriculture Forestry and Fishing as this industry has grown at the state level which makes the industry a Type II in this LGA.

(f) Examination of location quotients reveal that Agriculture, Forestry and Fishing is the only export industry to experience a decline of over 50 jobs.

(g) Both backward and forward linkages, and their spread indicate that the decline in Agriculture, Forestry and Fishing has had a significant spill over into other industries leading to employment losses there.

(h) Specialisation in employment has also increased in this LGA reflecting the decline in non-core industries.

Table 5: Greater Hume Shire

Part A

	2011-2016	No.	Gi0	IMF	CSF	Type	LQ	BL	BS	FL	FS	Rank
Industries experiencing falling employment												
Agriculture, Forestry and Fishing	-23.10%	-218	10.62%	4.99%	-33.71%	**II**	*	*		*		1
Education and Training	-48.54%	-147	-3.15%	-8.78%	-45.39%	**III**		*		*		4
Other Services	-63.13%	-59	4.99%	-0.63%	-68.12%	**III**		*		*		
Industries experiencing rising employment												
Primary Metal and Metal Product Manufacturing	20.46%	10	-11.76%	-17.38%	32.22%	**IV**			*			
Construction	28.65%	94	29.46%	23.84%	-0.81%	**II**		*				2
Transport, Postal and Warehousing	74.77%	128	16.34%	10.71%	58.43%	**I**	*			*		3

NSW Growth = 5.62%
Regional Growth = -15.76%
CARS 2011 = 0.013
CARS 2016 = 0.106

Part B Major Employing Industries

	2011	2016
Agriculture, Forestry and Fishing	944	726
Construction	327	421
Transport, Postal and Warehousing	171	299
Retail Trade	228	200
Health Care and Social Assistance	217	179
Education and Training	303	156
Public Administration and Safety	148	128
Accommodation, Food and Beverage Services	153	108
Fabricated Metal Product Manufacturing	65	70
Professional, Scientific & Technical Services	102	69

3.2.6 Murray River Shire

Data on the major employers for Murray River Shire are presented in Table 6 (Part B). Data on a variety of other aspects for Murray River Shire are presented in Table 6 (Part A).

(a) The change in total employment in Murray River Shire involves the largest percentage reduction in our study.

(b) The top ten employing industries in the LGA include, in first place, Agriculture, Forestry and Fishing. However, ranked second, is Accommodation, Food and Beverage Services which is the highest this industry sector has been ranked across our sample. Murray River Shire employs more people in this industry than any other LGA. Another feature of the Murray River economy is the importance of Arts and Recreation Services. It is the only LGA to have this industry in its top 10.

(c) The largest declines in employment in Murray River Shire have, unfortunately, also taken place in Accommodation, Food and Beverage Services which has lost more jobs than any other industry in any other LGA.

(d) The components of employment decline indicate that although Accommodation, Food and Beverage Services is a declining industry across the state, local factors have certainly provided for a worse performance in this LGA.

(e) Industry types however, indicate that local factors have impacted even more on Agriculture, Forestry and Fishing and Health Care and Social Assistance – both of which are growing at the state level and therefore are reported as Type II industries for Murray River Shire.

(f) Examination of location quotients reveals that both Accommodation, Food and Beverage Services and Agriculture, Forestry and Fishing are export oriented industries in Murray River Shire.

(g) Both backward and forward linkages, and their spread have meant that the decline in employment in the region's export industries has flowed quickly into a decline in employment in non-core industries in Murray River.

(h) Specialisation in employment has risen as a result.

Table 6: Murray River

Part A

	2011-2016	No.	Gi0	IMF	CSF	Type	LQ	BL	BS	FL	FS	Rank
Industries experiencing falling employment												
Accommodation, Food and Beverage Services	-39.79%	-298	-9.76%	-15.38%	-30.04%	III	*	*		*		2
Agriculture, Forestry and Fishing	-23.06%	-195	10.62%	4.99%	-33.67%	II	*	*		*		1
Education and Training	-47.78%	-112	-3.15%	-8.78%	-44.63%	III		*		*		9
Health Care and Social Assistance	-26.99%	-57	8.57%	2.95%	-35.56%	II		*		*		6
Industries experiencing rising employment												
Construction	17.05%	28	29.46%	23.84%	-12.41%	II		*				5
Transport, Postal and Warehousing	57.94%	89	16.34%	10.71%	41.60%	I				*		3

NSW Growth = 5.62%
Regional Growth = -22.12%
CARS 2011 = 0.078
CARS 2016 = 0.138

Part B Major Employing Industries

	2011	2016
Agriculture, Forestry and Fishing	846	651
Accommodation, Food and Beverage Services	748	450
Transport, Postal and Warehousing	153	242
Retail Trade	236	206
Construction	162	190
Health Care and Social Assistance	210	153
Arts and Recreation Services	148	148
Public Administration and Safety	146	136
Education and Training	235	123
Wholesale Trade	87	86

References

Blackwell, B.D., McFarlane, J.A., Fischer, A.M. and Dollery, B.E. (2017) 'Diversifying cores but stagnant peripheries: mining and other industry employment contributions to development in local government areas of the Northern Territory', *Economic Papers*, 36(3), pp. 317-334.

Hicks, J.; Basu, P.K. and Sherley, C. (2014) 'The impact of employment specialisation on regional labour market outcomes in Australia', *Australian Bulletin of Labour*, 40(1) pp. 68-90.

West G.R. (1999) 'Structural change in the Queensland economy: an industry analysis', *Economic Analysis and Policy*, 29, pp. 27-51.

4. Innovation across Local Government Areas

Data were sourced from Dr Kim Houghton of the Regional Australia Institute about innovation in the study area. The data were sourced from both the 2011 Census and 2014-15 patents/trademarks data.

As shown in Table 7, more traditional research and development (R&D) and science based measures of innovation were identified, as well as other "business dynamo" measures of innovation and entrepreneurship developed by Dr Houghton.

Table 7: Traditional Measures of Innovation and Business Dynamo Measures of Innovation and Entrepreneurship

Traditional R&D and Science Measures of Innovation	Business Dynamo Measures of Innovation and Entrepreneurship
Human resources in science and engineering (share in labour force)	New business entries as a proportion of total businesses, 2010-2014
Research & development managers (share in labour force)	Owner-managers as a proportion of total employed persons
Registered research services providers	Trademark applications, average annual per 10,000 working age population
Patent applications (2003-13 per 10,000 working age population)	Knowledge-intensive business services, employees per 10,000 working age population

These measures were available for the eight LGAs that existed prior to the council amalgamations. Note that Conargo and Deniliquin combined to become Edward River LGA, and Corowa and Urana combined to become Federation LGA. In Tables 8 and 9 these have been shaded to indicate their amalgamation.

First, Table 8 presents the traditional R&D and science measures of innovation, and a summary index, by LGA. Overall the best ranked LGAs were Conargo and Urana, who were both in the top 15% of LGAs overall. Both of these councils did well in terms of patent applications, and Urana did well in terms of R&D managers. Corowa also ranked well in terms of R&D managers as a share of the labour force, and was ranked in the top third overall. The remaining councils ranked approximately mid-range in terms of these traditional measures of innovation. Notable are the low ranks for most LGAs for research service providers, suggesting a lack of knowledge resources, and also the low to mid ranks for most LGAs human resources in science and engineering, suggesting a lack of technical expertise.

Table 8: Traditional R&D and Science Measures of Innovation by LGA

	Science and Engineering		R&D Managers		Research Service providers		Patent Applications		Innovation Index	
	Score	Rank	Score	Rank	Count	Rank	Score	Rank	Score	Rank
Berrigan	0.47	370	0.21	68	0	564	0.09	153	1.62	320
Conargo	0.42	427	0.00	224	0	564	0.26	44	2.32	72
Deniliquin	0.41	440	0.00	224	0	564	0.08	181	1.50	389
Corowa	0.59	157	0.36	31	1	84	0.05	292	1.84	188
Urana	0.37	477	0.48	19	0	564	0.23	47	2.32	73
Greater Hume	0.48	343	0.00	224	0	564	0.03	383	1.55	354
Murray	0.49	327	0.00	224	0	564	0.14	86	1.71	257

Note: Ranks are out of 567 LGAs, low rank number is a higher ranking i.e. a better rank; scores are normalised values (to between 0 and 1).

With respect to the business dynamo measures of innovation and entrepreneurship, Conargo ranked best overall, and was ranked in the top 10% of LGAs (Table 9). This was driven by its proportion of owner-managers as a proportion of total employees, and the average annual Trademark applications per 10,000 working age population. Similarly, Urana was ranked in the top 25% of councils, driven primarily by a high percentage of owner managers and a good result for the average annual Trademark applications. However, it should be noted that the proportion of owner-managers is likely to be driven by the number of farm businesses in the LGAs.

Notable however is the mid to low ranks for the number of new business entries and the availability of knowledge-intensive business service employees. Collectively the findings from the Business Dynamo statistics suggest that there are generally good proportions of owner-businesses in the LGAs who are good at protecting their intellectual property (IP). However, there are low rates of start-ups, and lack of access to knowledge intensive services to help drive innovation and competitiveness.

In summary, there are some positive signals from these results, including the moderate to high percentage of owner-managers, moderate to high IP protection, and the proportion of R&D managers in some areas. However, the results highlight several issues, including low to moderate access to knowledge resources to support innovation, low to moderate availability of technical expertise, and significantly low rates of business start-ups.

Table 9: Business Dynamo Measures of Innovation and Entrepreneurship by LGA

	New Business Entries		Owner Managers		Trademark Applications		KIBS		Business Dynamo Index	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Berrigan	0.11	504	0.53	181	0.04	362	0.11	357	0.80	458
Conargo	0.18	406	0.83	17	0.51	24	0.06	446	1.59	48
Deniliquin	0.16	447	0.42	322	0.16	83	0.22	190	0.95	300
Corowa	0.20	380	0.42	311	0.07	208	0.09	400	0.79	468
Urana	0.19	390	0.68	61	0.31	35	0.00	493	1.18	125
Greater Hume	0.17	430	0.60	109	0.03	417	0.18	236	0.98	262
Murray	0.22	330	0.56	152	0.10	150	0.15	292	1.02	216

Note: Ranks are out of 567 LGAs, low rank number is a higher ranking i.e. a better rank; scores are normalised values (to between 0 and 1).

5. Results from the Survey

5.1 Overview of Results

- Survey of n=148 people who are knowledgeable of the business ecosystem in each Local Government Area (LGA).

- Irrigated agriculture, tourism, engineering and food manufacturing were seen to be the industries for which the region is best known.

- Being a good place to live, the natural environment, irrigated agriculture, and a secure water supply were seen to be the main sources of comparative advantage.

- Various forms of traditional infrastructure such as schools, medical care and hospitals, professional support services, and the road network were seen to be reasonably adequate or better, and infrastructure overall was not seen to constrain business or innovation.

- A modestly positive culture in relation to entrepreneurship was noted.

- However, the operating environment for businesses overall rated on average 5.4 out of 10. Businesses on average report that they are not going through a strong growth phase, and unemployment was perceived to be rising.

- Factors identified as negatively affecting the operating environment were:
    - A lack of local entrepreneurial leadership, deal brokers and mentors to support the development of entrepreneurship and start-ups.
    - Limited business networks.
    - Limited cooperation between businesses and realisation of value chain opportunities, or other opportunities to work together.
    - Significant skills shortages, particularly people with strong technical and managerial skills.
    - Low awareness of business support opportunities, and a perceived lack of support programs.
    - Lack of warehouse and factory space in some LGAs.
    - Poor mobile phone and internet access in some LGAs.
    - Lack of political capital such as access to politicians, government institutions and industry associations.
    - Lack of access to innovative forms of finance.

- A lack of migrants working in the region, as well as people moving to the region for work was noted.

- Local government was not seen to make it easy to invest and do business in the region, though civic leaders were not seen to be unsupportive of business.

- Respondents evaluated 17 different development strategies. The two most popular were creating and strengthening business networks and assisting businesses with digital readiness. There was however not much difference in average ratings for the top 15 rated options, suggesting that respondents were generally supportive of most of the proposed strategies, but were collectively unable to differentiate the most preferred alternatives.

5.2 Questionnaire Description

The questionnaire was 14 pages. It was based on a questionnaire used in an earlier study conducted by part of the research team in Cairns, but was extended for the purposes of this research.

The questionnaire was designed to provide information on the adequacy of different aspects of the entrepreneurial ecosystem (see Miles and Morrison, 2015), as well as respondents' support for 17 different development strategies.

With respect to the entrepreneurial ecosystem, questions were included to measure the following:

- Overall evaluation of the operating conditions within the ecosystem and its drivers.
- Sources of comparative advantage, and industries where there may be comparative advantage.
- Adequacy of entrepreneurial leadership, including for start-up support and mentoring.
- Adequacy of the entrepreneurial culture.
- Adequacy of business support programs and facilities.
- Adequacy of various forms of traditional and other infrastructure.
- Adequacy of human capital.
- Adequacy of business networks and social capital between businesses, including cooperation between businesses.
- Adequacy of financial capital.
- Adequacy of knowledge, including links with universities and other education providers.
- Factors constraining growth.
- Operating conditions for businesses.

5.3 Sampling Logistics

Rather than a general business survey, the survey sought to sample people with a wide knowledge of local business conditions. Consequently, sample frames of knowledgeable people in the community were provided by economic development officers from participating local governments, and staff from the Regional Development Australia Murray Office. This included people working in business development, leaders of the business chambers, and business owners.

Three trips were conducted in person to distribute questionnaires across the five local government areas, with follow up telephone calls and emails completed to encourage a high response rate. A total of 301 surveys were distributed, and 148 completed surveys were returned (see Table 10).

5.4 Sample Description

As shown in Table 10, 41 surveys were received from Berrigan LGA (27.7% of the sample), 25 from Edward River (16.9%), 23 from Federation (15.5%), 29 from Greater Hume (19.6%) and 30 from Murray (20.3%). An overall response rate of 49.2% was achieved.

Table 10: Distribution of the Sample across LGAs and response rate

Council	Distributed	Returned	Response Rate
Berrigan	68	41	60.3%
Greater Hume	76	29	38.2%
Edward River	52	25	48.1%
Federation	52	23	44.2%
Murray	53	30	56.6%
Total	**301**	**148**	**49.2%**

As shown in Table 11, some 70.9% of respondents were between 36 and 65 years, with 11.5% below 35 years, and 11.5% above 65 years of age.

Table 11: Respondent Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 35 years	17	11.5	12.2	12.2
	36-50 years	48	32.4	34.5	46.8
	51-65 years	57	38.5	41.0	87.8
	Older than 65 years	17	11.5	12.2	100.0
	Total	139	93.9	100.0	
Missing	System	9	6.1		
Total		148	100.0		

In terms of employers of respondents (see Table 12), the majority (71%) worked for privately-owned businesses and were either the owner or an employee. The next highest percentage worked in the not-for-profit sector (13%).

Table 12: Respondents' Employer

	Responses	Percent
Local Council	4	3%
RDA	2	1%
Business Chamber	4	3%
Business Enterprise Centre	1	1%
Privately-owned Business	108	71%
Not-for-profit	20	13%
Other	13	9%

5.5 Features of the Ecosystem by LGA and Across the Region

5.5.1 Potential Areas of Comparative Advantage

To assist in identifying potential areas of comparative advantage, respondents were asked about what industries their LGA and region are known for. Overall, Irrigated Agriculture and Tourism were the most commonly noted, followed by Engineering and Food Manufacturing.

There was, though, a substantial amount of variation between LGAs:

- In Berrigan, Tourism, Engineering, Food Manufacturing and Logistics were noted with similar frequency (54-59%).
- In Edward River, Tourism, Engineering and Food Manufacturing were all recognised by a similar percentage of respondents (68%).
- In Greater Hume, Irrigated Agriculture and Tourism were not frequently mentioned, while Engineering and Other Manufacturing were the most commonly mentioned.

Table 13: What Industries the LGAs and Region are Recognised for (% of respondents identifying industry)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall
Irrigated agriculture	78%	76%	78%	28%	70%	66%
Tourism	56%	68%	83%	31%	70%	60%
Engineering	54%	68%	52%	59%	43%	55%
Food manufacturing	56%	68%	70%	24%	37%	50%
Other manufacturing	44%	32%	61%	48%	37%	44%
Logistics	59%	32%	43%	31%	17%	38%
Creative industries (artists, artisans, media, theatre)	29%	16%	22%	24%	20%	23%
Energy	10%	4%	9%	7%	3%	7%
High-tech	10%	0%	0%	7%	0%	4%

In addition, respondents were asked about whether specific tangible and intangible assets were sources of comparative advantage for their area. Three items received average ratings of agree or higher. These items were “a good place to live”, “natural environment that is enjoyable to visit” and “irrigated agriculture”.

The two next most highly rated items overall were “a secure water supply” and “a cooperative business”.

No significant differences were identified across LGAs, except for irrigated agriculture.

Table 14: Sources of Comparative Advantage
(1-strongly disagree is a source, 5-strongly agree is a source)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
A good place to live	4.33	4.25	4.36	4.12	4.24	4.26	0.496
Natural environment that is enjoyable to visit	4.11	4.00	4.05	3.88	4.17	4.05	0.514
Irrigated agriculture	4.17	4.38	4.14	3.00	4.17	3.99	10.229***
Secure water supply	3.94	3.25	3.86	3.65	3.46	3.65	1.557
A cooperative business community	3.50	3.71	3.36	3.62	3.52	3.54	0.501
Innovative business	3.31	3.61	3.05	3.36	3.07	3.28	1.307
Transport for inputs and outputs	3.17	3.39	3.23	3.36	2.79	3.17	1.470
Business leadership	3.17	3.26	2.91	3.00	3.10	3.10	0.557
Skilled workforce	3.12	2.83	2.68	2.91	3.15	2.96	0.875
Proximity to large markets	2.81	3.00	3.05	3.15	2.52	2.88	1.646
Creative industries	2.89	3.04	2.77	2.71	2.90	2.86	0.444
Cultural facilities	2.89	3.09	2.68	2.56	2.97	2.84	1.458
Access to the rest of the world	2.86	2.78	2.77	2.58	2.52	2.71	0.652
Mining	1.75	1.61	1.91	2.00	1.72	1.79	0.868

5.5.2 Ecosystem Leadership

Questions were asked to identify the depth of entrepreneurial leadership within the community. The responses to these questions suggest that there is currently a lack of leadership resources.

As shown in Table 15, average ratings indicated that in each LGA there are relatively few people (less than five) who are committed to developing entrepreneurship, who are good at making connections or brokering deals, or who are actively supporting and developing new and existing businesses.

These findings are supported by the results in Table 16. These results indicate that survey respondents consider that there are not a lot of economic development leaders who are good

at making and seeking connections or supporting entrepreneurship. Apart from Edward River, average ratings are all lower than three, where three represents “neither agree nor disagree” and two represents “disagree”. Of particular concern is the lack of a critical mass of experienced entrepreneurs who are willing to mentor or support potential entrepreneurs or starts-ups. Ratings for these latter two items averaged two, which is equivalent to “disagree”.

Table 15: Local Ecosystem Leadership

(1-none, 2-a few people (less than five), 3-some people (5-10), 4-a lot of people (>10))

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Local champions such as experienced entrepreneurs or government officers who are committed to developing entrepreneurship	2.03	2.60	2.06	1.95	1.79	2.07	3.180**
People who are especially good at making connections or brokering deals between businesses	2.00	2.45	2.06	1.67	1.75	1.98	3.833***
Mentors or experienced entrepreneurs in your community who actively seek to support and develop new and existing businesses, either voluntarily or for payment	1.59	2.06	1.82	1.37	1.77	1.70	2.606**
VC or angel investors in your community who actively fund and develop new and existing businesses	1.41	1.88	1.33	1.28	1.36	1.44	2.697**

Table 16: Attitudes to ecosystem leadership
(1-strongly disagree, 3-neither agree nor disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
In my community there are economic development leaders who are good at making and seeing connections	2.78	3.32	2.50	2.79	2.83	2.84	1.804
In my community there are economic development leaders who are effective at stimulating and supporting entrepreneurship and innovation	2.57	3.18	2.26	2.57	2.79	2.68	2.690**
In our region there is a critical mass of experienced entrepreneurs willing to mentor potential entrepreneurs	1.84	2.33	1.88	2.00	2.00	2.00	1.614
In our region there is a community of start-up entrepreneurs supported by other entrepreneurs	1.81	2.19	1.94	1.95	2.04	1.97	1.016

Local entrepreneurial leadership can be provided by entrepreneurs who are experienced in running medium sized or large businesses, particularly those who have their head office in a locality. However, the results from Table 17 indicate that there are relatively few medium or large sized businesses that are headquartered in each of the LGAs.

Table 17: Presence of Larger Businesses in the Region and Within LGAs

			Berrigan	Edwards River	Federation	Greater Hume	Murray	Total
How many large businesses with more than 70 employees do you have in your region	None	Count	7	0	1	6	10	24
		% within LGA	17.9%	0.0%	4.5%	21.4%	34.5%	16.9%
	Less than 5	Count	21	17	12	16	14	80
		% within LGA	53.8%	70.8%	54.5%	57.1%	48.3%	56.3%
	6-10	Count	2	5	4	0	2	13
		% within LGA	5.1%	20.8%	18.2%	0.0%	6.9%	9.2%
	11-20	Count	1	0	2	1	0	4
		% within LGA	2.6%	0.0%	9.1%	3.6%	0.0%	2.8%
	Dont know	Count	8	2	3	5	3	21
		% within LGA	20.5%	8.3%	13.6%	17.9%	10.3%	14.8%
Total		Count	39	24	22	28	29	142
		% within LGA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

5.5.3 Business Support Services

Survey participants were asked about their awareness of various business support services in each of the LGAs. First they were asked about their awareness of incubators, business support groups, and co-working spaces (see Table 18). The highest awareness was of business support groups, though this ranged from 33-70% of respondents across the LGAs. There was almost no awareness of incubators or co-working spaces in the LGAs. Many respondents simply did not know whether these existed in the LGAs.

Respondents were then asked about whether each of the LGAs have a business chamber. There was high awareness of the business chambers in Berrigan and Edward River, and almost three quarters of respondents were aware of the business chamber in Federation, but there was a lot of uncertainty in Greater Hume and Murray about whether a business chamber existed.

Respondents were asked about how well the business chamber in their LGA functions. In Edward River and Federation, about 30% of respondents gave ratings of 4 or 5 where 5 is excellent. In Berrigan only 20% of respondents and in Murray 17% of respondents gave ratings of this level. None in Greater Hume gave a rating above four.

Table 18: Presence of Incubators, Business Support Groups or Co-working Spaces by LGA

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall
Incubators	0%	0%	0%	4.2%	4.0%	1.6%
Business support groups	50%	69.6%	44.4%	33.3%	52.0%	50.0%
Co-working spaces	2.8%	8.7%	11.1%	0%	0%	4.0%
Don’t know	47.2%	21.7%	44.4%	62.5%	44.0%	44.4%

Table 19: Presence of a Business Chamber by LGA

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall
No	0%	0%	9.1%	39.3%	37.9%	16.8%
Yes	97.5%	95.8%	72.7%	35.7%	27.6%	67.1%
Don't know	2.5%	4.2%	18.2%	25.0%	34.5%	16.1%

Table 20: How well Business Chamber Functions by LGA

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall
Poor	16.7%	5.6%	10.0%	16.7%	50.0%	15.7%
2	36.7%	11.1%	60.0%	16.7%	0%	28.6%
2.5	3.3%	0%	0%	0%	0%	1.4%
3	20.0%	50.0%	0%	66.7%	33.3%	30.0%
3.5	3.3%	0%	0%	0%	0%	1.4%
4	13.2%	11.1%	20.0%	0%	16.7%	12.9%
Excellent	6.7%	22.2%	10.0%	0%	0%	10.0%

Respondents were asked about their awareness of local or state government provided business skills training programs and overall only 54% were aware of these. There was lower awareness of the availability of other types of training programs.

Table 21: Awareness of government support programs

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	Chi2-test
Local or state government provides business skills training programs or workshops	54%	72%	57%	48%	43%	54%	5.079
Local or state government provides local purchasing support programs	2%	16%	9%	24%	10%	11%	8.609*
Local or state government provides exporting assistance	12%	4%	9%	3%	3%	7%	3.425
Local or state government provides start-up support	12%	24%	17%	3%	3%	11%	8.464*
Local or state government provides innovation programs	5%	12%	22%	14%	7%	11%	5.184
Local or state government provides - don't know	22%	12%	22%	34%	37%	26%	6.013

Lastly, respondents were asked several attitudinal questions to gain insight into their views about the adequacy of business support services. Significant differences between LGAs were identified for the first of these items “Our region has adequate business support services”. The average rating for Edward River was three, which represents “neither agree nor disagree”. The ratings overall and for each of the other LGAs were less than three, where two represents “disagree”. The average ratings for all other items were close to two, indicating a lack of the business support service specified in the item.

Overall these results suggest that there is either a lack of business support services or that communication about them could be improved.

Table 22: Other attitudes to the availability of business support services
(1-strongly disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Our region has adequate business support services	2.21	3.00	2.57	2.27	2.36	2.45	3.157**
Free or low cost management assistance is available to existing firms	2.16	2.55	1.81	2.30	2.36	2.25	1.550
In our region there is adequate access to business incubators	2.19	2.41	2.11	2.00	2.33	2.20	0.824
In our LGA there are start-up weekends, business workshops and other start-up support programs	2.06	2.29	1.71	2.04	1.79	1.99	1.360

5.5.4 Perceived adequacy of Infrastructure

For infrastructure, overall schools received the highest average rating of almost 4 out of 5 where 5 is excellent, followed by the availability of professional support services (such as legal, accounting, real estate, insurance and consulting).

Medical care and hospitals, primary and secondary road network, mobile phone and internet services all received ratings of close to three, which represents average levels of adequacy. There were some statistically significant differences between LGAs, with medical care and hospitals rated more highly in Federation and Greater Hume, the primary and secondary road network rated lower in Murray, and mobile and internet services rated lower in Edward River and Murray.

The lowest rated areas of infrastructure were air transportation and train access, warehouse and factor space (apart from in Federation), business that non-core activities can be outsourced to and complementary businesses/value chain partners. The perceived lack of other businesses in regions that businesses can work with is a particular concern, given that this is often an effective way of increasing competitiveness.

The results for infrastructure suggest that the LGAs in general have reasonable basic infrastructure in terms of health and schooling, road access, telephony/internet and professional services. However, there are issues related to transportation and warehouse and factory space, as well as having appropriate other businesses to work with.

Respondents were also asked to evaluate whether a lack of infrastructure constrains business, innovation and entrepreneurship in their region (see Table 24). The average ratings for this item were between 3 and 3.86, where 3 represents “neither agree nor disagree”, and 4 represents

"agree". The greatest agreement was in Edward River, and the least agreement was in Greater Hume.

A correlation analysis was run to identify which aspects of infrastructure were correlated with this item. The only significant correlation was with internet access, and the correlation was small ($r=0.2$, $p<0.05$).

Table 23: Perceived Adequacy of Infrastructure by LGA (1-poor, 3-average, 5-excellent)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Primary and secondary schools	3.97	3.75	4.09	4.11	3.83	3.95	0.897
Availability of professional support services (legal, accounting, real estate, insurance, and consulting)	3.39	3.65	3.50	3.63	3.41	3.50	0.350
Medical care and hospitals	3.45	2.83	3.77	3.79	3.03	3.38	4.199***
Primary and secondary road network	3.22	2.87	3.23	3.22	2.30	2.98	5.278***
Mobile phone services	3.03	2.63	3.48	3.11	2.52	2.94	2.986**
Internet access	2.76	2.33	2.90	2.96	2.54	2.71	1.536
Complementary businesses and/or potential value chain partners	2.15	2.57	2.45	2.76	2.21	2.42	1.375
Businesses are present in your region that non-core activities can be outsourced to	2.37	2.38	2.69	2.55	2.05	2.40	0.979
Warehouse and factory space	1.94	2.45	3.21	2.32	2.16	2.35	4.483***
Access to trains	1.47	1.32	2.36	2.38	1.90	1.86	5.498***
Air transportation access	1.53	1.48	2.62	2.28	1.36	1.80	6.767***

Table 24: Overall evaluation of adequacy of infrastructure by LGA (1-strongly disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
A lack of infrastructure constrains business, innovation and entrepreneurship in my region	3.41	3.86	3.55	3.00	3.32	3.41	2.081*

5.5.5 Human Capital

Table 25 presents items related to human capital. The first two items are about the availability of people with strong technical and managerial skills. In both cases, the means for all LGAs are less than "average" indicating a scarcity of people with both technical and managerial skills.

The next two items relate to migrants or people in general moving to the region for work. For both items, and for all LGAs, the means for these items are close to two or less. This indicates that there are perceptions that the number of people moving into the region is much lower than in other areas.

Table 25: Human Capital by LGA (1-much less than average, 5-much higher than average)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Available of people with strong technical skills	2.34	2.33	2.42	2.43	2.52	2.41	0.251
Availability of people with strong managerial skills	2.26	2.48	2.37	2.36	2.33	2.35	0.265
Number of migrants working in this region	2.33	2.11	1.67	1.85	2.32	2.11	2.249*
Number of people moving to your region for work	1.91	2.05	2.11	1.90	1.81	1.94	0.412

With respect to technology, respondents were neutral about whether their communities were up to speed, with average ratings of about three, with three indicating "neither agree nor disagree". Lower than average ratings were given to whether education providers were providing a supply of work ready graduates.

Table 26: Other indicators of human capital by LGA (1-strongly disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
I would describe our community as being up to speed in technology	2.95	2.67	2.73	2.93	2.76	2.82	0.440
The education providers in our region provide a supply of work-ready employees	2.47	2.55	2.41	2.75	2.73	2.58	0.563

5.5.6 Finance

Three questions were asked about the adequacy of finance in the region. Respondents had neutral views on average about the availability of debt finance. Apart from in Federation, respondents perceived there was an inability to attract equity finance from outside the region. For all LGAs there was disagreement with the proposition that there was adequate access to venture capital. Thus overall it is perceived that while there may be adequate access to traditional debt finance, there is a lack of access to other innovative forms of finance.

Table 27: Access to Finance (1-strongly disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
In our region there is adequate access to debt finance (e.g. business loans)	3.00	3.23	3.58	3.24	3.13	3.20	1.083
Our region can attract outside equity investment	2.31	2.89	3.44	2.61	2.35	2.65	4.497***
In our region there is adequate access to venture capital	2.00	2.45	2.44	2.14	1.95	2.16	1.373

5.6 Other Respondents' Attitudes to Aspects of the Ecosystem

Next are reported respondents' attitudes to several other important aspects of the ecosystem, including the general attitudes towards entrepreneurship, businesses' willingness to cooperate, attitudes to local government, and business owners' attitudes to the local operating environment.

5.6.1 Attitudes to Entrepreneurship by LGA

Table 28 presents four items related to how entrepreneurship is viewed. Respondents generally agreed that starting a business is positively viewed, but were more neutral about whether entrepreneurs are positively viewed or whether innovation is encouraged. The item with the lowest average value was whether it is regarded as OK to fail in business, though this received close to a neutral rating overall (2.82). Overall this suggest that there is a modestly positive culture in relation to entrepreneurship.

Table 28: Attitudes to Entrepreneurship

(1-strongly disagree, 3-neither agree nor disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Starting a business is positively viewed	3.74	3.63	3.67	3.81	3.58	3.69	0.306
Entrepreneurs are positively viewed	3.25	3.29	3.40	3.42	3.42	3.35	0.238
Innovation is encouraged	3.38	3.36	3.24	3.27	3.19	3.30	0.183
It is regarded as OK to fail in business, it's important to have a go and keep trying until you get it right	2.95	2.79	2.90	2.76	2.67	2.82	0.461

5.6.2 Attitudes to Cooperation by LGA

Next, Table 29 highlights perceptions of attitudes to cooperation between businesses. Average responses to businesses being happy to work together (3.42) and share knowledge (3.29) were slightly positive, being closer to a neutral rating (of three) than agreeing (a rating of four). Respondents were neutral about whether there are strong business networks in their region, and were not positive about whether businesses in their LGA would cooperate to work on larger business opportunities.

Overall these results suggest that there is some willingness of business to work together, but that social capital and cooperation between businesses is relatively weak and could be strengthened.

Table 29: Willingness to cooperate
(1-strongly disagree, 3-neither agree nor disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Businesses in our community are happy to work together	3.34	3.42	3.48	3.59	3.31	3.42	0.327
Businesses in our community are happy to share knowledge with each other	3.24	3.42	3.29	3.31	3.25	3.29	0.114
There are strong business networks in our region	2.65	3.21	2.90	3.08	2.96	2.93	1.392
Businesses in our LGA cooperate to work on larger business opportunities that they would not be able to pursue separately	2.60	2.91	2.44	2.73	2.58	2.66	1.095

5.6.3 Attitudes to Local Government by LGA

With respect to attitudes to local government (see Table 30), respondents overall had fairly neutral views about whether civic leaders are supportive of business, and about whether there is interregional cooperation between LGAs.

Of concern is that they disagreed with the proposition that local government makes it easy to invest and do business in the region. There was, however, some significant variation in this item, with values lowest in Berrigan and Murray, and highest for Edward River.

Table 30: Attitudes to Local Government
(1-strongly disagree, 3-neither agree nor disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Our civic leaders are supportive of business	2.97	3.39	3.48	3.16	3.11	3.19	0.963
There is interregional cooperation between our LGA and neighbouring LGAs	2.83	3.20	3.29	2.83	2.75	2.97	1.099
Local government makes it easy to invest and do business in our region	1.97	2.83	2.50	2.52	2.16	2.36	3.115**

5.6.3 Operating Conditions for Business by LGA

Lastly, Table 31 displays information about the operating conditions for business in each LGA and overall. Note that this question was only answered by respondents who work for, or own, a private business.

The results indicate that the item with the highest level of agreement is that a large part of the respondents' business involves local supply. A concern with this finding is that supply outside the region is critical for increasing regional income and for jobs growth.

There is some evidence presented of adoption of innovations among businesses with an average rating of 3.71 for the item "In the last year I have introduced innovations to my business." This is encouraging given the importance of innovation for competitiveness.

However, the item "My business is currently going through a phase of strong business growth" on average only received a slightly positive rating of 3.24.

Consistent with other findings related to business cooperation, the items related to working together with other businesses received the lowest average ratings.

Significantly, transport costs were not seen to be a major constraint for businesses, though there were some concerns regarding the ease of travel in and out of the region.

Table 31: Operating Conditions for Businesses (1-strongly agree, 5-strongly disagree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
A large part of my business involves supplying goods/services to local customers	3.88	3.85	3.82	3.40	3.75	3.73	0.732
In the last year I have introduced innovations to my business	3.63	3.92	3.82	3.68	3.65	3.71	0.410
The competitive advantage of my business is its innovative and enterprising approach to business	3.38	4.08	3.65	3.32	3.47	3.51	2.011*
Travel into and out of my region for business is easy	3.44	3.23	3.59	3.67	2.89	3.39	2.010*
I purchase a significant part of my business inputs from other local businesses	3.50	3.77	3.35	2.76	3.25	3.29	2.719**
Strong growth by neighbouring businesses helps my business	3.13	3.54	3.76	3.29	2.88	3.28	1.982*
My business is currently going through a phase of strong business growth	3.26	3.69	3.41	3.04	2.94	3.24	1.735
The cost of transport is a major constraint on my business	3.19	3.23	2.82	3.29	3.61	3.23	1.038
I lose business to larger sponge cities like Albury	3.19	2.69	3.29	3.12	3.33	3.15	0.782
I sell most of my output outside of my local region	2.91	3.31	2.59	3.24	2.88	2.98	
I cooperate with neighbouring businesses to reduce my transport costs	2.41	2.77	2.41	2.68	2.53	2.54	0.598
I am part of a local industry cluster where firms in the cluster work closely together with our customers and suppliers	2.38	2.75	2.41	2.25	2.35	2.39	0.520

5.7 Overall Evaluation of the Ecosystems and its Drivers

5.7.1 Evaluation of the Ecosystems

Three questions were asked to understand how the ecosystem in the region overall is performing, as well as how the ecosystem within each LGA is performing (Table 32). For the region overall, the ratings were neutral in terms of whether it has an excellent operating environment. However, respondents generally disagreed with the proposition that

unemployment in the region was decreasing. Similarly, at an LGA level on average there were neutral ratings given to the operating environment. Note that no significant statistical differences were identified for the perceived operating environment across LGAs.

Table 32: Overall Evaluation of the Business Ecosystems across LGAs and Overall

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Our **region** has an excellent operating environment for businesses [#]	3.06	3.09	3.29	3.12	2.96	3.09	0.325
Unemployment in our region is decreasing [#]	2.55	2.62	2.20	2.67	2.20	2.46	1.427
Overall rating of operating environment for businesses in your **local government area** [*]	5.31	5.66	5.35	6.00	4.92	5.43	1.301

[#]1-strongly disagree, 5 - strongly agree, [*]1 - poor, 10 - excellent

5.7.2 Perceived Factors Constraining Growth

Next we explore respondents' perceptions of what factors may be constraining economic growth.

Respondents were presented with a list of nine items that may be related to growth and asked to identify the three most and the three least important items. The top three items were each assigned a rating of one, the least three important items were assigned a rating of -1, and the three items not mentioned assigned a value of zero, and the results were averaged and are presented in Table 33.

The item that respondents thought was most important was a lack of skilled and qualified workers, which is consistent with the results presented in Table 10 on human capital. Next most important was a lack of government schemes and grants to support innovation and entrepreneurship. Too much red tape was the third most important factor, and lack of start-up support programs was the fourth most important factor.

Interestingly, lack of training on exporting was the lowest ranked factor, though from the regional economic analysis it is evident that this is one of the most important factors for achieving economic growth.

Table 33: Perceived factors influencing growth

(1=one of three most important, -1 = one of three least important)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Lack of skilled and qualified workers	0.61	0.68	0.65	0.48	0.40	0.56	0.809
Lack of government schemes and grants to support entrepreneurship and innovation	0.44	0.12	0.48	0.24	0.50	0.36	1.041
Too much red tape associated with expanding, changing my business or exporting	0.22	0.28	0.26	0.52	0.37	0.32	1.700
Lack of start-up support programs	0.07	0.12	-0.09	0.03	0.30	0.09	0.861
Lack of management support programs	-0.15	0.08	-0.09	-0.24	-0.13	-0.11	1.038
Lack of assistance from relevant rural R&D corporations	-0.07	-0.24	-0.22	-0.17	-0.33	-0.20	1.716
Lack of access to finance	-0.22	-0.48	-0.26	-0.28	-0.17	-0.27	0.754
Lack of university R&D and community engagement	-0.41	-0.16	-0.22	-0.38	-0.37	-0.32	0.865
Lack of training on exporting (either nationally or internationally)	-0.24	-0.32	-0.57	-0.28	-0.47	-0.36	0.784

Questions were also asked about how different “capitals” influence growth (see Table 34). Average ratings above two indicate that the capital facilitates growth, while ratings below two indicates that a lack of this capital inhibits growth. Of concern is that the only capital overall to have a rating above two is for natural capital endowments. Financial capital is however close to two, and above two in Federation and Greater Hume. Thus respondents indicate that a lack of various capitals is inhibiting growth.

Consistent with previous findings, the capitals most inhibiting growth are human capital, political capital and social capital.

Table 34: Effect of Capitals on Growth

(Where 1=Lack of this capital tends to inhibit innovation and entrepreneurship in my LGA, 2=This capital has no effect on inhibit innovation and entrepreneurship in my LGA, 3=This capital tends to facilitate innovation and entrepreneurship in my LGA.)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Natural capital endowments such as soil, water, minerals, and landscape	2.13	1.91	2.26	2.36	1.91	2.11	1.336
Financial capital including access to informal and formal venture capital and loans, and government grants	1.84	1.57	2.00	2.25	1.71	1.86	1.396
Built capital endowments such as physical infrastructure, transport, telephone and internet access	1.84	1.50	1.71	2.15	1.71	1.78	1.167
Cultural capital such as demographics, social norms, attitudes, and institutions such as schools, university and the chamber of commerce	1.78	1.68	1.81	2.05	1.52	1.76	0.318
Social capital such as entrepreneurial, social and professional networks	1.56	1.74	1.76	1.67	1.65	1.67	0.541
Political capital such as access to politicians, government institutions and industry associations	1.53	1.64	1.81	1.71	1.58	1.64	2.093*
Human capital such as skilled workers, adequate labour pool, and basic science, technology and vocational education	1.59	1.29	1.43	1.73	1.67	1.54	1.530

As presented in Appendix 1, factor[1] and regression[2] analyses were conducted to provide additional insights into the factors related to respondents' overall evaluation of each LGA. In the first factor analysis nine constructs were identified: networks, attitudes to entrepreneurship, civic leadership, critical mass of experienced entrepreneurs, active mentoring, supply of skilled employees, access to innovative finance and business support programs. These factors were regressed against the dependent variable of overall rating of the operating environment within the LGA. The variables that were most closely related to the rating of the operating environment were attitude to entrepreneurship, supply of skilled employees, strong business networks, and civic leadership. Also important were access to innovative finance and a critical mass of experienced and supportive entrepreneurs.

The second factor analysis sought to reduce items related to infrastructure and skills. Four constructs were identified: (1) rail and air transport, health and schools infrastructure, (2) value chain infrastructure, (3) telephony and road infrastructure, and (4) skills infrastructure. These

[1] Factor analysis is a statistical technique used to reduce related items into underlying constructs.
[2] Regression analysis is a statistical technique used to understand the effect of one or more independent variables on a dependent variable. That is, how one variable is related to a set of other variables.

items were also regressed against the overall rating of the operating environment within the LGA. The variables most closely related to the rating of the operating environment were value chain infrastructure (i.e. businesses are present in your region that non-core activities can be outsourced to, complementary business and/or potential value chain partners, warehouse and factory space) and secondly skills infrastructure (i.e. availability of people with strong managerial and technical skills).

These findings reinforce the view that skills and employee shortages, lack of business to co-create value with, business networks and social capital, and lack of a supportive environment for new entrepreneurs to emerge are the factors most influencing the state of ecosystems.

5.8 Preferences for Regional Development Strategies

Respondents were questioned about the preferences for 17 different regional development strategies. Overall, and consistent with earlier findings, the most supported strategy is the creating and strengthening of business networks. The second most supported strategy on average was assisting local businesses with digital readiness and capability.

Overall, there was not a lot of difference in support for the various strategies, with average overall responses for the top fifteen strategies differing between 3.68 and 3.89. This suggests that respondents are generally supportive of these 15 strategies.

Note that no significant statistical differences across LGAs were identified. However, the top seven rated strategies in each LGA have been bolded.

Table 35: Agreement with inclusion of the following in an economic development plan
(1-strongly disagree, 5-strongly agree)

	Berrigan	Edward River	Federation	Greater Hume	Murray	Overall	F-test
Creating and strengthening business networks	**3.97**	**3.91**	**3.65**	**3.81**	**4.04**	**3.89**	1.139
Assist local businesses with digital readiness and capability	**3.97**	3.87	3.55	**3.92**	**3.93**	**3.87**	0.858
Chasing outside firms and industries to relocate and invest in my region	3.69	**4.04**	**3.70**	**3.96**	3.68	**3.80**	0.697
Create programs for assisting individual enterprises through improving their business practices and capabilities	**3.94**	**3.88**	3.50	**3.80**	**3.75**	**3.80**	2.717
Support high tech and "new economy" businesses	**3.77**	3.83	**3.65**	3.68	**3.96**	**3.79**	0.469
Identify a significant infrastructure project to assist business in my region e.g. transportation	3.69	**4.13**	**3.72**	**3.75**	3.68	**3.78**	1.096
Support for new start-up firms	**3.80**	3.88	3.50	3.68	**3.89**	**3.77**	0.759
Support the development of specific industry clusters	3.71	**4.04**	**3.70**	3.64	3.68	3.75	
Identify measures to encourage entrepreneurship	3.71	3.74	3.50	**3.80**	**3.93**	3.75	0.655
Attract innovative forms of private capital to the region	3.69	**4.08**	3.55	3.60	**3.79**	3.74	1.320
Support for exports out of the region or overseas	**3.74**	**3.96**	**3.70**	3.65	3.68	3.74	0.487
Focus on supporting industries that sell output out of our region to bring in additional dollars	**3.91**	**3.88**	**3.65**	3.72	3.50	3.74	1.043
Support high growth firms	3.77	3.74	3.40	**3.88**	3.68	3.71	0.871
Focus on supporting businesses serving local markets thereby circulating existing dollars in the community	3.77	3.87	3.60	3.58	3.57	3.68	0.596
Develop information on potential local suppliers	3.69	3.74	3.63	3.64	3.68	3.68	0.061
Attract more public sector resources to the region	3.66	3.61	3.37	3.56	3.68	3.59	0.343
Establish mechanism to access innovative forms of finance	3.57	3.65	3.20	3.48	3.50	3.50	0.808

Appendix 1 Factor and Regression Analysis

Factor analysis is a technique used to reduce correlated variables into a set of underlying constructs. Factor analysis is often applied prior to a regression analysis because of the capacity to produce uncorrelated factors through use of what is known as a varimax rotation. Producing uncorrelated factors reduces problems associated with multicollinearity in regression analysis. Multicollinearity can lead to the presence of insignificant and incorrectly signed coefficients in a regression equation.

Principal components factor analysis was applied first to the attitudinal items presented in Tables 15, 16, 27, 28 and 29. The rotated components matrix from this factor analysis are presented in Table 36. Eight constructs were identified[3]: networks, attitudes to entrepreneurship, civic leadership, critical mass of experienced entrepreneurs, active mentoring, supply of skilled employees, access to innovative finance and business support programs. These constructs include ecosystem elements other than infrastructure or human resources.

These constructs were then regressed against the overall rating given to the business operating environment in each LGA. The results of this regression are shown in Table 37. This regression explained 41% of the variation in the dependent variable, which is satisfactory for cross-sectional data. All variables were significant regressors, though active mentoring and business support programs were only significant at $p<0.1$.

As the independent variables are standardised factor scores, the coefficients can be compared to show relative effects. The independent variables most closely associated with the overall rating of the operating environment are attitude to entrepreneurship ($\beta=0.596$), supply of skilled employees ($\beta=0.472$), strong business networks ($\beta=0.451$), and perceptions of civic leadership ($\beta=0.403$). Moderate sized effects were access to innovative finance ($\beta=0.365$) and a critical mass of experienced and supportive entrepreneurs ($\beta=0.339$).

In the second factor analysis, 12 items related to infrastructure and skills (i.e. human capital) were reduced to four constructs[4]: (1) rail and air transport, health and schools infrastructure, (2) value chain infrastructure, (3) telephony and road infrastructure, and (4) skills infrastructure.

These items were also regressed against the overall rating of the operating environment within the LGA. This regression was not as robust as the previous regression and only explained 19% of the variation in the dependent variable. In this regression, the variables most closely related to the rating of the operating environment were value chain infrastructure (i.e. businesses are present in your region that non-core activities can be outsourced to, complementary business and/or potential value chain partners, warehouse and factory space) ($\beta=0.533$) and secondly skills infrastructure (i.e. availability of people with strong managerial and technical skills) ($\beta=0.439$). Both these constructs had a significant effect at $p<0.01$. Rail and air transport, health

[3] The factor analysis explained 78% of the cumulative variance of the items analysed.
[4] This factor analysis explained 63% of the cumulative variance of the items analysed.

and schools infrastructure also had a significant effect (β=0.439, $p<0.05$), but telephony and road infrastructure was not significantly related[5] to the rating of the overall business environment.

[5] Note that the p-value for the coefficient for this variable was p=0.135. It is likely that with a larger sample that this effect would have been significant.

Table 36: Variables Associated with Ecosystem Elements – Factor Analysis (Rotated Components Matrix)

	Networks	Attitude to entrepreneurship	Civic leadership	Critical Mass of Experienced Entrepreneurs	Active Mentoring	Supply of skilled employees	Access to innovative finance	Business support programs
Businesses in our community are happy to share knowledge with each other	0.862							
Businesses in our community are happy to work together	0.856							
There are strong business networks in our region	0.592							
Starting a business is positively viewed		0.864						
Entrepreneurs are positively viewed		0.789						
Innovation is encouraged		0.683						
Our civic leaders are supportive of business			0.834					
There is interregional cooperation between our LGA and neighbouring LGAs			0.813					
Local government makes it easy to invest and do business in our region			0.699					
In our region there is a critical mass of experienced entrepreneurs willing to mentor potential entrepreneurs				0.870				
In our region there is a community of start-up entrepreneurs supported by other entrepreneurs				0.822				
VC or angel investors in your community who actively fund and develop new and existing businesses					0.869			
Mentors or experienced entrepreneurs in your community who actively seek to support and develop new and existing businesses, either voluntarily or for payment					0.826			
The education providers in our region provide a supply of work-ready employees						0.821		
I would describe our community as being up to speed in technology						0.779		
Our region can attract outside equity investment							0.832	
In our region there is adequate access to venture capital							0.766	
Free or low cost management assistance is available to existing firms								0.876
In our LGA there are start-up weekends, business workshops and other start-up support programs								0.721

Table 37: Regression Results Showing Effect of Ecosystem Elements on Overall Ratings of the Ecosystem

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.531	.123		45.012	.000
	Strong Business Networks	.451	.119	.268	3.790	.000
	Attitude to entrepreneurship	.596	.121	.349	4.941	.000
	Civic_leadership	.403	.116	.245	3.463	.001
	Critical Mass of Experienced and Supportive Entrepreneurs	.339	.132	.182	2.578	.011
	Active Mentoring	.222	.120	.131	1.856	.066
	Supply of skilled employees	.472	.123	.272	3.851	.000
	Access to innovative finance	.365	.129	.201	2.839	.005
	Business support programs	.224	.121	.131	1.845	.068

a. Dependent Variable: Overall rating of operating environment for businesses in your local government area

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.667[a]	.444	.405	1.33911

Table 38: Factor analysis 2 – infrastructure and skills variables only (Rotated Components Matrix)

	Rail and air transport, health and schools infrastructure	Value chain infrastructure	Telephony and road infrastructure	Skills infrastructure
Access to trains	0.777			
Medical care and hospitals	0.770			
Air transportation access	0.641			
Primary and secondary schools	0.635			
Businesses are present in your region that non-core activities can be outsourced to		0.843		
Complementary businesses and/or potential value chain partners		0.796		
Warehouse and factory space		0.664		
Mobile phone services			0.810	
Primary and secondary road network			0.728	
Internet access			0.686	
Availability of people with strong managerial skills				0.826
Available of people with strong technical skills				0.822

Table 39: Regression Equation Showing Effect of Infrastructure and Skills Variables on Overall Ratings of the Ecosystem

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.480	.143		38.348	.000
	Value_chain_infrastructure	.533	.146	.303	3.651	.000
	Telephony_road_infrastructure	.228	.152	.124	1.505	.135
	Skills_infrastructure	.439	.146	.249	3.012	.003
	Rail_air_transport_health_schools_infrastructure	.279	.142	.162	1.966	.052

a. Dependent Variable: Overall rating of operating environment for businesses in your local government area

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.462[a]	.214	.186	1.56547

Appendix 2 Feedback from the Community Workshops

Meeting held at Deniliquin: Edward River Council

Murray Region Economic Development Unit (MREDU)

- Questions raised regarding the relationship between the MREDU and RDA.
  What are the overlapping areas of interest/influence?
  What are the intended influences to be brought to bare in the Murray?
- To what level will local ownership be achieved given divergent stakeholders?
- How will collaboration (co-operation to mutual benefit) be achieved? MRDEU & RDA need work effectivelyly together.
- Potential division of political backing between different groups diverting resources and efforts between different (competing) projects/work efforts.

Developing human capital through engagement with schools

- La Trobe running program to enable school children to spend time in businesses as part of their school program; which demonstrates to children what is available in relationship to work opportunities within their local area; and gives children experience of work; whilst a school based program can contribute to University/Tertiary students.
- Need engagement from businesses to enable this to happen – need to look outside immediate commercial benefit to making a contribution to society per se; organising involvement by business essential step in making this happen.
- Needs a community wide perspective in order to achieve potential retention of young people within the Riverina area.
- Critical lack of knowledge of skills available within the region.

Net emigration

- Considerable debate on loss of population to Melbourne in particular.
- Claims made that many people spend time in cities to return later in life.
- Implicit desire to return to region clearly present among those who leave the area – some case examples referred to.
- Some discussion of attracting people to the area, accepted life style principle driver to come to the area.

Business support

- Recognised a number of businesses/people provide support to start-up businesses.
- A couple of co-working spaces established.
- Seen as being contributors to start-up business, provide work support/spaces as well as advice.

- Incubators as a concept drew positive responses but not explicit commitments to steps to achieve them.
- Number of local start-ups present that expressed a desire for improved business support mechanisms.
- Did not necessarily see such support as coming from formal programs/bodies.
- Mutual support mechanisms seen as desirable/achievable.

Alternate report

- Edward River Council along with Victorian councils had a completed report working in a similar area – difference in terms of application of theory as well as survey work undertaken.

Networks

- Concept supported as a general principle.
- Development of knowledge of skills across area supported although no specific matters/issues mentioned.
- Stated need to develop local skills to undertake the development work desired – up-skill locals to lead and deliver on programs rather than have "blow flies" manage and deliver work.
- Heavy criticisms expressed regarding use and roles of consultants in working on programs aimed at the local region.
- Development of local actors seen as improving skills base and helping to ensure what is delivered is as desired by the local community.

Infrastructure - IT

- IT seen as being an ongoing need – many areas have sub-standard IT infrastructure.
- NBN seen in practice to be delivering less than promised.
- Coverage of IT infrastructure (NBN) seen as inadequate – coverage figures based principally on population covered not geographic area resulting in large areas having poor to inadequate access.
- Need for expertise in how to utilise IT rather than merely access to the hardware – expertise seen as a critically lacking element although a number of skilled providers in the region.

Infrastructure – rail

- Commentary made on poor state of rail infrastructure.
- Road freight capacity clearly adequate given number of trucking businesses in region (all of significant size/capitalisation).
- Rail track/support infrastructure seen as dated and inadequate for a timely transport system.
- Some mention of transfer semitrailer from road to rail – see for instance https://www.youtube.com/watch?v=wIwXPvGXnho or https://www.youtube.com/watch?v=9ugx87dSmBg

An issue for safety/fatigue management/road congestion, inter-modal freighting can achieve improvements.

Meeting held at Corowa: Federation Council

Meeting held with full Council present.

Capacity

- Recognised need for expertise in order to achieve business/trading advantages from technological developments.
- Raised phenomena of turnover (rates spoken of seem lower than in cities) partially driven by opportunities.

MRDEU

- Seen as a vehicle to achieve leverage/improved funding through increased scale plus greater influence.
- Given greater scope improve attractiveness of projects.
- Larger and better resourced (improved expertise) seen as being more attractive to those likely to undertake projects.
- Recognised need to make region attractive to those with expertise who have options outside the region – why would someone see region as being a better proposition to an urban opportunity?

Entrepreneurship/education

- Discussed proliferation of courses – standards seen as being problematic.
- Use courses to front end business opportunities seen as beneficial, and identify those questions that are needed to be asked (i.e. effective filtering of ideas) before starting businesses.
- Lack of business sense developed in trade training; their graduates will run their own businesses. Therefore skills in running a small business are needed to ensure adequate supply of trades people to regions.
- Highly supportive of concept of children/students spending time in local businesses so as to become aware of what opportunities are available locally rather than current situation where they assume nothing is available.
- Require willing business mentors prepared to give time/space to include working with children/students to promote opportunities in local region.
- Latter is matter of seeing role beyond immediate commercial benefit to a wider community benefit – retaining children seen as a community wide matter essential to future growth/viability but need to look beyond immediate personal benefit.

Advantages of local community

- Numbers of young people moving away chasing opportunities plus experience of life outside confines of regional life.
- Need to consider processes whereby young can travel/experience the wider world but see paths to return to region later in life (for family etc.) and advantages of region later in life.

Attracting people to region

- Have considerable life advantages in region.
- Move from Sydney, which has toxic lifestyle, to region provided lifestyle, safety as well as business opportunities (notable some of the entrepreneurs promoting this were exporters from national perspective not just region).
- Life opportunities in region seen as being unavailable in Melbourne/Sydney based on direct experience of those areas.
- Notable businesses operating in region whose skills/performance matched anything in capital cities.
- Region needs to see and believe in what it has to sell in order to attract people from major cities.
- Need to articulate hierarchy of those to attract to the region in order to market appropriately to those groups.
- Natural attraction – cost of 80 sq m Sydney same as 5,000 sq m site in Tocumwal.
- Less people, easier travel within region.
- Attractiveness of DIY working together within a more community arrangement – social connections achieved.
- See Melbourne as a particular market given proximity (Tocumwal to Melbourne 3 hrs 20 min).
- City people cash in and left with capital after buying into region.

Infrastructure

- One entrepreneur expressed problems: poor infrastructure to support business – power/gas connections inadequate – costs of upgrades prohibitive. Need to address provision of infrastructure region-wide not piece by piece in order to achieve progress.
- Business start-ups include people who brought job with them – niche market to promote/support.
- Accommodation available but needs development e.g. short term accommodation for back packers etc.
- Apparent failures re adequate electricity supply (undersupply with electricity running 190v cf 240v supposedly supplied.
- Rail infrastructure needs to provide an Australia wide solution (NSW divides metropolitan to country requiring users to approach 2 systems – should be one system to access rail across Australia).

- Increasing costs of multiple state/national groups working in regions adversely affecting development – costs increase as well as time lost negotiating competing interests – single regional body desirable.
- Saw entrepreneurs donating time to promote business/support possible start-ups as being a desirable move – requires a 'greater good' perspective.
- 'Sell' the region – show opportunities to potential newcomers – invite and demonstrate what advantages are available – be clear only a percentage will make change but that is worth pursuing.
- Make it easy to move to region.

Murray Region Economic Development Unit

- Create a functional economic area capable of developing expertise to make changes required/support operators within the region.
- Need to be clear as to what message to promote inter/intra regionally taking MREDU as a single unit.
- Need to be clear about who is delivering what, when and where – problems with competing self-interests.
- Significant possibilities with increasing technological developments in agriculture providing potential economic benefits to region – irrigated areas notably and observably experiencing stronger economies than other parts of the region.

Tall poppy response

- Tall poppy syndrome, change public narrative using media to promote those making changes and developments.
- Need local government to actively promote the changed narrative promoting those taking risks to develop the region.
- Critical therefore to make changes in the media messages used.

Community cohesion and leadership

- Bring people together.
- Bring people to region to experience benefits and show opportunities – need leadership and operational support to achieve this – who will own and drive such an initiative?
- MUST work for regional trust/mutual support – local parochialism will work against potential developments – region must be seen as a single unit not solely multiple LGAs (essentially specific towns).
- Local groups (RFS, SES, Rotary, churches) can drive community acceptance and cohesion – provide a vehicle for newcomers to find a place and role in the local community – encourage those groups to acknowledge such a collateral benefit to their operations which will improve their organisations as well as support the local community.

Networks

- Lack motivation for participation networks – don't see benefits; need narrative that works from community perspective not just individuals.
- Need awareness of who has what skills and where.
- Trust development critical to achieving the changes planned – unless willing to work together nothing will happen.

Critical infrastructure

- Significant road infrastructure (road transport businesses) available and continuing to develop – rail infrastructure mentioned but not developed as an idea.
- Communication needs remain a critical issue – poor to inadequate provision.

Social infrastructure

- Answer why come here?
- Need to see how to attract people to the region – what life advantages will they experience if they move to the region?
- Need a community-based approach to development not just a commercial one – develop social systems to support people on a regional basis.
- Recognise and advocate quality of life and safety – essential to develop trust within the community.