



Shaping Our Economic Future

An e-Impact Study of Small and Medium Enterprises in the
Western Downs Region, Queensland

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Queensland

A Report Prepared for the Western Downs Regional Council

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EXECUTIVE SUMMARY

Developments in network infrastructure, especially the provision of high-speed broadband that enables very rapid data transfer and high levels of connectivity, has meant that the application and effects of information and communication technology (ICT) on business performance have increasingly diverged and become even more significant. New opportunities have been created and businesses have become more competitive as ICT has reduced the barriers to information. The increased availability of network facilities and the advances in ICT have influenced business operations immensely and led to the growth of all businesses, including small and medium enterprises (SMEs).

Given this scenario, this project examines the use and the effects of ICT on business performance and innovation in the Western Downs region in Queensland, Australia. There has been little research on the use of ICT by SMEs in remote and regional areas in Australia. This study therefore improves our understanding of that by using a unique dataset for approximately 300 SMEs collected through a field survey conducted in the Western Downs region during March to June 2014. This study reveals interesting results on the performance and innovation behaviour of SMEs operating in the region and provides insights to trends of ICT usage by rural and regional SMEs. The findings of the study can be categorized under three broad themes – Diversity and disparity, Uptake, and Innovation and growth.

Diversity and disparity

The survey describes both the economic and ICT diversity in the Western Downs region. In terms of economic diversity, the main pillars of the region's economy are the mining, oil and gas, and agriculture sectors. The majority of the businesses in the region (about 67%) are characterized as non-employing and about 13% have an employment size of up to four persons. The study reveals significant diversity in business profitability. In particular, smaller businesses in terms of employment size show some signs of vulnerability. It was found that smaller businesses are relatively less connected in terms of leveraging business opportunities in the global market place.

Overall, the region exhibits a lower level of economic diversity when compared to the national average. This lower level means there is a great challenge for the region to

maintain its resilience and flexibility as well as reducing its vulnerability to external shocks. With regard to ICT, the survey results suggest that there is an above average diversity of digital devices in the region in order to ensure continuity of communication. There is a bias towards satellite and mobile connections. The high prevalence of satellite and wireless connections compared to Asymmetric Digital Subscriber Line (ADSL) connectivity demonstrates the remoteness of the area, the inadequate infrastructure and the challenges of getting connected. Significant heterogeneity exists across the firms and the sectors in the region in terms of the innovative behaviour of the firms and SMEs. Smaller firms are found to be lagging in terms of innovation activities as compared to the larger ones. The survey results indicate that about 72% of the firms in the agricultural sector are not sure or disagree with the growth prospects for their business.

Uptake

About 99% of the surveyed firms have some form of Internet connection. However, a large disparity exists in terms of them having web-based and e-commerce activities, thus reflecting a case of digital divide. In the case of web presence, a significant difference exists across businesses according to the level of employment. About 67% of the businesses employing four or fewer people do not have a business website as compared to 33% of businesses employing 5–19 people and only 6% which employ 20–200 people. In addition, about 80% of the businesses in the agricultural sector do not have a website, with this absence even more prevalent among the smaller businesses. This reflects a clear digital divide in terms of employment size and industry groups where some sectors and small businesses are lagging in their use of ICT.

The survey finds that the firms' use of ICT is significantly and positively correlated with profitability and business performance. Half of the respondents indicated that they were satisfied with their Internet connection (service). This is below the level reported by Australian SMEs who rank service satisfaction level at over 70%.

Small firms are found to have a lower level of e-commerce activities as compared to the large firms and this difference is found to be statistically significant in all cases. Policies that promote e-commerce activities therefore require a greater emphasis to be placed on small businesses. Furthermore, in the regional context where the agricultural industry is clearly

lagging on e-commerce activity, policy intervention should promote business confidence, growth and ICT across all industry groups.

Innovation and growth

Innovation is considered to be the key determinant of long-run business success and economic growth. The long-run prospect of a region or country is therefore determined by the innovative behaviour of businesses. ICT underpins innovation and competitiveness across a broad range of industries. In the rural and regional context, the task of being innovative remains overwhelmingly challenging as most firms are very small in size and suffer from the lack of a formal competitive market environment that fosters experimentation, research and development. Policy intervention which specifically promotes business innovation is therefore required. In this study the innovative behaviour of businesses in the region is examined through the perspectives of product innovation, process innovation and market innovation.

Overall, the majority of survey participants (61%) indicated that the innovation activities of their firms increased in the previous three years, while about 23% of the participants reported a neutral position. In exploring the firms' engagement in each of the three categories of innovation activities, a significant heterogeneity was observed. Overall, firms show a better performance in process innovation rather than product innovation or market innovation. A larger proportion of firms are engaged in process innovation activities. ICT can play an important role in improving process innovation activities. There is a direct positive relationship between a business computerising its operations and adding a new product/service.

In this study the growth prospects and confidence of businesses in the Western Down region were evaluated by examining the 'forward-looking' behaviour of the firms. Just less than half of the respondents were confident about the growth potential of their business. Just less than half of the survey respondents agreed that their business will be less profitable in the future. This is more than double the national measure and may reflect the difficulty in securing work or sales in regional and rural areas.

The agricultural sector is found to be the most neutral or unsure about growth prospects, with only 28% agreeing that there is a growth potential. Manufacturing, mining, and oil and gas are the most optimistic sectors about growth prospects, with 64% agreeing that there is growth potential. The service sector also had more than half of the responses indicating growth potential.

In summary, this report concludes that SMEs in the Western Downs region are not realising the full benefits of participation in the digital economy. In terms of various economic and development indicators, SMEs in the region are lagging behind their wider Australian counterparts, particularly in certain key industry sectors such as agriculture. The distinctive characteristics of SMEs means that their resource poverty affects their opportunity to identify and plan for business growth, including opportunities presented through ICT.

Key recommendations and strategies for the local and state governments to overcome the disparities on the use and effects of ICT across firms and industries are:

1. Develop a digital economy strategy for the Western Downs region to include actions to address the infrastructure gaps and to develop an ICT-enabled workforce.
2. Partner with business groups and not-for-profit bodies to improve digital literacy and to develop local strategies to take advantage of the digital economy, to raise awareness of the benefits of the digital economy and of the emerging opportunities for local businesses, and to attract more businesses to the region in order to diversify the economic base.
3. Develop local level digital strategies to support SMEs to build their digital capacity and to exploit the opportunities for e-commerce activities.
4. Design a strategy to improve innovation activities with a particular focus on product innovation, process innovation and market innovation.
5. Explore opportunities to develop 'digital hubs' as demonstration sites and to implement digital strategies with the agricultural and manufacturing sectors in particular.
6. Further research should focus on issues such as the e-commerce and innovation capabilities of the SMEs and creating value from such activities. This is necessary in order to examine the barriers to participating in the digital economy, especially with respect to e-learning, health and farm management with an emphasis on how to lift productivity.

KEY FINDINGS

- About 98% of the surveyed firms have fixed (landline) telephones, with many of them having multiple connections (on average two). About 91% of the surveyed firms use mobile phones and/or smartphones, about 10% use satellite phones, 10% use personalized digital radio and 36% use digital radio.
- The results from the study show a higher penetration of mobile phones and laptop computers as well as satellite phones and digital radios as compared to the national average, which may reflect the mobility of the SMEs and the nature of regional business. These results reflect an above average diversity of ICT devices in the region.
- More than 99% of the businesses have access to the Internet and 51% of the businesses have an Internet presence for business purpose.
- About 51% of the businesses have ADSL as the main type of Internet connection and about 38% of the businesses use wireless/satellite connection. More than 50% of the businesses are not satisfied with the speed of the Internet.
- Business use of the Internet is predominantly for collecting information (93%) along with some limited exposure of selling goods and services online (39%), purchasing raw materials (41%) and providing customer service (54%).
- Firms are lagging in terms of product innovation and market innovation.
- A significant difference across business size is observed in terms of having a website. About 67% of the businesses with employment size 0–4 do not have a business website as compared to 33% of businesses employing 5–19 people and only 6% of businesses which employ 20–200 people. The difference is statistically significant. About 48% of the businesses believe that doing business will be less profitable in the future.
- The agricultural sector is found to be lagging in terms of exploring the opportunities with ICT, particularly for e-commerce and innovation.
- Despite the sceptical views about future opportunities in the region, about 49% businesses agree that their businesses will grow in the future. A digital divide exists based on firm size and industry characteristics.

CHAPTER 1

INTRODUCTION

1.1 Background

We are in the midst of a data-driven, hyper-connected transition to an all Internet Protocol (IP) environment called the ‘Internet of Everything’ and this digital disruption is likely to have a profound impact on how business is done. The emerging all-IP environment has data at its centre and requires a network (i.e., Internet connectivity) to communicate with others. Globally and within Australia, there is a phenomenal growth in the number of Internet connections, Internet-enabled devices, device ownership and use of multiple devices connected to the Internet, which is accelerating the provision of information. To participate and productively engage as a full digital citizen in this emerging reality requires at the very least ubiquity of connectivity at high speed. There are multiple layers of technical complexity in terms of both infrastructure and building the capacity within the infrastructure to deliver the promise of the all-IP environment: put simply, it requires network infrastructure, cloud-based storage and service platforms, and connected devices and machines (Figure 1.1). Collectively these components drive the next wave of productivity and innovation. The digital disruption (changes) of new ways of doing business is having a profound impact on growth, productivity and innovation (Appendix A provides definitions of some of the key terms as they are used in this report).

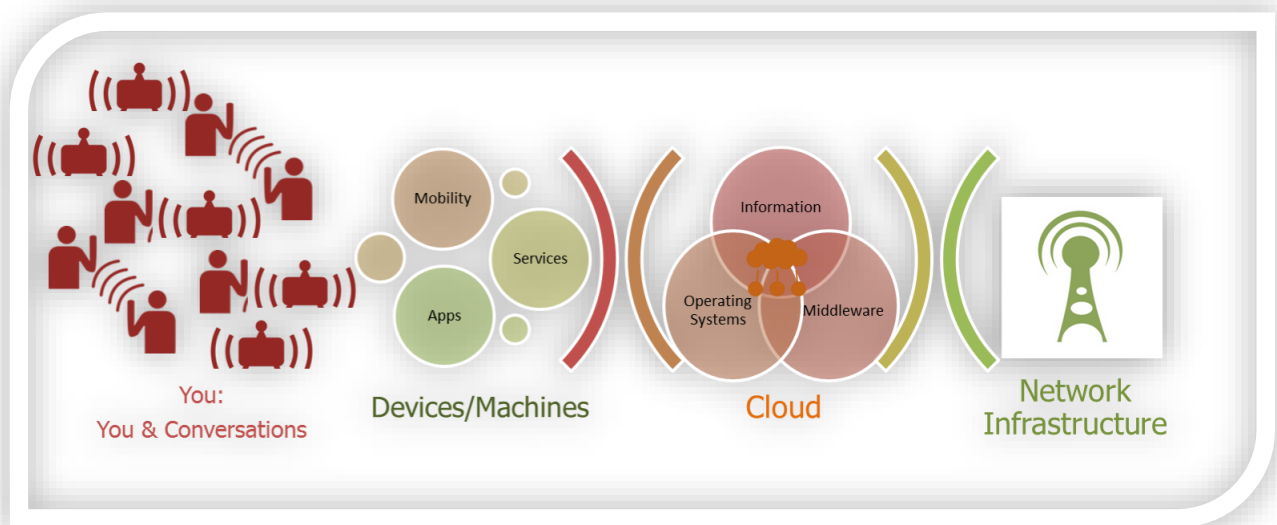


Figure 1.1: Requirements for the ‘Internet of Everything’

In the 'Akamai State of the Internet Report' (Belson, 2014), Australia has dropped down the list of speed of Internet connectivity from 39th to 40th, and in the *Global Information Technology Report 2008–2009* (Bilbao-Osorio, Dutta, & Lanvin, 2014) Australia has again slipped down the global ranking for investment and use of ICT from 17th to 18th. Added to this is Australia's performance in the Global Innovation Index where Australia finds itself at the bottom of the top group at 22nd in 2014, down from 15th in 2009 (WEF, 2014).

As a collective, SMEs have a critical role in the current economy and the emerging digital economy. They account for 69% of the total Australian workforce and 57% of total business income earned during 2011–12 (ACMA, 2014). They have a pivotal role as users of communications services and play a supportive role in the development of digital economy through the application of digital technologies to customer service delivery and business processes. However, as much as they are applauded for being the source of Australian innovation and entrepreneurialism, they are also especially disadvantaged by infrastructure, employment, regulation and compliance, finance and taxation (CCIQ, 2013). Their inability to lobby effectively for change is in part due to extreme time constraints, which in turn limits their ability for strategic planning and therefore the ability to prepare for and take advantage of the rapidly changing business environment enabled by digital connectivity.

The Western Downs Region is a local government area (LGA) in Queensland, Australia with a resident population of 32 872 people and a gross regional product (GRP) of AUS\$2.8 billion in 2012–13 (Map 1). Recently, the performance of the region has outpaced other LGAs in Queensland in terms of key economic indicators such as economic, population and employment growth (Lawrence Consulting, 2014).





Map 1: Western Downs Region

Its GRP grew at a rate of 5.8% as compared to 3.6% for Queensland in 2012–13. Nonetheless, a large disparity exists in terms of economic performance across different sectors with a shrinking economic contribution from many of them reflecting several major downsides in the region’s economy. Several economic sectors have experienced sluggish growth: for example, agriculture, forestry and fishing 2.4%, manufacturing 2.3%, construction 2.4%, accommodation and food services 2.5%, and information, media and telecommunications (-0.7%). The economic diversity index of the LGA recognises the narrow band of economic activity, with a ranking of 340 as compared to that of Brisbane LGA 62, Southern Downs LGA 299 and Toowoomba LGA 200 out of 560 LGAs in Australia¹. (Regional Australia Institute 2014). When considering the effect of digital disruption, the main pillars of the local economy – mineral and energy resources, and agriculture, forestry and fishing –

¹ A higher ranking reflects a lower level of diversity.

will not be affected most immediately, with mining, oil and gas being the least affected anyway.

ACMA (2014) indicated that in May 2013:

- 94% of SMEs had an Internet connection; and
- 71% of connected SMEs were satisfied in general with their Internet services.

There are, however, significant differences in the access and use of ICT across sectors, firms and regions (ABS, 2013b). For example, about 84% of businesses in the agriculture, forestry and fishing sector have access to the Internet compared to 93% for the manufacturing sector. Similarly, the accommodation and food services sector reported having Internet access at 72% as compared to more than 95% for many other services sectors. Only 11% of the businesses in the agriculture, forestry and fishing sector have a website, as compared to 57% for manufacturing and more than 60% by many service industries. Moreover, there are



significant differences in terms of the use of ICT, where some firms and sectors are clearly lagging. These differences have different implications for the economies of regional Australia depending on the investment and growth strategies for each region and the balance of traditional economic sectors and economic diversity in the context of business innovation, sustainability and resilience in the information age.

Apart from the Western Downs region, there is relatively little specific information to indicate ICT usage for SMEs in the remote and regional areas. Large-scale surveys provide

data on industry averages, but these are not adequate for detailed analysis on ICT access, usage and its effect on business performance and growth with particular reference to a specific small region. Similarly, there are studies on large regional enterprises but the results cannot be replicated for SMEs in rural areas. This challenges local governments in that they may lack the insight to develop effective local strategies to encourage ICT appropriate to their region.

The use and performance of ICT by SMEs in the Western Downs region in Queensland is a significant issue. While the performance of the region has been acknowledged above, closer investigation of the data indicates that large disparities exist in terms of economic performance across different sectors with a shrinking economic contribution from many of them, reflecting major downsides in the region's economy. It can be argued that the mining boom has masked a new reality for most sectors of the economy, with some sectors experiencing sluggish growth. These differences have implications for the labour market, equitable income and wellbeing of the population as well as future growth potential and sustainability of the regional economy.

While the changes that are being caused by ICTs and the digital paradigm have been acknowledged, Deloitte (2013) states ICTs provide a range of opportunities to generate new business models and sources of revenue, including:

- Leveraging mobility for speed, efficiency and market access;
- Pricing strategies based on new ways of doing business; and
- Increased opportunities to collaborate and to innovate.

Well-developed telecommunications infrastructure decreases the cost of acquiring information and can increase operational efficiency. ICT investment can generate larger economic benefits due to its potential positive network externalities (Meijers, 2007). This stimulates increasing social returns which in turn leads to sustained positive growth rates as envisaged by the endogenous growth theory (Romer, 1990). The capital deepening resulting from the investment in ICT is recognised in a rich body of literature (Ahmad, Schreyer, & Wölfl, 2004; Jorgenson & Stiroh, 2000) as an important driver of economic growth and productivity. The general purpose nature of ICT and its impact on productivity has now been

well documented (Lipsey, Carlaw, & Bekar, 2006). However, this means that positive returns to ICT investment require investment in complementary assets such as organizational capital and human resources. It is therefore important to control key organizational and complementary factors that generate higher ICT payoffs². As the digital era is changing the way business operates, there are calls for a renewed focus on the effective use of ICTs by the business enterprises (Alam and Shahiduzzaman, 2013).

There is also a great concern in how the digital divide affects the operations of SMEs. SMEs often lag behind large businesses in exploring digital opportunities which makes SMEs not only less competitive, but also more vulnerable to economic change (Arendt, 2008). While the early literature often cited lack of access to ICT as a barrier, the recent literature indicates that this barrier has been removed largely given the widespread diffusion of network facilities in most areas and regions (ACMA, 2014). However, digital divide in the context of access to ICT is about more than the provision of network infrastructure; the speed of the Internet, and the reliability and dedication of the service are important too. The public/private investment in ICT infrastructure often does not favour rural areas because of the low customer base and the consequent difficulties in achieving economies of scale (Raman & Chebrolu, 2007; Strover, 2001). Therefore, rural and remote areas can fall outside the range of cable and ADSL providers, which limits Internet access. However, the most common digital divide factor facing SMEs is the effective use of ICT due to the lack of knowledge, skills and education (Arendt, 2008). SMEs perform poorly in terms of ICT sophistication and e-commerce adoption in comparison to large companies (Standing et al., 2003).

1.2 Aims and objectives

Given this backdrop, the key aims of the study are to:

- Examine inter/intra industry digital divide; and
- Analyse firms' adoption and performance of ICT.

² This paragraph is largely drawn from Shahiduzzaman and Alam (2014).

The specific research questions addressed in this study are:

- How are regional and rural enterprises using the Internet?
- Is there an intra-industry inequality in terms of Internet adoption?
- Does usage of the Internet exert any positive impact on the performance of rural and regional SMEs?

1.3 Expected outcomes

The results from the study will assist the Western Downs Regional Council by:

- Benchmarking the use of ICT by businesses and so help in framing a digital economic strategy for the region in the context of the emerging digital disruption (changes);
- Providing insight to and an understanding of trends in ICT usage by businesses in the region; and
- Profiling industries/firms that require special attention from the policy and strategic perspectives.

Individual firms can benefit from the research by:

- Understanding the appropriate roles of ICT in business growth and productivity;
- Identifying the problems and opportunities of using ICT; and
- Pinpointing the key organizational and other complementary factors that generate higher ICT payoffs.

In general, this study will help policymakers and ICT managers to develop appropriate and effective digital technology strategies to enhance regional economic development.

CHAPTER 2

REVIEW OF LITERATURE

The term 'digital divide' is a multifaceted and diverse concept. In general, it refers to a certain type of inequality in respect of access to and use of ICT. A digital divide may arise due to the differences in the provision of ICT infrastructure and/or disparities in socio-demographics, skills and capacity. From the socio-economic point of view, a digital divide is not a desirable outcome because it reinforces an existing pattern of exclusion (Selwyn & Gorard, 2002) and it potentially creates a new form of social and economic exclusion. While the set of exclusions can be evident to any segment of society and the economy, the effects of these is particularly prevalent to the more vulnerable groups and sections (Alam and Imran, 2015). Lucchetti and Sterlacchini (2004) found that business units mostly receive access to the Internet and e-mail, but a clear gap exists between SMEs and the large companies in the use of ICT. The most important factor in the digital exclusion for SMEs is a lack of the knowledge necessary to select and apply the right technology in the business environment (Arendt, 2008; Higón, 2012). Moreover, the barriers of adoption of ICT in SMEs varies significantly across sectors (OECD, 2004).

The Australian Government's official statistical organization, the Australian Bureau of Statistics (ABS), routinely conducts surveys on the use of business use of information technology. The first survey was conducted in 1993–94 and the latest one (the twelfth) was conducted in 2011–12. While the earlier surveys were largely focused on the access to and use of computers, the most recent ones focus on Internet activities and electronic commerce (e-commerce). The survey provides a rich set of information on the use of ICT by the Australian businesses but it does not disentangle the perspectives of regional and rural enterprises.

Kimber and Mason (2013), in an exploratory study, conducted interviews with 19 owners and five managers of small businesses (up to 19 employees) in the Coffs Harbour region in New South Wales, Australia. The study examined the attitudes of small business owners towards Next Generation Broadband (NGB) and local training initiatives. They found that about half of the owners were dissatisfied with the speed of the Internet. Owners who

participated in the survey believed that improved Internet speed would be beneficial for maintaining and improving market share. Deloitte (2013) conducted a nationwide survey of 500 small businesses to measure the level of digital engagement and found that high digitally engaged small businesses are likely to have twice the revenue per employee than firms with low digital engagement. Results from the survey indicate that about 60% of firms surveyed had either a website with business information and/or used digital marketing to generate revenue.

Sensis (2012) investigated the levels of understanding and interest by SMEs on ICT usage and e-commerce. The survey used telephone interviews with approximately 1800 SMEs around Australia. While the survey covers all metropolitan and non-metropolitan regions in Australia, the sample excluded SMEs in the agricultural sector. The study found that the Internet connectivity of small businesses remained high at 92% during 2012. The most important reason for using the Internet was e-mail communication with clients, customers and suppliers. The proportion of SMEs having a website decreased from 67% to 62% from 2011 to 2012. RDA (2012) examined the needs, demands and opportunities relating to the adoption of high-speed broadband by conducting telephone interviews with 12 key stakeholders and 277 online surveys from four industry sectors – creative industries, health and aged care, education and finance – in the northern rivers region of New South Wales. The study found evidence of limited Internet connectivity in many locations.

CCIQ (2013) surveyed about 700 businesses in Queensland to gain insights to how they use ICT to engage with their customers and to support their operation. The study found that about 88.7% of the businesses had a website presence. However, only a small proportion (less than 10%) of their revenue was generated via online sales. Overall, the businesses regarded the digital economy as an important way to create opportunities for the future. Figure 2.1 summarises the key results from recent Australian studies.

Recent studies suggest organizational and managerial characteristics can play an important role in the use of ICT (Bordonaba-Juste, Lucia-Palacios, & Polo-Redondo, 2012; Del Aguila-Obra & Padilla-Melendez, 2006). Some studies suggest that firm size could be a limiting factor in using sophisticated ICT (Bordonaba-Juste et al., 2012; Gabrielli & Balboni, 2010). However, Jutla et al. (2002) found that SMEs could be more innovative and willing to

experiment with new business processes than the hierarchical large firms. Using firm-level data from the ABS Business Longitudinal Database and Business Characteristics Survey, ABS (2013a) found that businesses with more ICT intensity are likely to undertake more innovative activities. However, the relationship between innovation behaviour and ICT use remains relatively unexplored in the regional context.

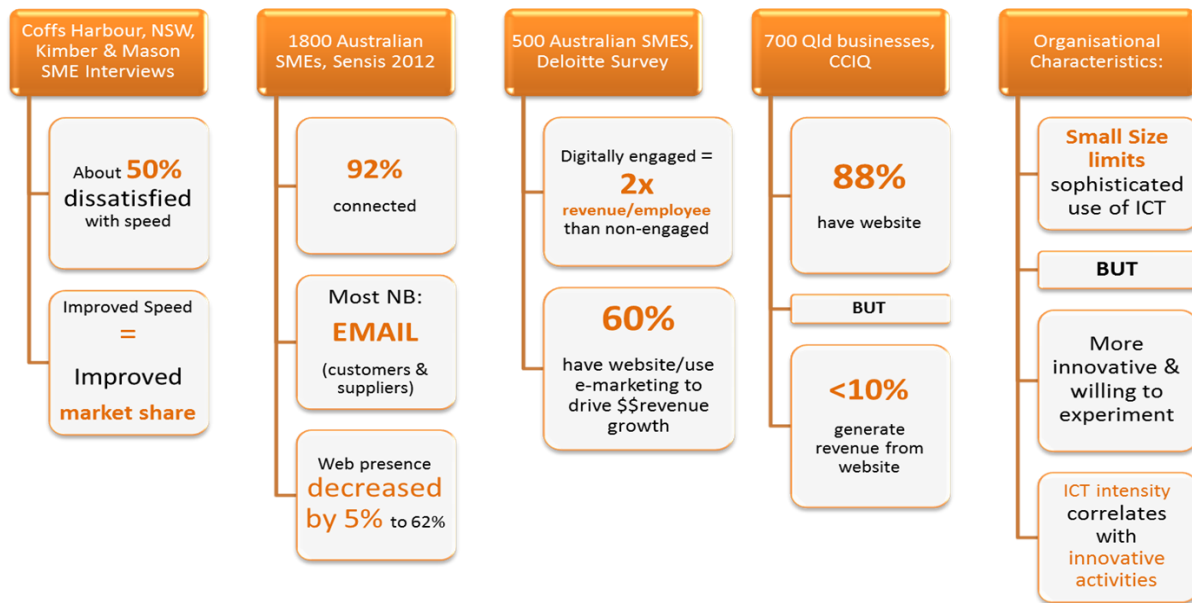


Figure 2.1: Infographic summarising a recent literature review.

CHAPTER 3

RESEARCH METHODOLOGY

Data used in this report were obtained through a business survey conducted in the Western Downs region of Queensland from March to June 2014.

3.1 Sample

The statistical unit for this study is the SMEs operating in the Western Downs region. The total population of the study is 2107 firms according to the Australian Business Directory Online. Businesses employing less than or equals to 200 employees were selected in the survey. The sample was stratified by four Statistical Local Areas (SLAs) of the Western Downs region: Chinchilla, Dalby, Murilla-Wandoan and Tara³. The sample structure is maintained where replacement businesses are recruited. Initially, 1000 businesses selected at random were invited to participate in the survey. The businesses were contacted by phone and asked if they wanted to undertake the survey over the telephone, by mail or online. In the event, 297 interested businesses participated in the survey: 67% of the surveys were through telephone interviews, about 30% through mail and personal visits, and about 3% were online. The telephone survey was conducted by Market Facts Pty Ltd, a Queensland-based market research consultant. The owner, general manager or ICT manager of the surveyed firms was requested to fill in the questionnaire.

3.2 Piloting

The survey instrument was tested in the study area in January–March 2014 to check its validity and reliability. The questions were refined based on the pilot survey. For example, there were no questions on the use of satellite digital radios (UHF/VHF) in the draft questionnaire, but the piloting experience revealed that businesses in the region made extensive use of



³ SLA is an Australian Standard Geographical Classification defined area adopted by the ABS.

this technology for communication, long-range data communication and television broadcasting. Similarly, Personal Digital Assistants (PDAs) were added to the final questionnaire. The pilot survey also helped us to revise the questions about the verbal communications of rural businesses.

3.3 The questionnaire

An extensive literature review was conducted to prepare the draft questionnaire. The final questionnaire, titled 'Shaping the Economic Future Questionnaire', was branded and promoted by the University of Southern Queensland and the Western Downs Regional Council (see Appendix B). The questionnaire comprised four sections: (i) about the business use of ICT, (ii) Organizational operation and growth, (iii) About your business, and (iv) Demographic information (optional). A detailed background of the scope and benefits of the research was presented on the Council's website.

3.4 Data processing and transformation

Following an initial screening of the data, 289 of the 297 businesses were retained for the final analysis. Two businesses reported to have employment size more than 200 employees and another six attempted the survey online but did not complete it. Statistical software SPSS 22 was used to process the data, transformation and analysis. Figure 3.1 shows the data processing and transformation snapshot of this study.

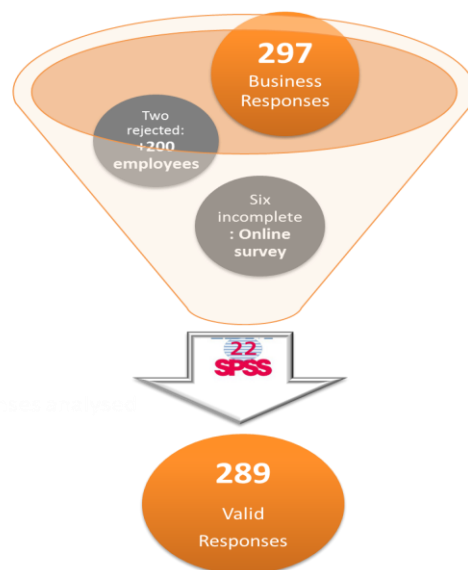


Figure 3.1: Data processing and transformation snapshot.

3.5 Analytical approach

The report used three forms of statistical tools to analyse the data:

- Descriptive statistics
- Cross tabulation
- Correlation analysis

Descriptive statistics quantitatively provide simple summaries about the sample and the measures and describe the basic features of the data. Cross tabulation and correlational analyses show the relationship between two or more categorical variables and show the differences across sectors, groups and categories.



CHAPTER 4

ABOUT THE BUSINESS

4.1 Overall

The survey included 289 randomly selected SMEs in the Western Downs region. Figure 4.1 shows the distribution of the business sectors: 24.1% were in the agriculture sector followed by wholesale and retail trade (21.9%), accommodation and food (13.3%), manufacturing, mining and gas (9.3%) and so forth.

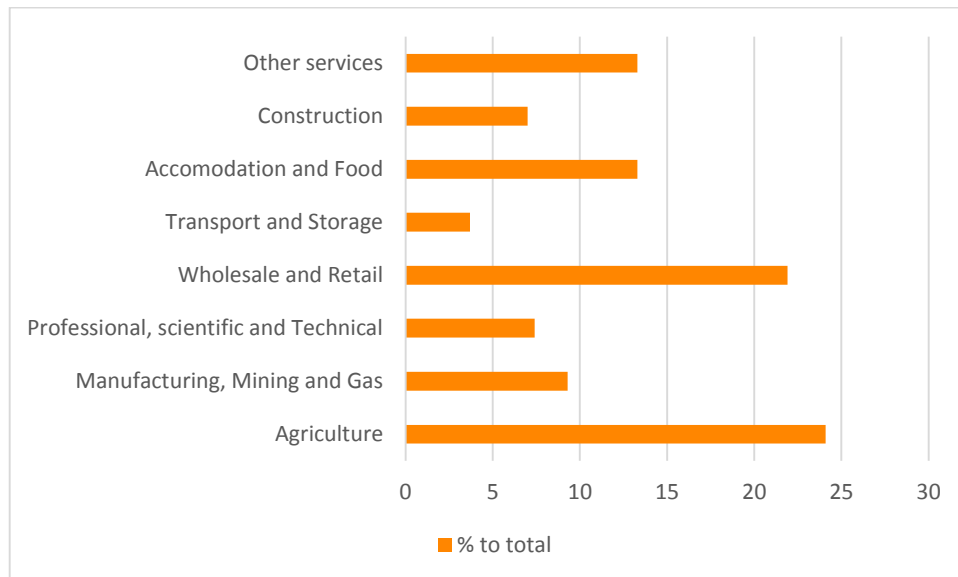


Figure 4.1: The business sectors covered in the study.

According to the ABS (2014a), the agriculture, forestry and fishing sector represents about 48.2% of the total number of businesses in the region. Other important sectors in terms of the number of businesses are construction (10.3%), rental, hiring and real estate services (7.4%) and transport, postal and warehousing (5.4%). The mining and energy sector, which corresponds to about 0.5% of the total number of businesses, represents about a 20.3% share of gross regional product, followed by 14.1% by the agriculture, forestry and fishing sector, 14.3% by wholesale and retail trade, 5.7% by construction and 3.6% by the manufacturing sector. This diversity of the businesses in the region therefore is reflected in the samples selected in the study.

KEY TAKE-OUT: Agriculture is well represented in the respondents' profile followed by retailers, and accommodation and food, consistent with ABS profiles of the region.

4.2 Employment size

ABS (ABS, 2014b) indicates that in the Western Downs region about 67% of the businesses are characterized as non-employing, 20% have an employment size of up to four persons and about 13% employed more than 5 people in 2012. Given that the majority of the businesses are small in nature, the employment size in this study is classified as 0–4⁴ employees, 5–19 employees and 20–200 employees. This categorization is consistent with the ABS (2013b).

In this survey 58% of the businesses had an employment size of 0–4 people, 30% had 5–19 people and about 12% had 20–200 people (Figure 4.2).

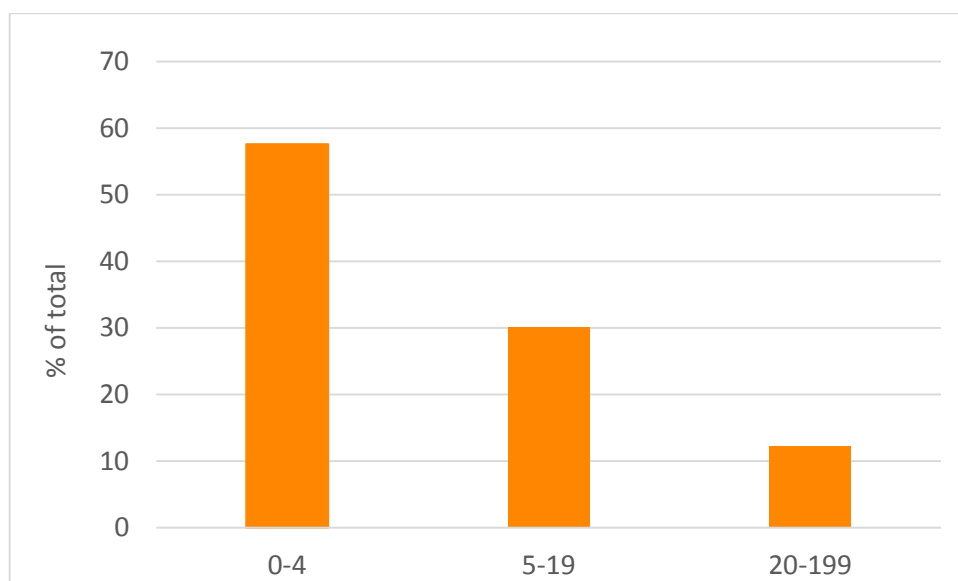


Figure 4.2: Employment profile of businesses in the study.

⁴ A 'zero' employee indicates the business is run by the owner.

KEY TAKE-OUT: Over half the businesses that responded employ four or fewer people while almost a third employ 4–19 people, which is representative of the region’s SMEs.

4.3 Business profitability

Table 4.1 presents the overall picture on profitability of the businesses in the study. Respondents to the survey were provided with the option of describing their business as (i) unprofitable, (ii) average profitable or (iii) above average profitable. About 61% of the businesses described themselves as ‘average profitable’, 32% considered themselves as ‘above average profitable’ and almost 7% described themselves as ‘unprofitable’.

Table 4.1: Overall business profitability.

| Category | Frequency | Per cent | Cumulative Per cent |
|--------------------------|-----------|----------|---------------------|
| Unprofitable | 19 | 6.7 | 6.7 |
| Average profitable | 173 | 60.9 | 67.6 |
| Above average profitable | 91 | 32.0 | 99.6 |
| Don't know | 1 | 0.4 | 100.0 |
| Total | 284 | 100.0 | |
| Missing | 5 | | |

KEY TAKE-OUT: About 32% of the businesses indicated that they enjoy above average profitability whilst over 60% indicated that they perceived their business as being of average profitability. A minority of 7% of businesses indicated they were unprofitable.

Table 4.2 shows the cross tabulation of profitability by size of the business. About 8% of the businesses with an employment size of 0–4 people has been characterized as unprofitable by the respondents as compared to 5–6% for an employment size of more than 5 people. The Pearson Chi-square test statistics presented in Table 4.3 indicate that there is a significant association (significant at 95% confidence level as shown by asymptotic significance value of less than 0.05) between profitability and the size of firms. This reflects a significant downside risk for the micro enterprises in the region.

Table 4.2: Profitability by size of employment.

| | | Profitability | | | Total |
|-----------------|--------|---------------|--------------------------|--------------------------|-------|
| | | Unprofitable | About average profitable | Above average profitable | |
| Employment size | 0–4 | 12 | 110 | 37 | 159 |
| | 5–19 | 4 | 46 | 32 | 82 |
| | 20–200 | 2 | 14 | 18 | 34 |
| Total | | 18 | 170 | 87 | 275 |
| Missing | | | | | 15 |

Table 4.3: Chi-square tests on the differences in profitability by employment size.

| | Value | Degrees of freedom | Asymptotic significance (2-sided) |
|------------------------------|---------------------|--------------------|-----------------------------------|
| Pearson Chi-square | 15.446 ^a | 6 | 0.017 |
| Likelihood ratio | 15.279 | 6 | 0.018 |
| Linear-by-linear association | 10.771 | 1 | 0.001 |
| Number of valid cases | 275 | | |

KEY TAKE-OUT: There is a positive relationship between the perception of profitability and the number of employees in SMEs. Overall, micro-enterprises (0–4 employees) are at a disadvantaged position in terms of profitability.

4.4 Exposure to international export

In order to gauge the exposure of the businesses in international trade, participants in the survey were asked to provide information on the percentage of revenue they earn from international trade activities. About 81% of the respondents responded to the question, of which about 80% of the businesses indicate that they do not earn any revenue from international export. The other 20% of the businesses have some form of global integration through import and/or export. Table 4.4 shows the exposure of different industry categories and their involvement in some form of international export activity. Substantial differences in the export exposure of different industry groups can be seen: the manufacturing, mining and gas sectors are in the leading position (39%) followed by the agriculture, forestry and fishing sector (30%).

Table 4.4: Involvement of businesses in international export by industry groups.

| | | Industry groups | | | | Total (%) |
|---------------------|-----|-----------------|---------------------------------|--------------------------------|--------------|-----------|
| | | Agriculture (%) | Manufacturing, mining & gas (%) | Wholesale and retail trade (%) | Services (%) | |
| Revenue from export | No | 70 | 61 | 83 | 87 | 80 |
| | Yes | 30 | 39 | 17 | 13 | 20 |
| Total | | 100 | 100 | 100 | 100 | 100 |

Figure 4.3 shows the involvement in export by size of the business. As shown, small businesses have little exposure to international export. Industry size is therefore an important factor in determining integration to the global marketplace. Overall, the export share to revenue is very low for the majority of SMEs in the survey (Table 4.5 and Figure 4.4).

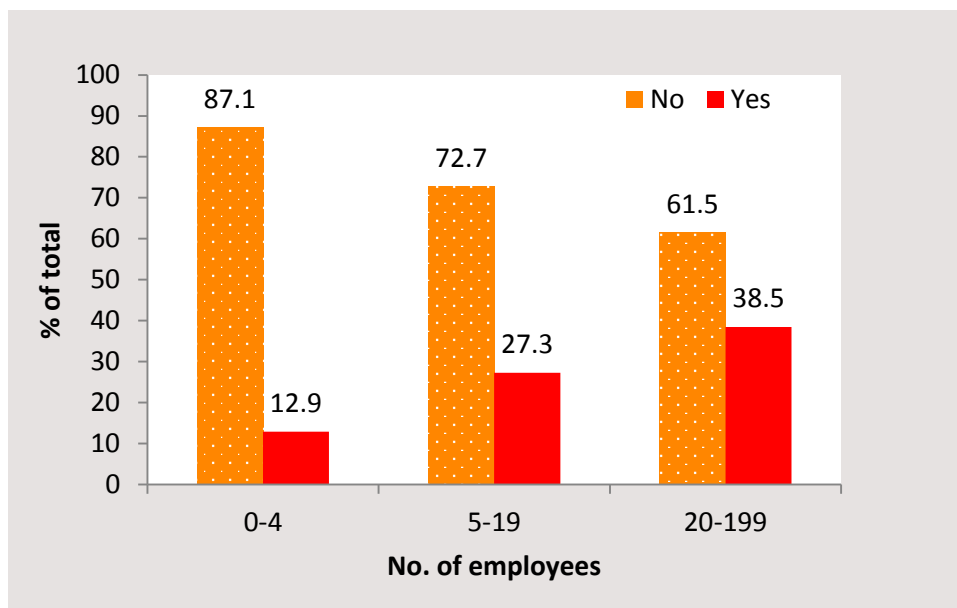


Figure 4.3: Involvement in international export and size of business.

Table 4.5: Percentage of revenue from international export.

| | Frequency | Per cent | Valid per cent | Cumulative per cent |
|----------------|-----------|----------|----------------|---------------------|
| 0% | 187 | 64.7 | 65.8 | 65.8 |
| 1–20% | 28 | 9.7 | 9.9 | 75.7 |
| 21–40% | 8 | 2.8 | 2.8 | 78.5 |
| 41–60% | 7 | 2.4 | 2.5 | 81.0 |
| 61–80% | 3 | 1.0 | 1.1 | 82.1 |
| 81–100% | 1 | 0.3 | 0.4 | 82.5 |
| Don't know | 50 | 17.3 | 17.5 | 100.0 |
| Total | 284 | 98.3 | 100.0 | |
| Missing system | 5 | 1.7 | | |
| | 289 | 100.0 | | |

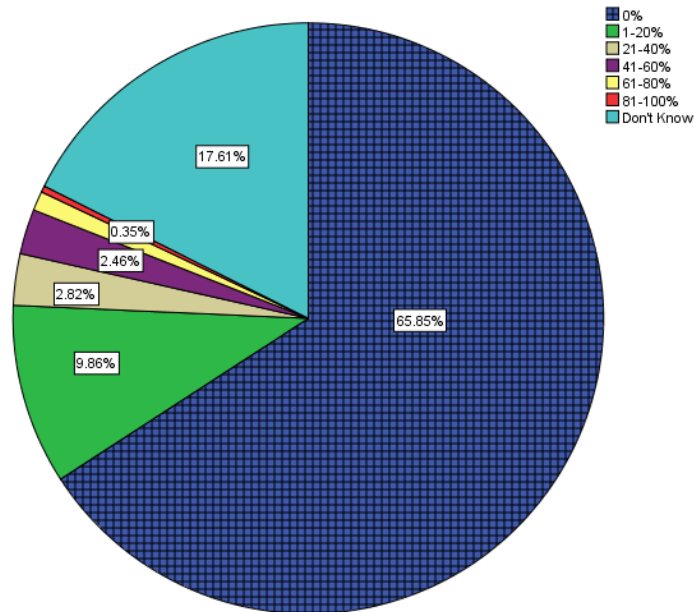


Figure 4.4: Percentage of revenue from international exports.

International trade is an important indicator of connectivity with markets and innovation opportunities. The 'Internet of Everything' is connecting everything into global networks and global supply chains which impacts on operational costs and access to new markets. The equalising effect of ICT is best demonstrated when businesses leverage a global marketplace and the efficiencies of streamlined processes. Developments in ICT such as Enterprise 2.0, cloud computing and social networks can enable SMEs to integrate with the global marketplace.

KEY TAKE-OUT: Most industries in the region are not well networked in the global economy. Industry size is an important factor in determining global integration. Leveraging the global integration of SMEs in the region should therefore be an important policy agenda.

4.5 Workplace environment

Coupled with key characteristics of the SME owner/CEO, an organisation's culture is a main determinant on the adoption of ICTs to strengthen a business's competitive position and to take advantage of the opportunities offered through digital disruption (Ghobakhloo, Sai Hong, Sabouri, & Zulkifli, 2012). Organisational characteristics such as a supportive working environment that engage and encourage employee participation in a transparent, goal-oriented workplace is essential for the efficient deployment and application of ICT. Building a positive work environment also contributes to employee productivity and encourages innovation.

It is, therefore, important to allow for these factors when examining the effects of ICT on business performance. In this study the work environment of the rural businesses were examined by considering five major aspects: i) work environment, ii) teamwork, iii) flexibility, iv) promotion and appraisal, and v) training and development. Participants in the survey were asked to rate the organisational positioning of the businesses in a five-point Likert scale. In addition, a 'don't know' option was included to cater for the respondents' understanding on these issues.

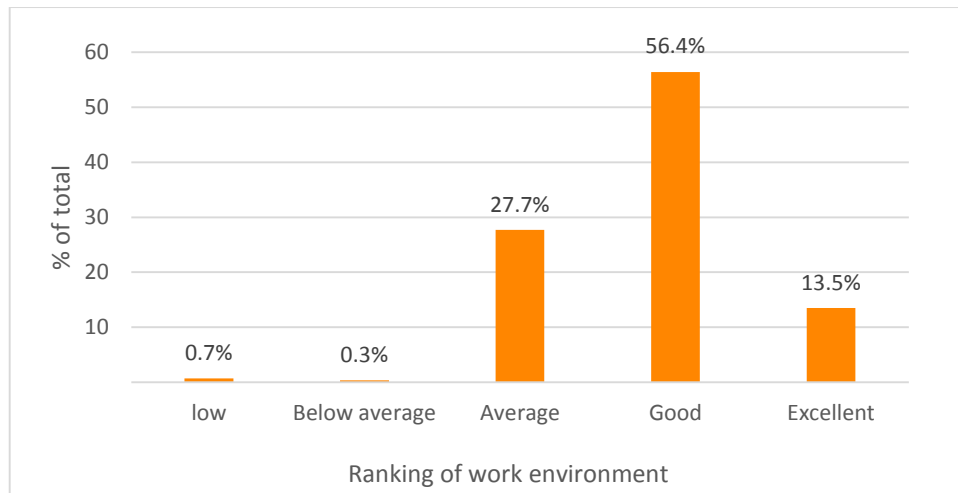


Figure 4.5: Perception of positive work environment.

KEY TAKE-OUT: The majority of respondents enjoy a positive work environment and this suggests that the work environment supports more sophisticated ICT adoption.

4.6 Innovation behaviour

Business innovation is regarded as a key determinant of individual business success and economic growth and prosperity for a region. It provides comparative advantage to the innovative firms to grow and adapt with changes. (OECD, 2005, p. 46) defines innovation as:

... the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.

Innovation, therefore, is a very broad concept and its various dimensions make it difficult to measure. This is particularly true for rural and regional businesses that are very small in size and unlikely to have any formal market experiment and research. Thus, the innovation behaviour of individual businesses is examined by considering the following three perspectives:

- Product innovation: adding a new product and/or service;
- Process innovation: computerized operations and employee training (on-site/off-site) (as a proxy of research and development); and
- Market innovation: selling to a new market, expanding advertising and promotional activities, and expanding the distribution channel.

In order to construct a composite index on innovation, businesses in the survey were asked to rate each innovation activity of their firm in the five-point Likert scale. A 'don't know' option was included in the questionnaire for respondents who were not aware of the activity.

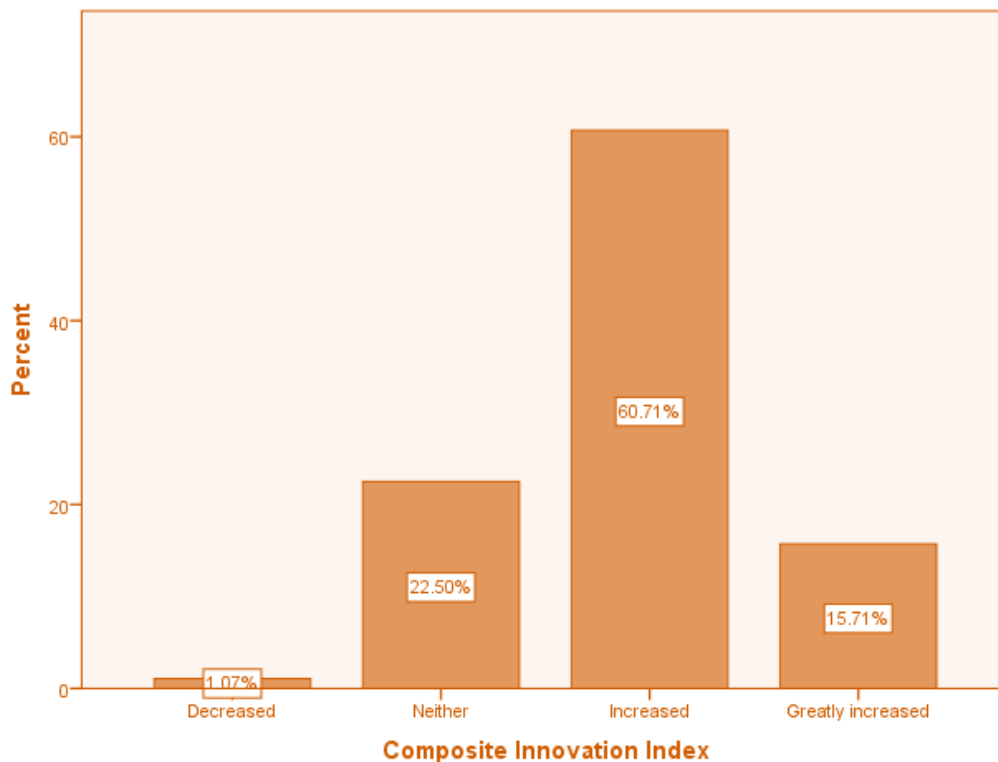


Figure 4.6: Innovation behaviour of businesses in the study.

Figure 4.6 shows the innovation behaviour of businesses based on the five variables in the three innovation categories above. About 61% of the participants considered that the innovation activities for their firm increased in the past three years, while just under 23% took a neutral position.

Figures 4.7–4.9 show firms’ engagement in each of the three categories of innovation activities. The figures show the heterogeneity of firms. Overall, firms show a better performance in process innovation than in market innovation or product innovation. A larger proportion of firms are engaged in process innovation. ICT can play an important role in improving such kinds of innovation activities.

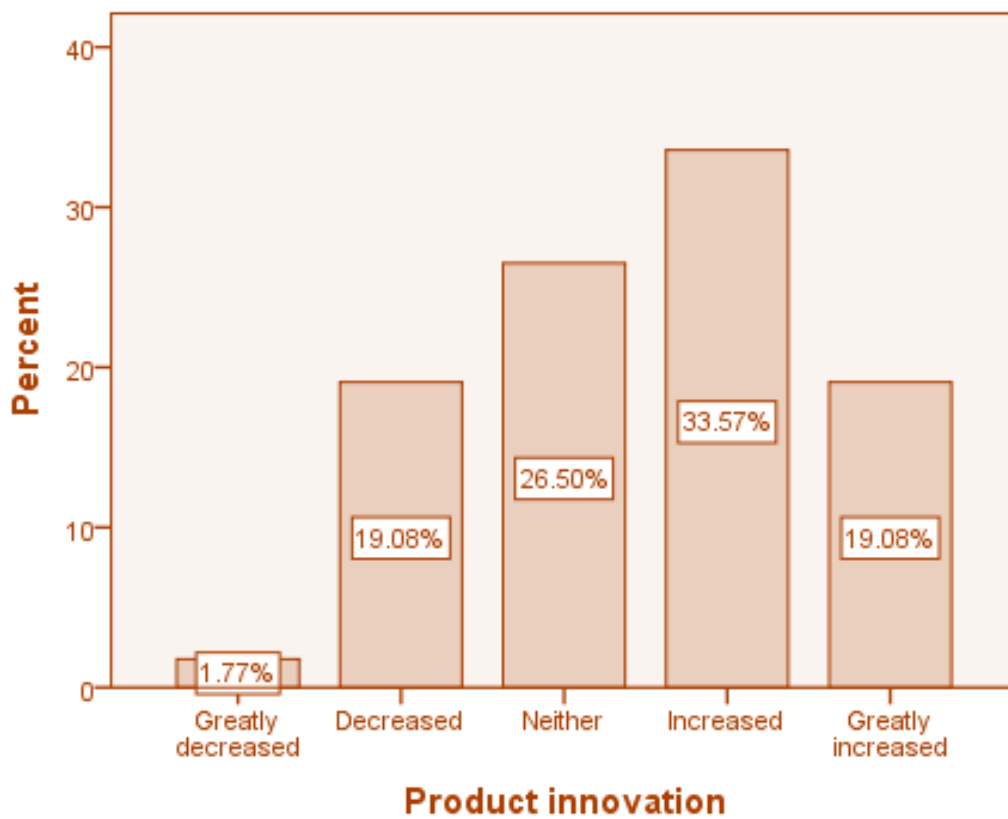


Figure 4.7: Product innovation behaviour of businesses in the study.

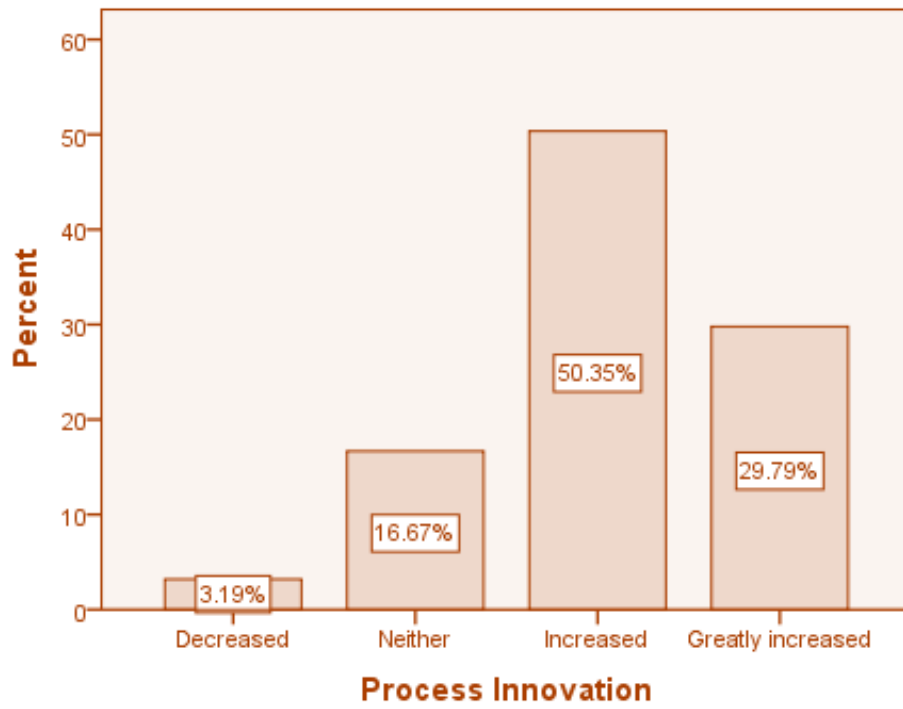


Figure 4.8: Process innovation behaviour of businesses in the study.

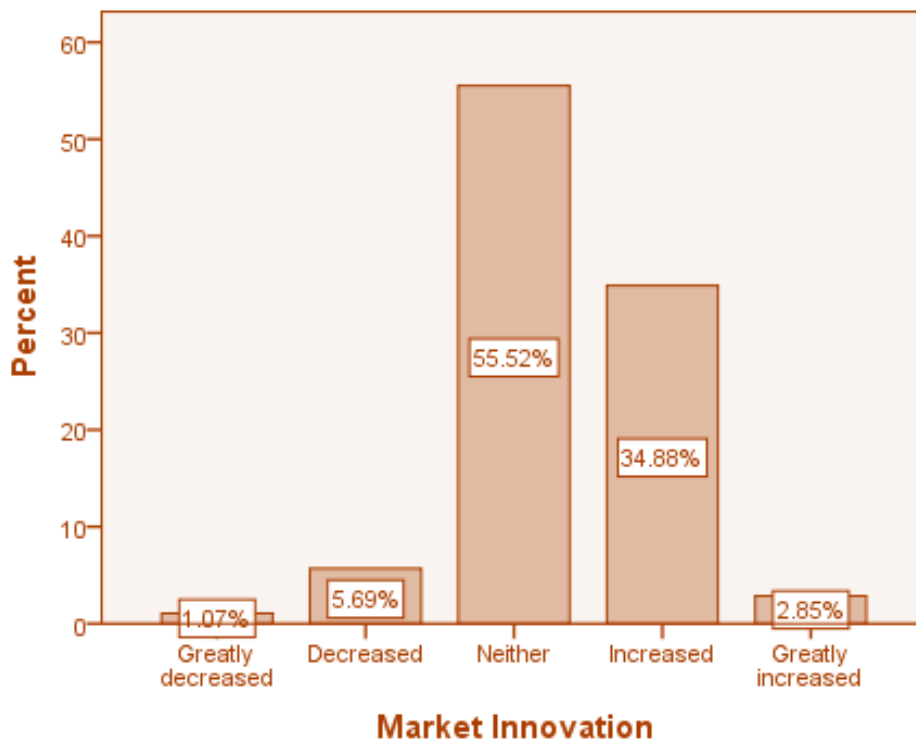


Figure 4.9: Market innovation behaviour of businesses in the study.

Investigating the most important innovation activities of the firms might be interesting. So, a factor analysis, in the form of the Principal Component Analysis (PCA), was performed to extract the most important factors that represent firm-level innovation activity. The results of the factor analysis, presented in Appendix C show that adding a new product or service and computerizing operations have associated Eigen values greater than 1. If these two factors are extracted, about 52% of the total variance would be explained.

Table 4.6 presents the results of the bivariate correlation between these two factors. Both Pearson's and Spearman's correlation coefficients indicate the existence of a significant positive correlation (marked by *) between these two factors. Yet, we do not know the causal relationship between these two factors, which is examined in the next chapter.

Table 4.6: Correlation between computerizing operations and adding new product or services.

| | | | Computerizing operations | Adding new product |
|----------------|-------------------------------|-------------------------|--------------------------|--------------------|
| Pearson | Computerizing operations | Coefficient | 1.000 | 0.350* |
| | | Sig. (2-tailed) | 0.000 | 0.000 |
| | | N | 285 | 285 |
| | Adding new product or service | Correlation Coefficient | 0.350* | 1.000 |
| | | Sig. (2-tailed) | 0.000 | 0.000 |
| | | N | 285 | 285 |
| Spearman's rho | Computerizing operations | Correlation Coefficient | 1.000 | 0.360* |
| | | Sig. (2-tailed) | 0.000 | 0.000 |
| | | N | 285 | 285 |
| | Adding new product or service | Correlation Coefficient | 0.360* | 1.000 |
| | | Sig. (2-tailed) | 0.000 | 0.000 |
| | | N | 285 | 285 |

* Correlation is significant at the 0.01 level (2-tailed).

KEY TAKE-OUT: About 75% of the respondents indicated that they innovated in some or all areas reviewed. Analysis showed that innovations were associated more with process innovation as opposed to new market or product innovation, consistent with Australia's innovation profile. There is a direct positive relationship between the computerising of operations and adding a new product/service.

4.7 Growth potential

SMEs in the rural and regional areas are restricted in their opportunities to explore potential business prospects. They work in an environment of low population density and lagging infrastructure provision. They face particular problems of natural variability, transportation infrastructure, and constraints in labour and financial resources. They also tend to be more socially isolated with limited opportunity for collaboration and exposure to new ideas as well as limited access to ICT. Overcoming such barriers and creating the potential to develop and grow are significant challenges for regional and rural businesses.

In this study the growth prospects and confidence of the businesses in the region were evaluated by examining the forward-looking behaviour of the firms. As shown in Figure 4.10, about 48% of the participants strongly agree/agree that their businesses have growth potential as opposed to 41% taking a neutral position and about 9% not perceiving growth potential. Figure 4.11 indicates that about 48% of the respondents believe that their business will be less profitable in the future compared to 31% who believe that their business will be profitable in the future. About 19% of the businesses maintained a neutral position.

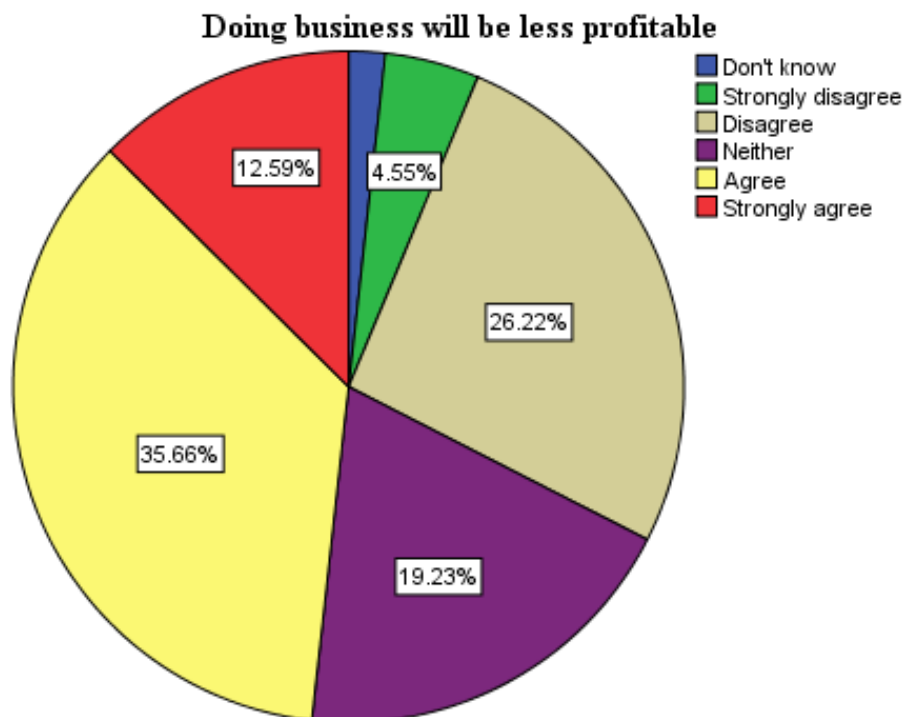


Figure 4.10: Growth potential of businesses in the study.

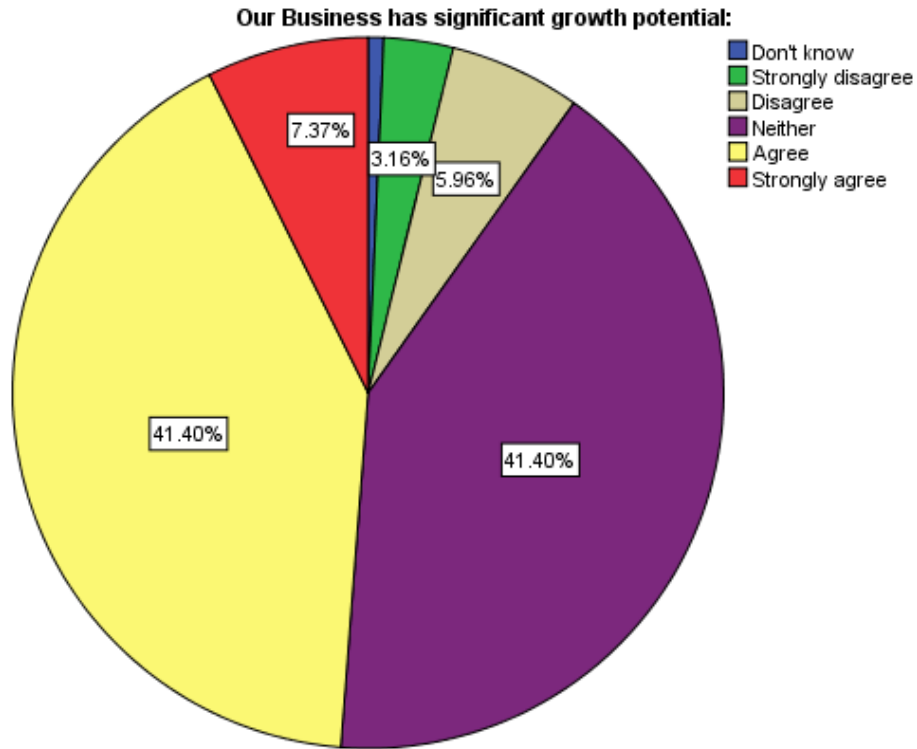


Figure 4.11: Profit potential of businesses in the study.

The business attitudes towards growth in the Western Downs region were in line with Australian and Queensland SMEs as measured in the Sensis SMEs surveys in March and June 2014 (Sensis, 2014a, 2014b). In these instances, SMEs confidence in their business prospects fell during the quarter from 51% being confident of the future to 47%, although mention is made of regional SMEs having confidence levels 13% higher. The sharp fall in confidence in June 2014 has been recorded as its lowest level in five years. SMEs in Queensland reported decreases in work/sales as a contributing factor (Sensis, 2014a). In contrast to the national expectation on declining profitability, where 48% of the surveyed businesses anticipated a decline in profitability, 22% of the national SMEs expect business to be less profitable in the year ahead.

Table 4.7: The growth potential of businesses in the study.

| Statement and position | Western Downs sample | Sensis Australian sample (2014a) |
|--|----------------------|----------------------------------|
| <i>Agree that there is growth potential for their business in the future</i> | 48% | 47% |
| <i>Agree that business will be less profitable in the future</i> | 48% | 22% |

KEY TAKE-OUT: Just less than half of the Western Downs respondents were confident about the growth potential for their businesses. This is similar to the national confidence levels, but may be lower than other regional confidence levels. Just less than half of the survey respondents agreed that business will be less profitable in the future. This is more than double the national measure and may reflect the difficulty in securing work/sales.

4.8 Additional insights

Further analysis was conducted of the Western Downs data to profile differences between industry sectors and business size.

Industry sector

As shown in Table 4.8, an analysis of attitudes towards growth potential by each industry sector identified that:

- The agricultural sector is the most neutral/unsure about growth with 60% taking a neutral position and only 28% agreeing that there is potential.
- Manufacturing, mining and energy resources is the most optimistic sector about growth, with 64% agreeing that there is potential, indicating that this sector has more surety of potential than the other sectors. Interestingly, although not high, this sector also had the highest number of disagreeing responses to growth potential at 12%.
- More than half of the responses from the services sector also agreed there is growth potential.

Table 4.8: Cross tabulation – growth potential and industry groups.

| | | Industry groups | | | | Total (% of total) |
|--------------------|-------------------|-----------------------------|--|---|--------------------------|-----------------------|
| | | Agriculture (% of total) | Manufacturing, mining & gas (% of total) | Wholesale and retail trade (% of total) | Services (% of total) | |
| Growth potential | Don't know | 0.0 | 0.0 | 1.7 | 0.7 | 0.7 |
| | Strongly disagree | 1.5 | 4.0 | 3.4 | 3.6 | 3.2 |
| | Disagree | 9.2 | 8.0 | 1.7 | 5.8 | 6.0 |
| | Neither | 61.5 | 24.0 | 46.6 | 32.8 | 41.4 |
| | Agree | 23.1 | 56.0 | 41.4 | 47.4 | 41.4 |
| | Strongly agree | 4.6 | 8.0 | 5.2 | 9.5 | 7.4 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Pearson Chi-square | | Value 25.954 | df 15 | Asymptotic Sig. (2-sided) 0.039 | | |

The Sensis (2014b) report for June did not measure agriculture or mining and gas, but did show that about 45% of the manufacturing, and wholesale and retail trade sectors were confident about their growth, less than any of the equivalent sectors in the Western Downs region sample. This suggests that in certain sectors the region is more confident about business growth than at the national level. The services cluster in the sample includes the industries of finance, communication, property and business services as well as accommodation and food, with 57% being confident in future growth. This is a similar level to the growth potential perceived for the national equivalents, which average around 55% but are as high as 62% in the accommodation and food sector.

Employment size

As shown in Table 4.9, an analysis of attitudes towards growth potential by employment size identified that:

- More than half of the micro-businesses with 0–4 employees disagree (5.7%) or neutral (54%) about the growth potential with 40% being confident of growth;
- More than half of the respondents with 5–19 employees (61%) agreed that there was growth potential, reflecting higher confidence than the micro-businesses; and
- Large SMEs with 20 or more employees similarly agreed with the potential for growth (58%, with a high proportion in strong agreement).

Table 4.9: Cross tabulation – growth potential and employment size.

| | | Employment size | | | Total |
|--------------------|-------------------|---------------------|----------------------|------------------------------------|-------|
| | | 0–4 (% of total) | 5–19 (% of total) | 20–200 (% of total) | |
| Growth potential | Don't know | 0.6 | 0.0 | 0.0 | 0.4 |
| | Strongly disagree | 2.5 | 2.4 | 8.8 | 3.3 |
| | Disagree | 3.2 | 8.4 | 14.7 | 6.2 |
| | Neither | 53.8 | 27.7 | 17.6 | 41.5 |
| | Agree | 36.1 | 53.0 | 38.2 | 41.5 |
| | Strongly agree | 3.8 | 8.4 | 20.6 | 7.3 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 |
| Pearson Chi-square | | Value 40.565 | df 10 | Asymptotic Sig. (2-sided) 0.000 | |

Comparing this with Sensis’s June 2014 report, at a national level, micro-businesses were more confident in growth than the Western Downs sample, with about 40% of SMEs with 0–4 employees confident of growth. Confidence increased as the number of employees rose, with about 61% of SMEs employing 5–19 employees and 59% of SMEs employing 20-200 employees agree on growth potential in the future.

Table 4.10: Summary of growth confidence in comparison with the Sensis June 2014 report.

| Metric | Confident of growth | |
|--|---------------------|-------------------------------|
| | Western Downs | Sensis Australian (June 2014) |
| Sample | | |
| Sector | | |
| Manufacturing, mining & gas | 64 | |
| Manufacturing | | 41 |
| Wholesale & retail trade | 47 | 45 |
| Services | 57 | |
| Finance, communication, property & business services | | 55 |
| Size | | |
| Micro (0–4 employees) | 40 | 45 |
| Small (5–19 employees) | 61 | 57 |
| Medium (20–200 employees) | 59 | 66 |

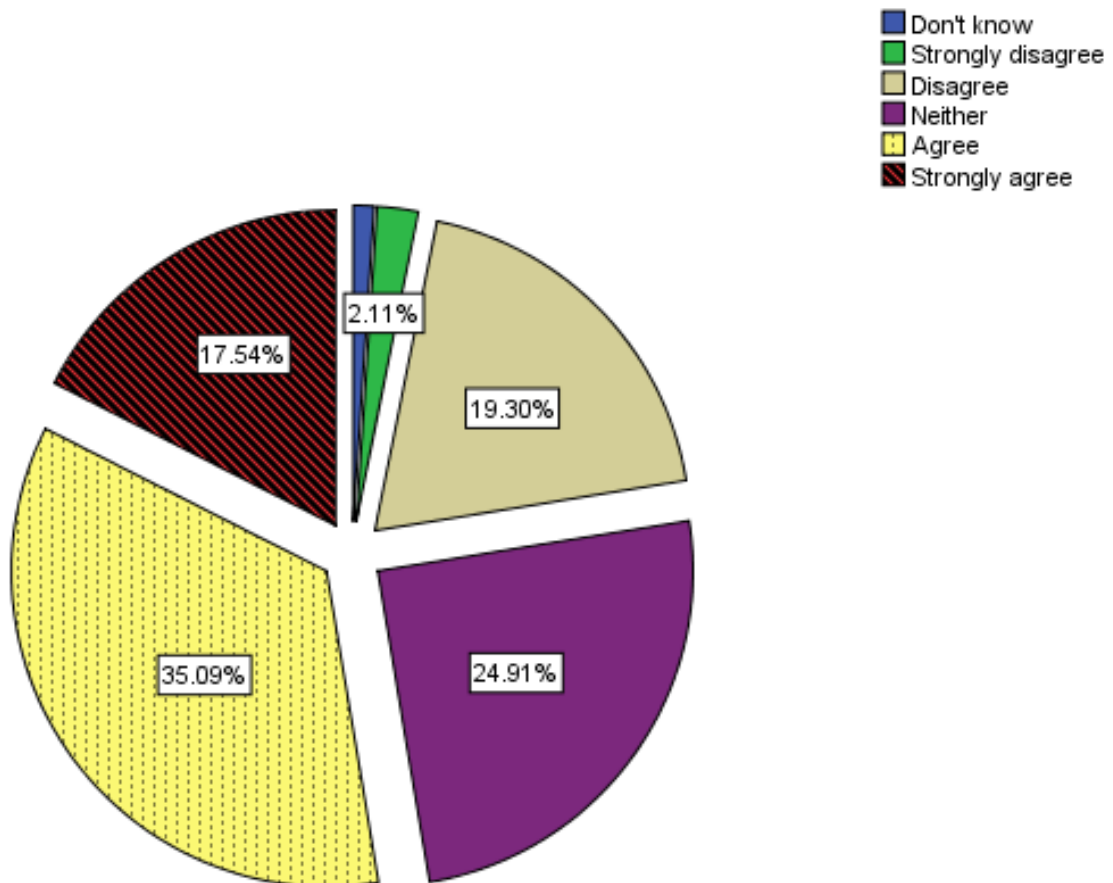


Figure 4.12: Business will be competitive in the future

KEY TAKE-OUT: There is a divide in terms of belief in growth opportunities, with just less than half the respondents believing there is growth potential in the market. A similar number are unsure of growth opportunities. This may be due to the changing nature of the market and the move of mining, oil and gas into the production phase from the labour intensive construction phase. Less than a third of the respondents believe that business will be profitable into the future with most being unsure or believing that business will be less profitable.

4.9 Business opportunities in the region

About 67% of the businesses disagree with the statement that there will be more business opportunities in the region in the future. About 20% of the businesses were optimistic about the future business opportunities in the region (Figure 4.13).

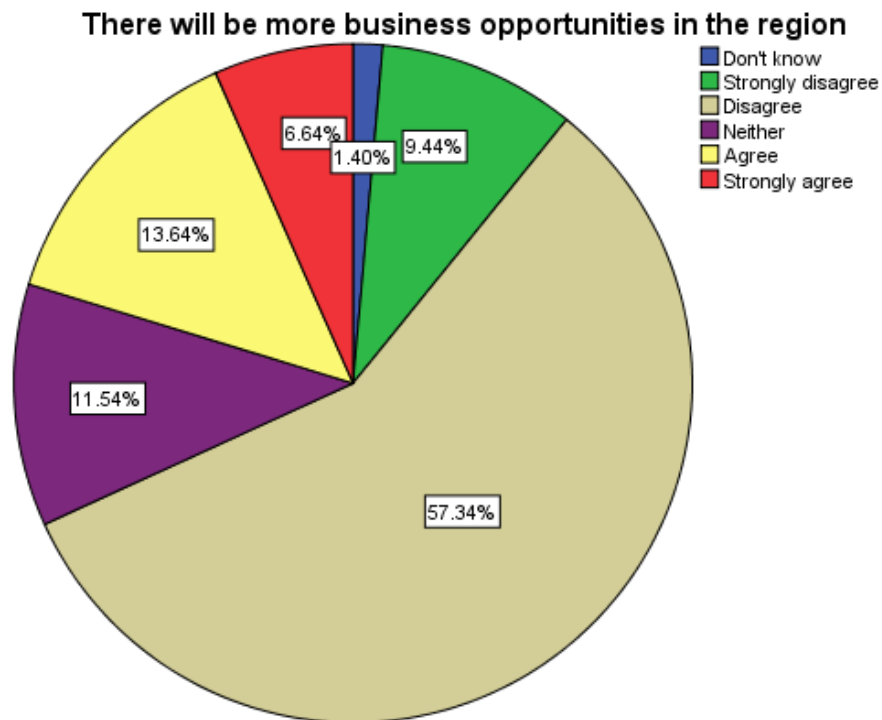


Figure 4.13: Business opportunities in the region.

Table 4.11: Cross tabulation – opportunities in the region and industry groups.

| | | Industry groups | | | | Total |
|----------------------------------|-------------------|-----------------|-----------------------------|------------------------------------|----------|-------|
| | | Agriculture | Manufacturing, mining & gas | Wholesale and retail trade | Services | |
| More opportunities in the region | Don't know | 0.0 | 0.0 | 5.1 | 0.7 | 1.4 |
| | Strongly disagree | 12.3 | 16.0 | 8.5 | 7.3 | 9.4 |
| | Disagree | 66.2 | 40.0 | 61.0 | 54.7 | 57.3 |
| | Neither | 12.3 | 20.0 | 11.9 | 9.5 | 11.5 |
| | Agree | 6.2 | 16.0 | 10.2 | 18.2 | 13.6 |
| | Strongly agree | 3.1 | 8.0 | 3.4 | 9.5 | 6.6 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Pearson Chi-square | | Value 23.79 | df 15 | Asymptotic Sig. (2-sided) 0.069 | | |

Table 4.12: Cross tabulation – opportunities in the region and local area.

| | | Statistical Local Area | | | | Total |
|----------------------------------|-------------------|------------------------|------------|------------------------------------|-------|-------|
| | | Dalby | Chinchilla | Miles: Murilla-Wandoan | Tara | |
| More opportunities in the region | Don't know | 0.7 | 1.7 | 4.2 | 0.0 | 1.5 |
| | Strongly disagree | 6.4 | 13.8 | 10.4 | 20.8 | 10.0 |
| | Disagree | 56.4 | 48.3 | 70.8 | 70.8 | 58.5 |
| | Neither | 15.0 | 12.1 | 2.1 | 8.3 | 11.5 |
| | Agree | 13.6 | 19.0 | 10.4 | 0.0 | 13.0 |
| | Strongly agree | 7.9 | 5.2 | 2.1 | 0.0 | 5.6 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Pearson Chi-square | | Value 25.882 | df 15 | Asymptotic Sig. (2-sided) 0.039 | | |

KEY TAKE-OUT: Most respondents were unsure or pessimistic about in future growth opportunities in the region. The distinctive characteristics of SMEs means that their resource poverty affects their opportunity to identify and plan for new business growth, including opportunities presented through ICTs.

CHAPTER 5

ABOUT THE BUSINESS USE OF ICTS

5.1 ICT infrastructure

To obtain an understanding of the overall ICT infrastructure, firms were asked to provide information on their use of the different ICTs: fixed-line phone, mobile/smart phone, satellite phones, PDAs, digital UHF/VHF radios, desktop computers, laptop computers and tablets. Firms were also asked to indicate the number of each technological device they used from a scale of 0 to 5 or more. The results indicate that 97.6% of the firms used fixed-line phones, with many of them having multiple connections (about two on average), and about 91% used mobile/smart phones (with an average value of more than two connections) for business purposes. About 10% of the businesses used satellite phones, about 10% used PDAs and about 36% used digital radios. About 89% of the firms used desktop computers, about 74% used laptops and about 51% used tablets along with other technology as shown Figure 5.1.

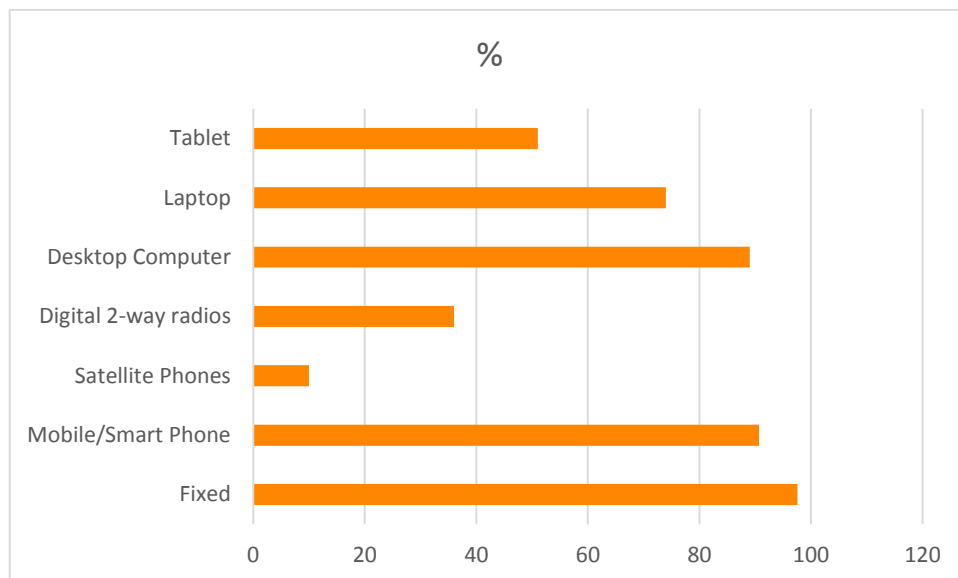


Figure 5.1: ICT infrastructure.

This ICT infrastructure varies little from the national profile (ACMA, 2014). ACMA's SME research indicates a similar profile:

- 94% with fixed-line phones;
- 70% with mobile phones (according to (Sensis, 2012)), 68% smart phones);
- 87% with a desktop computer;
- 94% with an Internet connection, of which 87% had broadband; and
- 55% with laptop computers.

Variations from the national perspective worth noting in the Western Downs sample are the higher percentage of fixed-line phones, which are not showing the decline in penetration common in the rest of Australia and, more notably, the much higher penetration of mobile phones and laptop computers. Mobile phones and laptops reflect the mobility of many of the SMEs and the nature perhaps of regional work where travelling to customers and customer sites is required. Drive-in/drive-out operations, a typical feature of regional areas experiencing rapid growth and development in the mining, oil and gas sector, require mobile ICT access. The implications of smart mobile devices are that the Internet experience becomes location-aware and provides more application-based user Web experiences.

A similar situation applies with the satellite phones and digital two-way radios in the Western Downs. These unique ICT devices are indicative of the regional/remote location of the Western Downs with a lack of infrastructure being a key driver in their adoption as well as the nature of the industries operating in the region. The high profile of digital two-way radios could be the result of the major QGC (BG Group Energy Company) network operating in the region as well as the generally greater use of two-way radios in remote regions and in geographically dispersed business sectors like agriculture and mining.

Taken collectively, the Western Downs responses suggest that there is an above average diversity of ICT devices in the region, reflecting the more remote, mobile nature of work there and the possible constraint of poor infrastructure access which requires a variety of ICT devices to ensure continuity. The development of a mobility index for the sample would be useful to quantify the mobile nature of SMEs in the region. A comparison with Queensland SMEs data (CCIQ, 2013) shows that work device distribution is consistent with

the size of business, with 27% of SMEs having between 1 and 5 devices but the remaining ones having more than five.

5.2 Use of the Internet

Table 5.1 presents some key indicators of ICT usage by businesses in the region. The results presented in the table indicate that the region is consistent with other studies which show connectivity to the Internet and business Web presence for SMEs in Australia. However, there are important differences between this study and other research. First, wireless and satellite connectivity is more prevalent than ADSL. This may be a result of the challenge of trying to get connected and also the migratory profile of part of the population for whom wireless access provides roaming coverage in line with the nature of their work. The high prevalence of satellite connectivity demonstrates again the remoteness and challenges of getting connected via ADSL. Second, not only are fewer activities conducted online in the Western Downs region, but the frequency of the activities is also less. Correlated with other indicators and informal discussions with respondents suggest that part of the problem is the constraint of Internet access, where priority is given to key activities. For example, there is a notable absence of video conferencing which requires high and consistent Internet access.

Table 5.1: Business use of ICT: a snapshot of selected indicators.

| | | Percentage | | | |
|-------------------------------------|---------------------------------|------------|------|------|--------|
| | | WDRC | ACMA | CCIQ | Sensis |
| Businesses with | Internet access | 98.6 | 94 | | 96 |
| | Web presence | 50.9 | 64 | 88 | 66 |
| Businesses with Internet access and | ADSL as main type of connection | 51.2 | 75 | | 96 |
| | Wireless | 29.9 | 11 | | 43 |
| | Satellite | 8.5 | | | |
| Businesses that | Search information online | 93.0 | | | |
| | Sell goods and services online | 39.1 | | | |
| | Purchase raw materials online | 40.8 | | | |
| | Provide customer support | 53.7 | | | |

KEY TAKE-OUT: Western Downs businesses are connected to the Internet and do have a web presence in similar proportions to SMEs nationally. However, their online activities are more constrained. This may be a result of difficulties in accessing the Internet, as shown by the over-representation of satellite and wireless connectivity.

5.2.1 Internet access and Web presence

Table 5.2 shows the number of businesses in the sample having Internet access. Almost all of the businesses have Internet access except a few in the 0–4 employment size category. However, there is no significant difference in Internet access across the industry size as reflected through the Chi-square statistics (significance value is not less than 0.05).

Table 5.2: Main place of Internet access by employment size of business.

| | | Employment size | | | Total |
|----------------------------|-----|-----------------|------|---------------------------|-------|
| | | 0–4 | 5–19 | 20–199 | |
| Main place Internet access | No | 3 | 0 | 0 | 3 |
| | Yes | 156 | 83 | 34 | 273 |
| Total | | 159 | 83 | 34 | 276 |
| Pearson Chi-square | | Value | df | Asymptotic Sig. (2-sided) | |
| | | 2.232 | 2 | 0.328 | |

In the case of businesses having a website, a significant difference by employment size is observed (Table 5.3). About 67% of the businesses with employment size of 0–4 do not have a website as compared to 33% with employment size of 5–19 and only 6% with employment size of 20–200. The difference is statistically significant as shown by an asymptotic significance value of less than 5% (significance value is less than 0.05).

Other Australian SME research indicates that between 64% and 88% of Australian SMEs have websites. The trend of an increased Web presence as employee numbers increases is consistent with Australian SMEs, usually indicating that they are likely to be more capable in terms of financial and other resources to attend to the requirement of website management. Bigger businesses usually have more money, more reasons to use a website and access to shareholders' funds.

Table 5.3: Having a website by a business's employment size.

| | | Employment size | | | Total |
|--------------------|-----|-----------------|----------|---------------------------------------|-------|
| | | 0–4 | 5–19 | 20–199 | |
| Website | No | 106 (67%) | 27 (33%) | 2 (6%) | 135 |
| | Yes | 52 (33%) | 56 (67%) | 32 (94%) | 140 |
| Total | | 158 | 83 | 34 | 275 |
| Pearson Chi-square | | Value 54.99 | df 2 | Asymptotic Sig. (2-sided) 0.000 | |

Table 5.4 shows the Internet presence of businesses by employment size and industry group. About 80% of the agricultural businesses do not have a website and the proportion of businesses not having one is even higher the smaller the number of employees. This reflects a clear digital divide in terms of employment size and industry group where some sectors and smaller businesses are lagging others in terms of having an Internet presence.

Table 5.4: Internet presence by the employment size of the business and industry category.

| Industry | | | Employment size | | | Total |
|--|---------|-----|-----------------|------|--------|-------|
| | | | 0–4 | 5–19 | 20–199 | |
| Agriculture | Website | No | 39 | 9 | 2 | 50 |
| | | Yes | 7 | 4 | 2 | 13 |
| | Total | | 46 | 13 | 4 | 63 |
| Manufacturing, mining and gas | Website | No | 2 | 3 | 0 | 5 |
| | | Yes | 2 | 9 | 9 | 20 |
| | Total | | 4 | 12 | 9 | 25 |
| Professional, scientific and technical | Website | No | 3 | 1 | 0 | 4 |
| | | Yes | 2 | 8 | 4 | 14 |
| | Total | | 5 | 9 | 4 | 18 |
| Wholesale and retail trade | Website | No | 23 | 8 | 0 | 31 |
| | | Yes | 13 | 11 | 2 | 26 |
| | Total | | 36 | 19 | 2 | 57 |
| Transport and storage | Website | No | 7 | 0 | | 7 |
| | | Yes | 2 | 1 | | 3 |
| | Total | | 9 | 1 | | 10 |
| Accommodation and food | Website | No | 11 | 1 | | 12 |
| | | Yes | 13 | 10 | | 23 |
| | Total | | 24 | 11 | | 35 |
| Construction | Website | No | 10 | 2 | 0 | 12 |
| | | Yes | 1 | 4 | 2 | 7 |
| | Total | | 11 | 6 | 2 | 19 |
| Other services | Website | No | 6 | 2 | 0 | 8 |
| | | Yes | 9 | 7 | 9 | 25 |
| | Total | | 15 | 9 | 9 | 33 |

KEY TAKE-OUT: Western Downs SMEs are under-represented compared to other SMEs in Australia in terms of having a business website. This is exacerbated significantly for micro-enterprises and agricultural businesses. This may be a consequence of the size of the business where resource constraints mean there are insufficient resources for website development and management. A lack of Internet presence for agricultural businesses restricts their access to markets potentially, especially with respect to the 'paddock to plate' concept that seeks to improve supply chain efficiency to ensure that consumers have improved and direct access to farming produce.

5.3 Type of Internet connection

Connectivity is a crucial challenge for regional and rural Australia. Broadband providers in Australia offer a range of technologies from fixed-line services to wireless and satellite broadband. The main concern for the regional, rural and remote wireless connectivity solutions for 'last-mile' connectivity in Australia has been to address three objectives (Islam et al., 2008):

- i) Wireless broadband solution with reasonable data rate;
- ii) Cost-effective and affordable technology deployment; and
- iii) Create business opportunities through Internet access among rural people or people living in remote areas.

As shown in Table 5.1, about 51% of the businesses that responded to the survey use ADSL as the main type of connection as compared to about 30% that have wireless connection and about 9% that use a satellite connection. Multiple connections to the Internet were not accurately captured in the survey, but there were indications that some businesses had more than one type of connection to the Internet.

Given the complexity of ICT, it is understandable that respondents are somewhat confused about the types of Internet access. They are more likely to relate their access to their experience in terms of speed, latency and capacity (i.e., how crowded the network is). Since the term broadband and wireless can have different meanings, our discussion has grouped them in terms of 'Internet access'.

The region's challenges in terms of Internet access have been well documented, from aging copper lines which are affected by rain through to insufficient capacity on the 3G/4G towers for a fluctuating population and the high bandwidth requirements of data-rich Internet experiences. From discussions following the completion of the questionnaire, it was evident that the most important aspect of connectivity – availability on demand – is not possible and this limits the opportunities to receive information, suggesting that the users' needs are not being met.

KEY TAKE-OUT: Most respondents were unsure about their specific type of connectivity, indicating confusion. This therefore makes it difficult for them to lobby for specific connectivity types and understand what sort of data speeds they could get from the connection types.

5.4 Satisfaction with Internet connectivity

Half the respondents indicated they were satisfied with their Internet connection (service). This is well below the satisfaction levels reported by Australian SMEs who rank service satisfaction levels at over 70%. Slightly over one-fifth (21%) of respondents were neutral about their level of satisfaction (Figure 5.2). A follow-up field observation suggested that the neutral position was adopted when, for example, SMEs perceived that they could do what they needed to do, but if Internet access were better, they would do more. Another common perspective can be summed up as 'I don't know what I don't know and I just think there is probably something better'. Finally, 26% of respondents were dissatisfied with access in the region with their comments indicating issues relating to actual access (the Internet was often not available), over-capacity on the networks (which slowed speeds substantially) and challenges with service consistency.

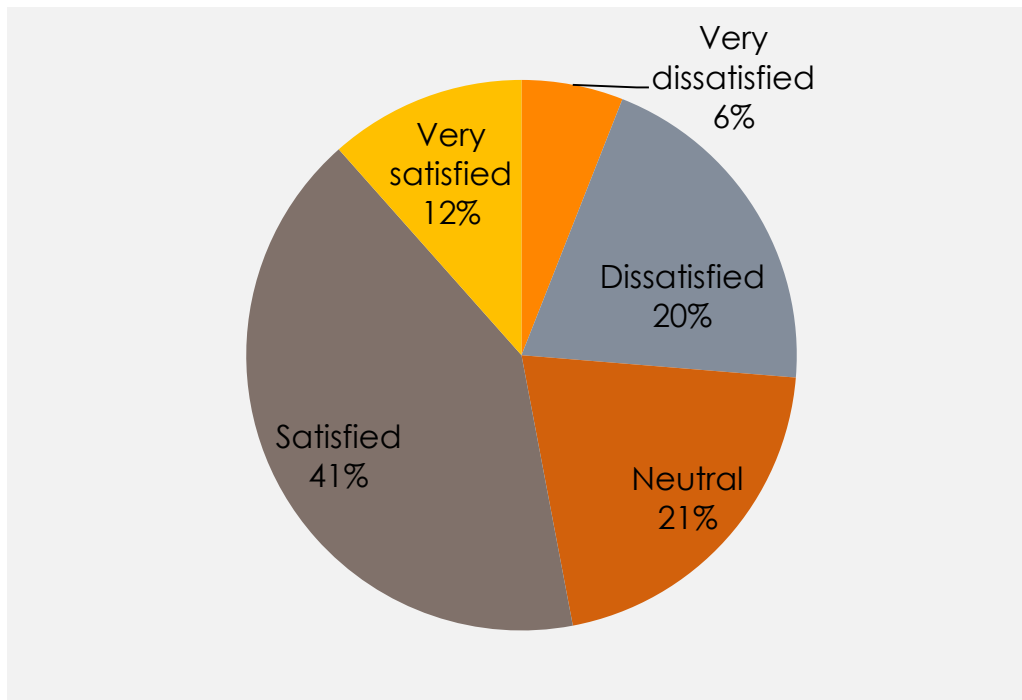


Figure 5.2: How do you feel about the speed of Internet access in your business?

The evaluation of the Internet service was done in the context of their current understanding as well as on how they could imagine business being done if the Internet connection was better. The emergence of the ‘Internet of Everything’ assumes ubiquity of connectivity to encompass people and machines. The resulting digital disruption is based in part on everything being connected and interacting in a plethora of cloud-based platforms, accessed anywhere, anytime and contextually aware, especially with respect to geo-location. If reliable, high-speed Internet is not available, this emerging way of doing business cannot be accessed, restricting the opportunity for businesses to take advantage of the benefits associated with increased connectivity. As connectivity, speed and bandwidth becomes more available, research shows that technological diversity increases substantially and more data is created and consumed. This is part of the discovery process that leads to innovation and process improvements.

Current access to high-speed Internet is being clouded by discussions around the National Broadband Network (NBN), with this infrastructure being regarded as an opportunity to bridge any existing digital divide in regional Australia and to enable businesses to participate in the digital economy more fully. The question of when the NBN service will arrive and how

to get the best from it restricts discussions on alternatives. Given that there is no specific scheduling of the NBN into the region, the region is at risk of lack of digital infrastructure.

5.5 Internet spending

In response to the question ‘On average, how much does your business spend on the Internet access every month?’, about 10% of the respondents chose ‘Don’t know’. Information from 90% of the surveyed firms indicated about 25% spend \$51–\$81 and about 29% spend over \$150 (Figure 5.3).

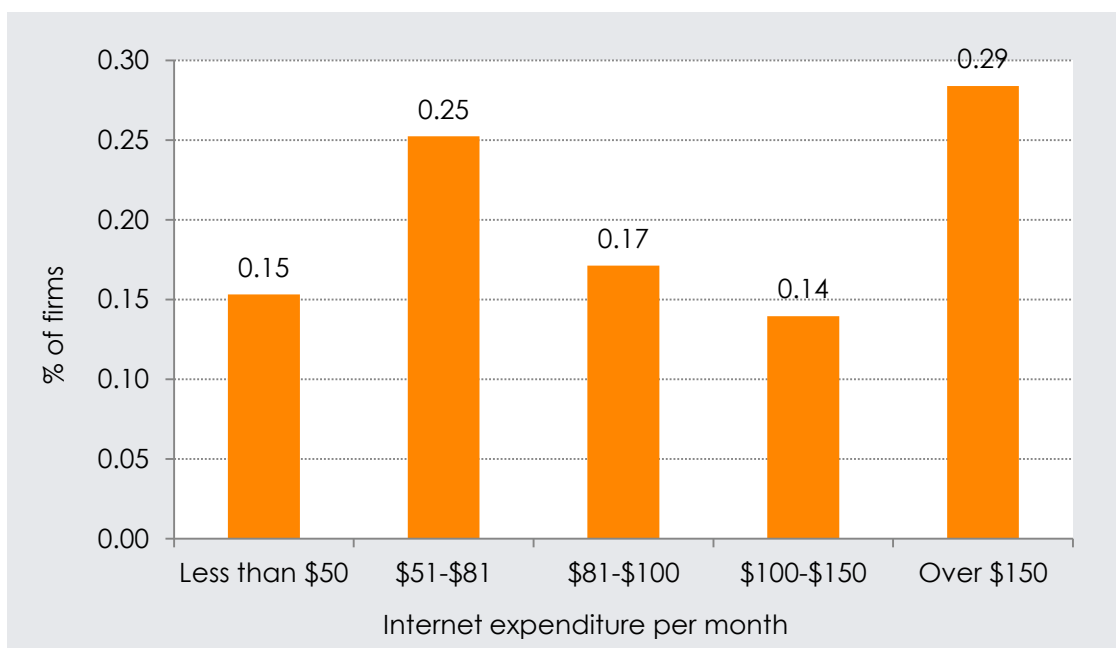


Figure 5.3: Average Internet expenditure per month.

In order to gauge if any mean difference across the Statistical Local Area exists, a one-way ANOVA test was performed. Test results indicate significant differences between the areas with Dalby having the highest average spending. In terms of economic activity and development, Dalby is also the most economically active area. Similarly, we found that Internet spending is positively and significantly correlated with the average revenue of the firms, with larger revenues correlating with higher Internet spending.

5.6 ICT and business performance

The effects of ICT on firm performance and productivity are an ongoing research issue. Several studies have found the positive effect of ICTs on business performance (Brynjolfsson and Yang, 1996; Adeya, 2003; Lal, 2007). However, not all firms and sectors share the same benefits from ICT due to the differences in organizational and industry structure (Brynjolfsson & Hitt, 2000). Aral and Weill (2007) found that the performance of ICT varied across firms. Previous studies in Australia have also shown a wide variation in performance across firms and industries (Productivity Commission, 2004). However, this evidence is mostly based on large firms. Examining the impact of ICT on rural and regional firms has been relatively unexplored.

Table 5.5 presents the Pearson correlation between the index of computerized operation and profitability of the businesses. Business profitability is positively correlated with computerized operation: a coefficient of 0.216 is significant at 1% confidence level.

Table 5.5: Correlation between computerized operations and profitability.

| | | Profitability | Computerized operation |
|---|----------------------------|----------------------|-------------------------------|
| Profitability | Pearson correlation | 1 | 0.216** |
| | Asymptotic Sig. (2-tailed) | | 0.000 |
| | N | 284 | 282 |
| Computerized operation | Pearson correlation | 0.216** | 1 |
| | Asymptotic Sig. (2-tailed) | 0.000 | |
| | N | 282 | 285 |
| ** Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 5.6 presents the cross-tabulation between computerized operations and profitability across firms. The table confirms the general pattern that a higher level of computerization is generally associated with a higher level of profitability. About 51% of the firms identified as ‘above average profitable’ in terms of their profitability ranking have increased computerized operations to a great extent (‘Greatly Increased’).

Table 5.6: Computerized operations and profitability cross tabulation.

| | | Profitability | | | Total |
|---------------------------|-------------------|------------------------------|--|--|-------|
| | | Unprofitable (% of total) | About average profitable (% of total) | Above average profitable (% of total) | |
| Computerized Operation | Greatly decreased | 0.0 | 0.6 | 0.0 | 0.4 |
| | Decreased | 5.6 | 1.2 | 0.0 | 1.1 |
| | Neither | 22.2 | 22.7 | 10.0 | 18.6 |
| | Increased | 55.6 | 44.8 | 38.9 | 43.6 |
| | Greatly increased | 16.7 | 30.8 | 51.1 | 36.4 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 |

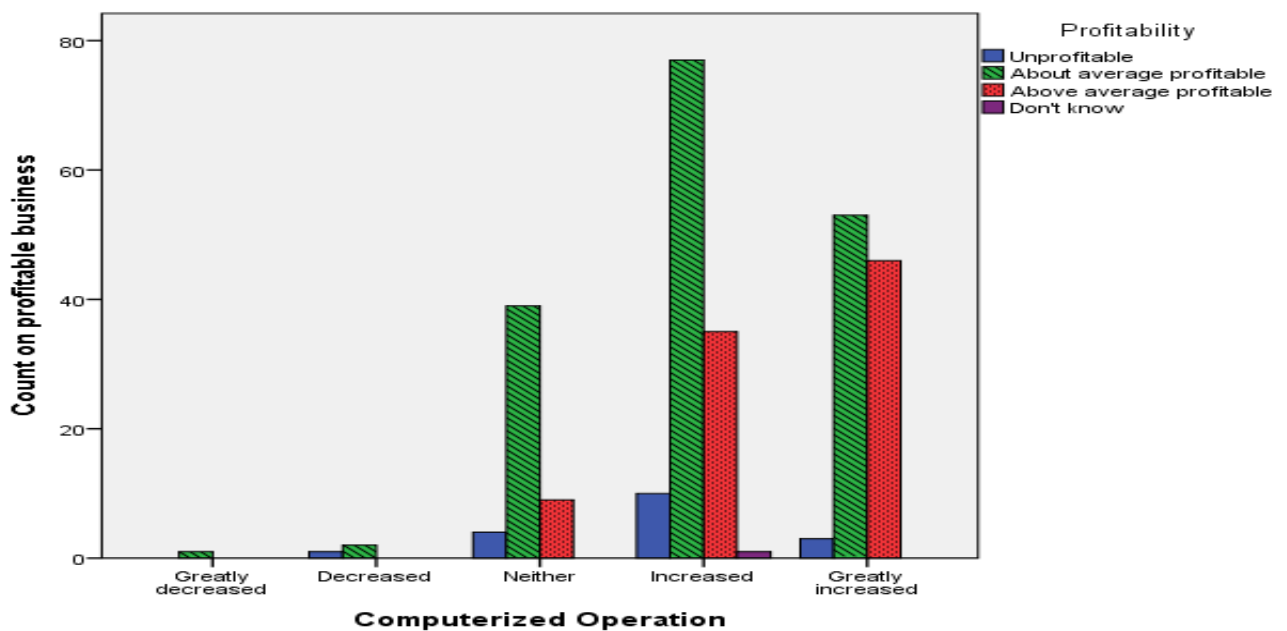


Figure 5.5: Profitability and computerized operations.

KEY TAKE-OUT: Firms can potentially gain financially from the investment in ICTs.

CHAPTER 6

E-COMMERCE

6.1 Introduction

As part of the rapid progress on the use of ICTs, businesses are increasingly going online for business purposes and to explore new opportunities. The use of ICT for business purposes is generally termed as e-commerce. In short, e-commerce refers to the process of buying and selling, transferring or exchanging products, services and/or information via computers, including on the Internet. E-commerce offers a variety of potential benefits to businesses, including increased profit and/or cash flow, reduced costs, improved quality, better service and support to the customers, and the ability to participate in larger markets, both domestic and international. Several studies have examined the e-commerce adoption of SMEs (see, Parker & Castleman, 2007, for a review). Yet, few studies have addressed the issues in the regional context.

This section reviews the types of e-commerce adopted by SMEs in the Western Downs region, the factors for differences in their adoption and the digital divides that have emerged. The results are compared to the national average.

Some studies note factors that determine differences in e-commerce adoption by SMEs (Parker & Castleman, 2007; Taylor & Murphy, 2004). Gabrielli and Balboni (2010) considered a firm's size is important in explaining the differential use of communication tools, even within the category of SMEs. Oliveira and Martins (2010) found evidence of statistically significant differences on e-commerce adoption between the telecommunication and tourism industries. Leroux et al. (2001) found that e-commerce in some sectors such as agriculture would be more difficult than in others due to the structure of that particular industry and the product complexity. Hooker et al. (2001) found that American farmers are usually somewhat slower to adopt ICT than the average American businesses.

ABS (2013b) found that about 48% of businesses in Australia with an employment size of 0–4 persons receive orders via the Internet as compared to 65% with an employment size of 5–20 persons and 74% with employment size of 21–199 persons in 2012. Figure 6.1 shows

that the income from Internet operations increased at a faster pace for the larger businesses in Australia during 2009–10 to 2011–12 as compared to the smaller businesses. Figure 6.2 shows the sectoral differences in e-commerce adoption in Australia in 2011–12.

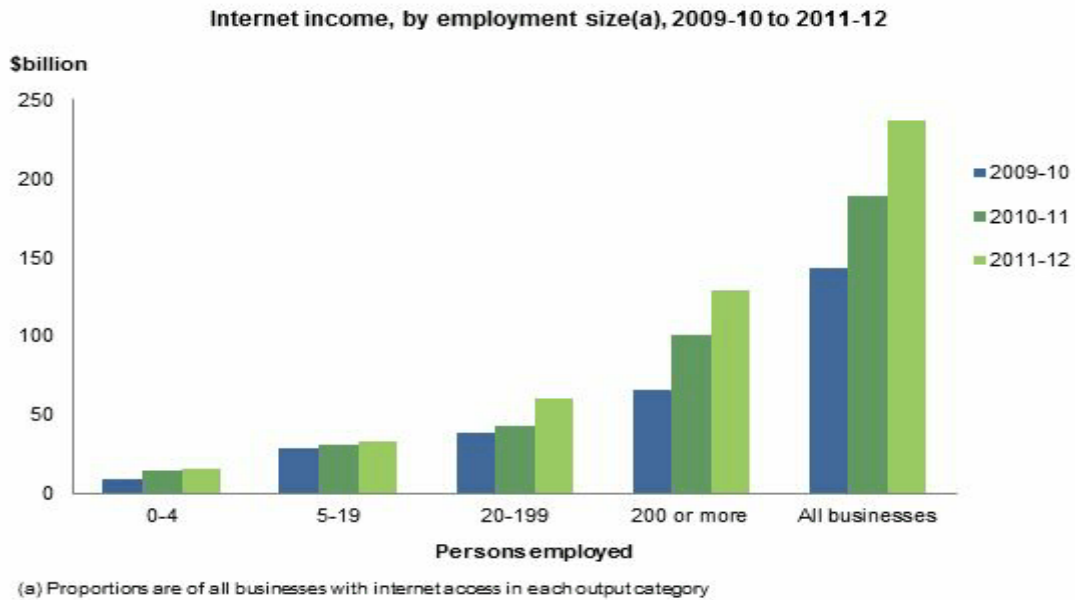


Figure 6.1: Income from the Internet, 2009–10 to 2011–12. Source: ABS (2013b).

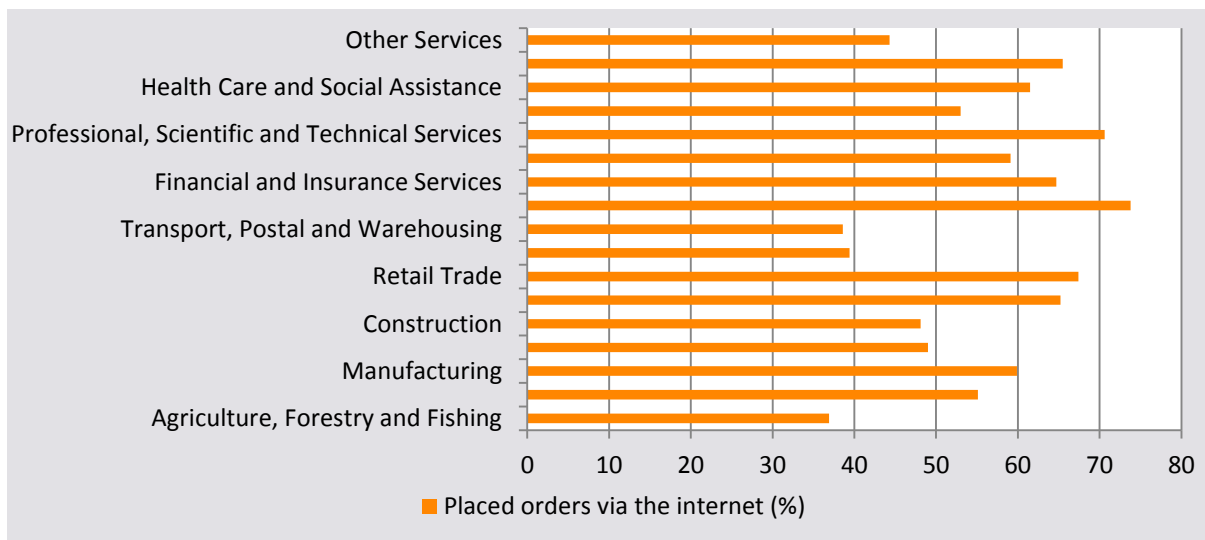


Figure 6.2: Sectoral differences in e-commerce adoption, 2011–12. Source: ABS (2013b).

6.2 E-commerce adoption by employment size

Table 6.1 presents the cross-tabulation of employment size and the use of ICT for various e-commerce-related activities. As shown, e-commerce activities have particular relevance to the employment size of the businesses. Firms with a higher employment size tend to have a greater focus on e-commerce activities as compared to the smaller ones and the difference is found to be statistically significant in all cases. Therefore, smaller businesses require policies that promote e-commerce activities.

Table 6.1: E-commerce activities by employment size.

| Activities | Employment size | | | Pearson Chi-square | P value | Sensis |
|---------------------------------------|-----------------|------|--------|--------------------|---------|--------|
| | 0–4 | 5–19 | 20–200 | | | |
| Businesses with Internet access that: | | | | | | |
| Promote goods and services | 42% | 67% | 71% | 18.27 | 0.00 | 60% |
| Sell goods and services online | 30% | 54% | 56% | 17.37 | 0.00 | 56% |
| Purchase raw materials online | 32% | 53% | 74% | 24.57 | 0.00 | 55% |
| Customer support | 42% | 74% | 76% | 28.90 | 0.00 | 66% |

Table 6.2 shows the cross-tabulation between e-commerce score and industry group from the survey data. The e-commerce score is obtained by adding the binominal response (yes, no) for each of the four categories. The ‘yes’ response is coded as 1 and ‘no’ as 0. The constructed e-commerce score therefore ranges from 0 to 4, where the number 0 reflects when the firm undertakes none of the e-commerce activities and 4 reflects the firm conducting all four activities as shown in Table 6.1.

As can be seen in Table 6.2, about 41% of the agricultural businesses use none of activities (zero score). Overall, manufacturing, mining and gas has a larger proportion of firms in highest score category (score 4). The difference across industry groups is found to be significant at 5% level as shown by the Chi-square statistics (Table 6.2). We therefore posit that significant differences in e-commerce activities exist between industry groups in the region, even within the category of SMEs in the region.

There is a marked digital divide in terms of e-commerce readiness as this is an essential construct of the emerging ‘Internet of Everything’ paradigm and a mechanism to take

advantage of the growing digital marketplace. While the extent of e-commerce adoption is low in all industry sectors in the region, some sectors such as agriculture, wholesale and retail trade, and services have shown a below average performance.

Table 6.2: Cross-tabulation between e-commerce score and industry group.

| Industry group | | E-commerce score | | | | | Total |
|-----------------------------|-------------------|------------------|-------|-------|-------|---------------------------|--------|
| | | 0.00 | 1.00 | 2.00 | 3.00 | 4.00 | |
| Agriculture | Count | 26 | 11 | 4 | 10 | 13 | 64 |
| | % within industry | 40.6% | 17.2% | 6.3% | 15.6% | 20.3% | 100.0% |
| Manufacturing, mining & gas | Count | 4 | 5 | 2 | 2 | 12 | 25 |
| | % within industry | 16.0% | 20.0% | 8.0% | 8.0% | 48.0% | 100.0% |
| Wholesale and retail trade | Count | 15 | 17 | 9 | 7 | 11 | 59 |
| | % within industry | 25.4% | 28.8% | 15.3% | 11.9% | 18.6% | 100.0% |
| Services | Count | 26 | 32 | 21 | 27 | 29 | 135 |
| | % within industry | 19.3% | 23.7% | 15.6% | 20.0% | 21.5% | 100.0% |
| Total | Count | 71 | 65 | 36 | 46 | 65 | 283 |
| | % within industry | 25.1% | 23.0% | 12.7% | 16.3% | 23.0% | 100.0% |
| Pearson Chi-square | Value | | | | df | Asymptotic Sig. (2-sided) | |
| | 24.99 | | | | 12 | 0.015 | |

While a direct comparison cannot be made, it is interesting to note that 33% of Queensland businesses claim to derive more than 10% of their revenue from online sales (CCIQ, 2013). According to Sensis (2012), 51% of the SMEs would take orders online and 62% of the SMEs would receive payments online in 2012. By extrapolation, this suggests that the Western Downs businesses are lagging in their e-commerce and global integration initiatives.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

SMEs play a critical role in overall economic activity, especially in the context of rural and regional development, but they suffer from various constraints. In general, SMEs face limited access to market information and suffer from globalisation constraints. They are short of time to allocate to strategic planning and also tend to lack the specialist skills and resources, such as financial and organizational, to determine a future for growth through periods of change. The tendency to employ generalists, not specialists, reliance on short-term planning and informal implementation of market strategies and decision-making processes are distinctive characteristics of SMEs that tend to make them poorly equipped to deal with significant change. This resource poverty is a major differentiator between SMEs and large corporations, putting them at a disadvantage for adopting and using ICT.

The objective of this study has been to examine the adoption and usage of ICT of SMEs operating in the Western Downs region. It provides insights to and understanding of the trends of using ICTs by rural and regional enterprises and examines whether the adoption and use of ICT differs across firms and industries. The results from the study were generated through structured surveys conducted in the region during March–June 2014. Of the total of 289 SMEs that participated in the survey, 58% had an employment size of 0–4 people, 30% had 5–19 people and about 12.3% of the businesses employed 20–200 people.

KEY RESULTS

Overall business

- The results from the study indicate that there is a significant association between profitability and size of firms. This reflects significant downside risk of the micro-enterprises in the region. This finding is validated with the broader research which shows that many micro-enterprises are at significant risk of financial strain and difficulties due to the nature of being a small business. The results presented in the

report show that smaller businesses are lagging in terms of innovation and e-commerce activities.

- Most industries in the region are not well networked into the broader global economy and smaller businesses are found to be least integrated through international export. Leveraging the global integration of the SMEs in the region should, therefore, be an important policy agenda. Exploiting online networking facilities such as social media and leveraging Internet presence can play an important role in online marketing and sales through which the SMEs can potentially improve their competitive position.
- Overall, firms in the region are found to be at the lower level of innovative activities. Firms have shown a better performance in process innovation rather than market innovation or product innovation.
- About half of the businesses in the survey were optimistic about the growth prospects for their businesses. The other half were either neutral or had a negative perception on the potential of their business. About half of the survey participants believe that business will be less profitable and more competitive in the future.
- In terms of growth prospects across industries, the agriculture sector was perceived as having the least potential for growth: about 72% of the participants took either a neutral position or disagreed that there was growth potential.
- In terms of industry size, 41% of the respondents with micro businesses (0–4 employees) agreed or strongly agreed with growth prospects as compared to about 61% of participants with an employment size of 5–19 and 59% with the employment size of 20–200.
- Only 9% of the participants from the agricultural sector were found to be optimistic about the business opportunities in the region as compared to 24% from the manufacturing, mining and gas sector, 14% from the wholesale and retail trade sector, and about 28% from the services sector. In terms of geographical locations, firms from Miles and Tara were less pessimistic regarding opportunities in the region as compared to businesses in Chinchilla and Dalby.

Use of ICT and digital divide

- The survey results suggest that there is an above average diversity of ICT devices in the region, with a bias towards satellite and mobile connections, reflecting the more remote, mobile nature of work in the region and the possible constraints to infrastructure requiring ICT access from a variety of devices to ensure continuity.
- The findings of this research are consistent with other studies in terms of connectivity to the Internet and SMEs' web presence in Australia. The high prevalence of satellite and wireless connections as compared to ADSL connectivity demonstrates the remoteness, infrastructure inadequacy and challenges of getting connected.
- In the case of Internet presence, a significant difference across businesses by the size of employment was observed. About 67% of the businesses with an employment size of 0–4 do not have an Internet presence as compared to 33% with an employment size of 5–19 and only 6% with an employment size of 20–200. The difference is statistically significant as shown by the asymptotic significance value of less than 5%.
- About 80% of the agricultural businesses do not have an Internet presence and the share is even higher among the smaller business categories by the size of employment. This reflects a clear digital divide in terms of employment size and industry groups where some sectors and smaller businesses are lagging.
- Half of the respondents indicated that they were satisfied with their Internet connections. This is below the satisfaction levels reported by Australian SMEs who rank service satisfaction levels of over 70%.
- Smaller firms are found to have a lower level of e-commerce activities as compared to the larger ones and the difference is found to be statistically significant in all cases. Smaller businesses require policies that promote e-commerce activities.
- Significant differences in e-commerce activities exist across industry groups and the agriculture sector in particular is found to be clearly lagging.

RECOMMENDATIONS

This report has presented evidence of SME's use of the Internet to communicate and interact with customers, but the study has also found that they are not realising the full benefits of the digital economy. In some key areas SMEs in the Western Downs region are lagging their Australian counterparts, particularly in certain industry sectors such as agriculture. Furthermore, a region that is well connected to broadband Internet services (including satellite and wireless) can develop significant regional strengths in order to attract new businesses and a highly skilled workforce.

While 65% of SMEs in Australia agree that conducting business online is important to business growth, only 14% feel that they are taking full advantage of this opportunity. In particular, small businesses have indicated they would like to increase their capacity to sell goods and services online: 30% want to sell goods and services online, and 26% indicate they would like to be able to accept online payments.

Key strategies for the region include:

1. Develop a digital economy plan for the Western Downs region to include strategies to address the infrastructure gaps and to develop an ICT enabled workforce.
2. Develop collaborative partnership with business and not-for-profit groups to improve digital literacy, to promote local strategies to take advantage of the digital economy, to raise awareness of the digital economy's benefits and the emerging opportunities for local business communities, and to attract more businesses to the region as a way of diversifying the economic base.
3. Develop local digital strategies to support smaller and non-employing businesses in building their digital capacity to exploit opportunities in e-commerce.
4. Design strategies to improve innovation activities with a particular focus on product innovation and process innovation.
5. Explore opportunities to develop 'digital hubs' as demonstration sites.
6. Work with the agriculture and manufacturing sectors in particular to develop and implement digital strategies.

7. Further research should focus on e-commerce and the innovation capabilities of the smaller and farm businesses as ways to create greater value from these SMEs. One aspect to examine is the barriers to participation in the digital economy, especially with respect to e-learning, health and farm management, with a focus on lifting productivity.

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APPENDICES

Appendix A: Glossary of terms, abbreviations and acronyms

Australian Bureau of Statistics (ABS): The ABS is a national statistical agency which provides statistics on a wide range of economic, environmental and social issues.

Asymmetric Digital Subscriber Line (ADSL): ADSL is a form of a digital subscriber line, a data communications technology that enables faster data transmission over copper telephone lines than a conventional voice band modem can provide. Data transmission speeds to the subscriber is higher than data transmission from the subscriber, hence the qualifier 'asymmetric'. The maximum transmission speed is from 2 to 8 Mbps and the maximum range is up to 2 km (for 0.4 mm cable).

ADSL2+: The services of the next generation of the Asymmetric Digital Subscriber Line, ADSL2+, are provided outside the regulated broadband requirement of the national provider (Telstra) and are primarily enabled in areas where there is high interest. The delivery speed can be up to 20 Mbps depending on the distance between the premises and the exchanges and the noise, interference and crosstalk generated in the system. ADSL 2+ cannot provide connections for the last mile connectivity in regional and rural Australia, hence wireless technology is required.

Broadband: Broadband is an Internet connection that can send and receive data in large amounts.

Digital disruption: Digital disruption refers to the changes enabled by digital technologies that occur at a pace and magnitude that disrupt established ways of value creation, social interaction, doing business and, more generally, our thinking.

Digital divide: This term 'refers to a certain type of inequality in respect of the access and use of ICT. Digital divide may arise due to differences in the provision of infrastructure and/or disparities in income, skills and capacity.

E-commerce: The general term for the use of computers and the Internet for business purposes. It refers to the process of buying and selling, and transferring or exchanging products, services and/or information via the Internet.

Fixed Wireless: Fixed wireless Internet is an aerial mounted on the roof of the premises (fixed) and directed to an NBN fixed wireless tower.

4G: 4G is the newer version of the 3G wireless technology.

Gross Regional Product (GRP): GRP is conceptually equivalent to gross domestic product. It measures value created through production by production units (e.g., regional residents) in the regional economy (usually a state, council or shire district).

Information and communication technology (ICT): ICT includes technology and/or communications equipment, including software. ICT is an umbrella term that includes any communication device or application, encompassing: radios, televisions, cellular phones, computers and network hardware and software, satellite systems and so on, as well as the associated various services and applications such as videoconferencing and distance learning (DCITA, 2005). In the US the reference is often 'IT'.

Mobile broadband: Mobile broadband is access to the Internet through a wireless device such as a mobile phone, a smart phone, an iPad or another tablet.

National Broadband Network (NBN): The NBN is an upgrade to Australia's existing telecommunications infrastructure. It is Australia's biggest ever network infrastructure project for fixed line phone and high-speed broadband Internet access to all of the Australian premises. It will ultimately replace the old copper networks that are currently being used for phone network and broadband internet services. The new NBN policy adopted a variety of technologies to deliver the NBN. A combination of high-speed fixed wireless and satellite services will be used in addition to the fibre optic network to connect all Australian premises. Seventy one percent of households and businesses will receive fibre to the node, while 22% will be receiving fibre direct to the premises. A further 7% of Australians in rural and remote areas will receive the NBN via fixed wireless (4%) or satellite services (3%).

Fibre optic (optical fibre): Also known as Fixed Line, a Fibre NBN connection uses fibre optic cable technology. Fibre optic cable is made of glass and uses pulses light to transmit data with speeds much faster than over the traditional copper network. The key difference is that fibre optic cables have much higher bandwidths than copper cables as a result they can transmit much more data, over a much longer distance.

Personal Digital Assistant (PDA): PDA is a mobile hand-held device that functions as a personal information manager. It provides computing and information storage and retrieval capabilities, and telephone, fax, Internet and networking features.

Satellite: A purpose-built satellite services will provide the high-speed broadband to those who live and work in the very remote areas. Satellite Internet is a satellite dish, usually mounted to the roof of a premise, which receives an Internet connection from an orbiting satellite. It is the slowest of the three NBN technologies and the Internet speed is slightly hindered by an effect called latency. This has to do with the distance a signal has to travel to reach the satellite.

Small and medium-sized enterprises (SMEs): SMEs are defined as sole owner operations or firms employing less than 200 employees. SMEs are an engine of the Australian economy, employing two-thirds of private sector workers and contribute half of private sector gross domestic product.

3G: 3G, abbreviated from the 3rd generation of ICT, is wireless technology used predominately for mobile devices such as phones, iPads and other tablets.

Appendix B: Survey questionnaire



Shaping our Economic Future Questionnaire

Western Downs Regional Council (WDRC) and the University of Southern Queensland (USQ) are currently researching the opinions of business owners and managers of our region's small and medium scale enterprises (SMEs) so that we can develop appropriate and effective Information and Communications Technology (ICT) strategies to enhance our regional economic development. The information that you provide is essential to help us form the most effective and appropriate strategies and guide investments for our regional development.

Your opinion is significant in this process and we appreciate your time to complete this survey.

Things you need to know

- Your answers will be anonymous.
- Your participation in this survey, whilst extremely important, is voluntary. Your informed consent is given when you complete and return the questionnaire.
- All your information remains strictly private, in compliance with the Federal Privacy Act (1988).
- The questionnaire will take about 15-20 minutes to complete, on average.
- Key findings from this survey will be available to you if you provide your contact details at the back of the questionnaire.
- To be eligible to participate in this survey, you must be aged 18 years or over.

The full report will be accessible through

<http://www.advancewestern Downs.com.au/addressing-the-digital-divide-in-the-western-downs> and business@wdrc.qld.gov.au

Structure of the questionnaire

There are three sections in this questionnaire. They cover the business use of ICT, organizational operation and growth and about your business and region, with are clearly labelled section headers for each of these three sections. Please read each question and then write/tick the answer that best applies to you.

Ethical concerns (*Ethics no. of the Questionnaire H13REA150*)

If you have any ethical concerns with how the research is being conducted or any queries about your rights as a participant please feel free to contact USQ Ethics Officer on the following details.

Ethics and Research Integrity Officer, Office of Research and Higher Degrees

USQ, West Street, Toowoomba 4350, Ph: +61 7 4631 2690, Email: ethics@usq.edu.au

Thank you for being involved with this research.

Yours sincerely

Associate Professor Khorshed Alam (Principal Investigator);

Phone (07) 4631 1291 (Office); Email: Khorshed.Alam@usq.edu.au

Section One: About your business use of ICT

1. Which of the following does the business use and how many of each? (Please tick one box per row)

| | None | 1 | 2 | 3 | 4 | 5 or more |
|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Fixed-line phones | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mobile phone/smartphone | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Satellite phones | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Personal Digital Assistant (PDA) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Digital UHF/VHF radios | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Desktop computers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Laptop computers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tablet PCs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. A Local Area Network (LAN) is a computer network that interconnects computers in an office building. Thinking about your computers, do any of them connect to a central LAN:

Yes No

3. Does the main place of business have the Internet access? Yes No (Skip to Q14)

4. If your answer to Q3 is yes, please indicate the type of Internet access you have:

Dial-up ADSL ADSL 2+ Wireless
 Cable Satellite Others: _____

5. Do you use Wi-Fi for the Internet use in your business: Yes No

6. How long has the business used the Internet? _____ (years)

7. What type of Internet plan do you use?

Stand-alone Internet plan Bundled Internet plan

8. On average, how much does your business spend on the Internet access every month?

<\$50 \$51-\$80 \$81-\$100 \$100-\$150 Over \$150

9. How do you feel about the speed of the Internet access in your business?

Very satisfied Satisfied Neutral Dissatisfied Very dissatisfied

10. How often do you use the Internet to access business information/operation?

Always Very often Fairly many times Occasionally Never

11. Thinking about your business operations, do you use the Internet (including email) for?
(Please tick all that apply)

Searching for information Online order Purchasing raw materials
 Promoting goods and services Staff support Providing Customer Support
 Selling goods and services Others (please specify) _____

12. Does your business have a website? Yes No

13. Did your business ever use video conferencing (including Skype) for remote meetings?

Yes No

14. Does your business use any of the following social networking sites for business purpose?

Facebook YouTube Twitter LinkedIn WordPress Tumblr Blog
 Other _____ None

15. On average, what percentage of your total purchases are made online every year (A\$/year)?

0% 1-20% 21-40% 41 – 60% 61-80% 81-99% 100% Don't know

16. On average, what percentage of your total sales are made online every year (A\$/year)?

0% 1-20% 21-40% 41 – 60% 61-80% 81-99% 100% Don't know

17. If you use mobile phone in your business, how satisfied are you about its access?

Very Satisfied Satisfied Neutral Dissatisfied Very dissatisfied

18. If you had better Internet and/or mobile connections, do you think it would improve business operations?

Yes No Unsure

19. How much do you think would be the present market value of your business's ICT assets (your phones, mobile phones, computer devices, back-up devices software, Internet connections etc.)?

Less than \$1000 \$1001-\$5000 \$5001-\$10,000
 \$10,001-\$20,000 Over \$20,000 Unsure

20. Does your business have an ICT Strategy? Yes No Don't Know

21. Does your business have an ICT Terms of Use Policy? Yes No Don't Know

22. Does your business have an ICT Privacy Policy? Yes No Don't Know

23. Does your business have an ICT Training Policy? Yes No Don't Know

24. What percentage of your staff has some form of formal ICT training?

- None less than or equal to 25% 26-50% 51-75% 100%
 Unsure

25. What proportion of your staff uses ICT every day in their work?

- None Little Some A Lot All

26. What proportion of your employees has adequate ICT skills to conduct their day-to-day business activities?

- None Little Some A Lot All

27. Does your business have any specialised ICT staff?

- Fulltime Part-time
 No Contractor when needed

28. Do you believe your business is affected by an ICT skills shortage?

- Yes No Unsure

29. In your opinion how has the performance of your business been affected by ICT? (please tick one)

- Significantly improved and enabled Somewhat improved and enabled
 No effect
 Negatively impacted and disabled Significantly impacted and disabled
 Other (please specify)

Section Two: About your organisation's operations and growth

30. Thinking about your business, would you like to use ICT to develop opportunities?

- Definitely yes Probably yes May be Probably not Definitely not

31. Thinking about your business, how do you feel about change?

- Very positive Somewhat positive Neutral Somewhat negative
 Very negative

32. How do you evaluate the performance of your business as compared to most of your competitors?

Much better Better About the same Worse Much Worse

33. In your business, how **true** are the following statements: (Please tick one box per row)

| | Very True | True | Neither | Not true | Not true at all | Don't know |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Our work environment is positive and friendly | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Employees effectively work in a team to attain organizational objectives | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Our organization follows flexible work practices, e.g., job sharing, leave for carers etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Promotion and appraisal systems are fair and unbiased | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Employees go through appropriate development and training | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

34. During the past five years, how has the business engaged in: (Please tick one box per row)

| | Greatly increased | Increased | Neither | Decreased | Greatly decreased | Don't know |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Adding a new product or service | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Computerising operations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Selling to a new market | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Expanding distribution channels | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Expanding advertising and promotion | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Training employees on-site/off-site | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Adding new employees | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Exploiting new opportunities for business | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

35. In terms of the future, I believe that: (Please tick one box per row)

| | Strongly agree | Agree | Neither | Disagree | Strongly disagree | Don't know |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Our business has significant growth potential | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| There will be many more opportunities in the region | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| In the future, doing business will be less profitable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Our business will be competitive in the future | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Our business will need to adapt to changes in the region | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section Three: About your business

36. Where does your main business operate?

Locality/Suburb _____ Postcode _____

37. In what industry(s) does the business operate? (Please tick one)

- Agriculture Mining & Gas Manufacturing
Professional, Scientific & Technical Services
Construction Retail Transport & Storage Accommodation & Food
Rental, Hiring and Real Estate Services
Other _____

38. In what year was the business founded? _____

39. The business is a:

- Sole Trader Partnership Private company Association
Limited public Unsure

40. What best describes your business?

- Single site business Head office Regional office
Branch office Franchise Home business

41. Number of equivalent full time employees in the business: _____

42. What percentage of the business revenue goes to salaries and wages?

- Less than 20% 20-39% 40-59% 60-80% Over 80%

43. In your business, what percentages of employees have the following positions?

Tradespeople ____% Office support staff ____% Professionals staff ____%
Apprentices ____% Other ____%

44. What percentage of your employees has, as their main job, the acquisition, analysis and manipulation of information?

0-10% 11-30% 31-50% 51-80% More than 80%

45. What was the average revenue of your business in the last financial year (2012-13)?

\$0 - \$20K \$21K - \$50K \$51K - \$100K \$101K - \$250K
 \$251K - \$500K More than \$500K Unsure

46. What percentage of revenue of your business was from international export activities in the last financial year (2012-13)?

0% 1-20% 21-40% 41 – 60% 61-80% More than 80% Don't know

47. What percentage revenue of the business was from international import activities in the last financial year?

0% 1-20% 21-40% 41 – 60% 61-80% More than 80%
 Don't know

48. Would you describe your business to be:

Unprofitable Average profitable Above average profitable

49. What do you think the present market value is for all assets that your business has (e.g. land, building, machinery etc)?

\$0-\$20K \$21K-\$50K \$51-100K \$101K-\$250K
 \$251K-\$500K More than \$500K Unsure

Demographic information of survey participant (optional)

50. Your gender Male Female Other

51. Your age group <30 Yrs 30 – 39 Yrs 40-49 Yrs 50 – 59 Yrs 60 Yrs
and above

52. Your position in the firm

Owner General Manager ICT Manager Other (please specify)

53. Are you willing to provide further details or be involved in an interview (optional) to help us understand the business value of ICT in regional areas?

Yes

No

54. If your answer to Q53 is yes, please provide the following details. Your contact details will not be provided to any other agency or third party and will be used for the purpose of this research only.

Company name _____

Contact name/ position _____

Contact email (to get survey results) _____

Company website (if any) _____

Postal address (to get survey results) _____

Thank you for your time.

Appendix C: Results from Principal Component Analysis

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|--|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1. Adding new product or service | 1.819 | 30.314 | 30.314 | 1.819 | 30.314 | 30.314 | 1.601 | 26.690 | 26.690 |
| 2. Computerizing operations | 1.294 | 21.565 | 51.879 | 1.294 | 21.565 | 51.879 | 1.511 | 25.189 | 51.879 |
| 3. Selling to a new market | 0.925 | 15.420 | 67.299 | | | | | | |
| 4. Expanding distribution channel | 0.742 | 12.367 | 79.666 | | | | | | |
| 5. Expanding advertising and promotion | 0.675 | 11.257 | 90.923 | | | | | | |
| 6. Training employee on site/off site | 0.545 | 9.077 | 100.000 | | | | | | |

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