

**THE IMPACT OF BROADBAND TECHNOLOGIES ON THE  
ECONOMIC DEVELOPMENT OF REGIONAL  
COMMUNITIES RESEARCH REPORTS**

**Identifying the Impact of Broadband Adoption on Business Development in  
Four Regional Queensland Communities**

**DRAFT**

**RESEARCH REPORT No. 3**

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Central Queensland University  
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## **Executive Summary**

This research involved a survey of businesses in Bowen, Gympie, Longreach and Roma about the current and future use of broadband. The survey was collected by phone, mail and internet in May and June 2006, with a total of 496 responses collected from 812 businesses approached.

The survey generated a number of broad groups of research findings.

First, the results indicate that there are many more similarities between the business communities than differences in the takeup and use of CIT. Longreach was a little different to the other communities with higher levels of takeup and use, perhaps reflecting an older and more stable business community. In most cases, little difference in usage could be detected between communities.

Second, there are clear differences between usage and attitudes according to whether businesses have broadband or narrowband connections. Businesses with broadband tend to have much more positive views about the usefulness and importance of broadband, and to be concerned about the impacts of any potential loss of service or connection. In comparison, narrowband users tend to have a much more conservative view of the benefits of broadband, tend to be more confused about its cost, and more concerned about its misuse. This may help explain why they have not taken up the new technology.

The benefits of broadband do not appear to be fully realised until people have practical experience with the technology. Even among adopters of the technology, it appears that many may have been unsure how it would affect their business operations at the time of adoption, indicating that it was “something you got because you had to”. Over a quarter of users could then identify ‘unexpected benefits’ and a similar number were expecting positive changes to their business operations in the future.

Third, the key uses of the internet by businesses were to get information and research, and to use on-line banking. Communicating with suppliers and other businesses were more important than communicating with customers. Businesses with broadband indicated that there were major benefits in relation to improving supplies and business performance, but more limited benefits in terms of attracting new customers, reducing staff costs or increasing turnover. The findings are quite similar to earlier studies of broadband usage in the limited use of broadband for marketing purposes, and the impact in reducing costs rather than increasing sales.

Fourth, there are generally high satisfaction levels for the speed and reliability of internet connections. Satisfaction was lowest in Bowen and highest in Roma. Broadband users appeared very satisfied with their connection speed and reliability, in marked contrast to narrowband users. However around one third of broadband users express confusion about broadband technology and confusion and concern about its cost, which suggests that further information support is needed.

Fifth, business respondents did not appear to be concerned about improved technology increasing outside competition. Only 21% of respondents with broadband and 7% with narrowband thought that the presence of broadband had increased

business competition. This suggests that the provision of broadband technology is perceived to be largely beneficial to regional businesses. However the main customer group targeted by both Gympie and Bowen respondents was new customers outside their local area, so there may be a failure to recognize the threat of new competitors.

Sixth, respondents generally viewed the social benefits of broadband very highly, rating these as more beneficial than the business benefits. There was strong support for broadband provision having broader community benefits, including overcoming some of the problems of remoteness, improving business activity, improving infrastructure services and improving skills levels.

Seventh, broadband users put a higher value on improved speed than did narrowband users. There was some evidence of diminishing marginal values for increased speed of connection. There appears to be little value for further improvements in service levels, and modest values for further improvements in reliability.

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## 1. Introduction

Communication infrastructure is an essential service for businesses and communities in the same way that transport, security, education and health are integral to community functioning and development. The development of broadband technology in recent years has transformed communications, with flow-on effects at individual, business and community levels. Businesses have opportunities to increase productivity and reduce costs, while individuals have better access to information, new products, and services such as education and entertainment. The communication changes are also having impacts at community levels, allowing more virtual communities to develop, and enabling 'teleworkers' to live in areas of lifestyle choice.

These business, lifestyle and social changes are largely the consequence of voluntary consumer choices, but they may also involve some unanticipated ripple effects. One set of concerns relates to the possibility that uneven adoption and growth patterns could lead to greater differentiation between communities, particularly between urban and regional settings. Another set of concerns relates to the impact of changing business and social patterns, particularly when these are focused on smaller and regional centres. A further concern is that deficiencies in communication infrastructure and services may constrain economic development, particularly in regional areas.

To address these issues there have been a range of government programs developed to encourage provision of broadband infrastructure and better adoption of its use. While there is general agreement that better communication fosters regional economic development, limited research is available in Australia to describe how the process occurs or to detail the extent of the benefits. Such information is important in designing effective infrastructure and support programs, and to determine the relative benefits of additional investments.

The focus of this research project was to identify the impact of broadband technologies on the economic development of regional communities in Queensland. The project was framed in the context of regional communities having variable levels of access (at least historically) to broadband infrastructure and services, and to wide variations within business communities about the type and extent of usage. Key aims of the study included the development of a better understanding about how businesses used broadband, key factors that might inhibit take-up, and an appraisal of the priorities for further development.

The research has been undertaken in three stages. The first part of the project involved a desktop review, while the second stage involved structured interviews with key community representatives. The third stage involved direct data collection from businesses in four regional communities; Bowen, Gympie, Longreach and Roma. These communities were chosen as being representative of a number of regional communities in the state.

Outcomes of the first two stages of the project have been reported in the first two research reports. This report is focused on presenting the results and implications of the data collection from the four communities of interest, and essentially caps the results of the project. The report is structured in the following way. In the next

section, the key issues of interest that framed the data collection process are outlined. These are largely drawn from the first two stages of the project. In section three, the survey design and collection performance is outlined, while results are reported in the following two sections. Conclusions and recommendations follow in the final section.

## **2. Relating broadband technologies to economic development of regional communities**

It was concluded from the literature review (Report 1) that there are clear, measurable economic benefits associated with the adoption of broadband technology. For individual firms, the adoption of broadband can help to:

- promote efficiency and reduce costs
- overcome locational barriers
- create new market opportunities.

The extent to which firms are able to capture these benefits and apply the new technology to their best advantage depends on the characteristics of both the firms and the environment in which they operate. Some of the influencing factors include:

- industry type, and the opportunities for benefits
- the extent of adoption in the wider community (allowing network externalities)
- the availability of operational knowledge and skills.

It is possible that the benefits of adoption may be lower in rural compared to urban areas because of different environments (i.e. different industry bases), but broadband is generally expected to generate benefits for even the smallest communities. There are concerns that communities without broadband coverage or significant adoption (some regional communities) will have lower levels of economic development, and concerns that the introduction and adoption of broadband can involve adjustment pains.

Little information is available to suggest how the impacts of broadband adoption will flow through to specific sectors of an economy, or spill over into wider community development and growth issues. There is also very little information available about how smaller communities develop relative to larger ones, and how the benefits of broadband adoption might relate to labour skills, support and training services and the attractiveness of a region to labour mobility and new business establishment.

The use of semi-structured interviews in the business communities of interest (Report 2) identified that broadband was generally viewed as having major advantages over dial-up access and that further economic benefits are expected over time. Businesses are expected to use broadband to reduce costs and increase productivity, while communities will gain access to a wider group of services such as education and health. Some of the key issues surrounding the introduction of broadband were identified as cost, speed, reliability and equity of availability. Broadband increases competition by giving customers more information about alternative products, suppliers and their prices, but also gives businesses access to broader markets, new

products, and lower cost suppliers. Not all businesses are utilizing broadband technology for a range of reasons, including:

- limited appropriateness for business
- limited skills and knowledge
- lack of available support
- cost.

The background information about the factors that are expected to influence the use and adoption of broadband helped to draft the primary data collection phase. There were two key focuses for data collection:

- to identify current activities and attitudes of businesses in relation to broadband use, and
- to identify factors that will influence future behaviour.

The data collection process was complicated by varying levels of computer, internet and broadband usage in the business communities. This meant that the survey instruments had to be tailored to some extent to the levels of technology adoption of the different businesses. This was done by developing different versions of the survey questionnaires that were applicable to:

- businesses without computers
- businesses with computers without internet access
- businesses with narrowband access
- businesses with broadband access

A key focus of the data collection was to identify factors that explain current levels of adoption of narrowband and broadband technologies, identify the benefits of adoption, and explain likely future behaviour. However, it was expected that business operators would find it difficult to explain their decision processes in purely commercial terms. Because of this, a key focus in the design of the survey instruments was to develop a number of measures of attitudinal variables.

Another key focus of the data collection was to predict factors that would influence future adoption rates. To relate this information better to a policy setting, it was preferable to have some quantitative assessment of the influence of these factors. To achieve this, the data collection also involved the use of the Choice Modelling technique. In the application, business respondents were given different alternatives for future communication with varying attributes (including cost), and asked to select their preferred choice. The analysis of the choices made provides information about the relative importance of the different attributes used to describe the communication options.

In the next section, the design and collection of the survey instrument is described in more detail.



### **3. Survey design and collection details**

The questionnaire survey was designed in two parts. The first part, Part A, was designed to elicit general information about internet and broadband usage. Respondents who were using the internet, with either a narrowband or broadband connection were questioned further about their opinions on the impacts of broadband. Respondents who had an internet connection were then asked to complete the second part of the survey, Part B, which was designed to determine the relative importance of different Communication Information Technology (CIT) infrastructure components. This section incorporated the choice modelling exercise.

#### **3.1 Sample frame**

Four regional towns were selected for comparison.

- Bowen, a coastal community based on agriculture and some tourism;
- Gympie, a community close to the coast and south-east Queensland, becoming more popular as a “lifestyle location”;
- Roma, a regional hub based on agriculture, and
- Longreach, a regional hub based on agriculture, with an important tourist industry.

The sampling frame for the survey was restricted to these communities as defined by designated postcodes. The target population was all businesses in the given areas that contain a current telephone number, including mobiles and 1800 numbers.

In Longreach and Roma (populations of 3,673 and 5,907<sup>1</sup> respectively), the business community was relatively small and all available business telephone numbers were included in the sample frame.

In Bowen and Gympie (populations of 8,550 and 10,623 respectively) there were larger business communities, and a randomly selected sample (using the Market Pro database) was contacted. An initial target was set of approximately 180 completed Part A interviews for each location.

The target participant designated for survey completion was an employee of each business who was preferably in a management position, or else someone who had sufficient knowledge of the company’s Information Technology (IT) systems.

#### **3.2 Survey collection**

The survey was conducted through the Population Research Laboratory at Central Queensland University. A multiple data collection strategy was adopted to engage the different business communities and to present the different survey formats. While some questions could be asked by telephone, parts of the survey (the Choice Modelling scenarios) had to be presented visually. To achieve this, the survey was delivered in two parts;

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<sup>1</sup> ABS 2001 Census

- Part A contained questions about the type of communications technology used and the reasons for adoption, together with some attitudinal questions. Respondents were streamed (for both Part A and Part B surveys) according to their level of communication technology. Part A was completed either as a telephone interview (CATI - Computer-Assisted Telephone Interviewing system<sup>2</sup>) or a mail out survey.
- Part B contained the choice modelling questions. This was completed either as an online survey (SSIWeb) or as a mail out survey. Only businesses with narrowband or broadband connections were asked to complete the Part B survey.

Respondents were able to participate in the survey by the following combination of methods;

- Completing Part A on the telephone and going on to complete Part B online
- Completing Part A on the telephone and completing Part B by post
- Completing both Part A and Part B by post
- Completing Part A by email and Part B online
- Completing Part A by email and Part B by post.<sup>3</sup>

The questionnaire was pilot-tested by trained interviewers. Interviewer comments (e.g. confusing wording, inadequate response categories, question order effect, etc.) and pre-test frequency distributions were reviewed before modifications were made to the final questionnaire.

Potential respondents in the communities of interest were initially contacted by telephone and asked to participate in the research. They were offered two different ways of completing the survey questionnaire. Respondents could choose to complete Part A of the survey over the telephone and have the choice modeling section (Part B) of the questionnaire mailed to their home address or emailed to them to complete online, or they could have the whole questionnaire (A&B) sent to them by post or email. In either case contact details were updated with either an email address and/or postal address.

The telephone interviews were conducted in April/May 2006. If the interviewers were unsuccessful in establishing contact on their first call, a minimum of 15 call back attempts were made before declaring a telephone number as "no contact." Respondents who had been sent a survey through the post were given one postal and one telephone reminder. Respondents who had follow-up contact via email were given three email reminders.

### **3.2 Survey response rates**

Response rates for general business surveys have been on the decline in recent years. Respondents in urban areas are increasingly subject to telephone solicitation for

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<sup>2</sup>The Ci3 CATI System is a PC-based product of Sawtooth Software, Evanston, Illinois.

<sup>3</sup> This occurred due to access restrictions between some workplaces and the online survey. This only happened twice.

fundraising, market research, or sales. As a result, some businesses are reluctant to participate in telephone surveys. A perceived barrier to contacting respondents is the increased use of the call display option to screen telephone calls. However, the response rate from telephone interviews was much higher than from respondents who completed the survey through email or postal contact.

The response rate for the Part A telephone interview (all contacts) was 56.28%, calculated as follows:

$$\frac{(Complete\ interviews + Partial\ Interviews)}{(Complete + Partial) + (Refusal + Non\ Contact + Other)}$$

$$= 457/812 = 56.28\%$$

The response rate for Part A completed wholly by telephone was 39.7%, and completion by email or postal contact was much lower at 16.6%.

The response rate for Part B was  $277/720 = 38.47\%$

Overall 496 usable surveys were collected that had either been fully or partially completed. Details are presented in Table 3.1.

**Table 3.1 Completed survey details**

	<b>Bowen</b>	<b>Gympie</b>	<b>Longreach</b>	<b>Roma</b>	<b>Total</b>
Completed Part A only	63	58	38	63	222
Completed Part B only	6	13	9	12	40
Completed {Part A + Part B)	55	52	72	55	234
<b>Total survey collected</b>	<b>124</b>	<b>123</b>	<b>119</b>	<b>130</b>	<b>496</b>
<b>Completed Part A</b>	<b>119</b>	<b>110</b>	<b>110</b>	<b>118</b>	<b>457</b>
<b>Fully completed Part B</b>	<b>49</b>	<b>57</b>	<b>72</b>	<b>47</b>	<b>225</b>
Partial Part B – did not complete choice sets	12	8	9	2	49

Of the 457 respondents to the Part A section who indicated their position in the organisation, only 3.7% were IT specialists. The majority of respondents were owner/partners (43%), the manager or member of the Board (24%), or in other management/professional positions (22%). Seven percent of respondents were not in management or professional positions.

## 4. Part A survey results

457 respondents completed Part A of the survey, with over 100 responses from each of the four locations. The results from the survey are analysed under the following headings, with each discussed in a separate section.

1. Business enterprise characteristics;
2. Businesses without computers and without internet connection;
3. Business use of the internet;
4. Narrowband and broadband users; and
5. Attitudes to broadband.

The large majority of business respondents in all locations were internet users. However, there was a significant difference in usage<sup>4</sup> between locations with the lowest proportion of users in the Gympie sample and the highest proportion in the Longreach sample (Table 4.1).

**Table 4.1 Internet usage by region**

	<b>Bowen</b> (n=124)	<b>Gympie</b> (n=120)	<b>Longreach</b> (n=120)	<b>Roma</b> (n=123)
Internet users	82%	77%	90%	82%
Broadband	50%	53%	74%	63%
Narrowband	32%	24%	16%	19%
No internet	5%	13%	2%	5%
No computers	11%	10%	8%	11%

*Note:* this includes some information collected in Part B only completions

### 4.1 Business enterprise characteristics

The majority (84%) of the respondents were from private industry, 7% classed themselves as from government, and 6% were not-for-profit organisations (Table 4.2). Respondents were asked about the structure of their business in assist in determining their level of independence in decision-making. In the private industry respondents, there were 294 independent organisations (64%), 19 (4%) franchises, and 70 (15%) branch offices. Seven of the government organisations (1.5%) classed themselves as either single branch or head office, and twenty-six (6%) as branches. Nineteen of the twenty-two not-for-profit organisations were also branches. Overall, 310 (68%) could be therefore regarded as independent entities, and 134 (29%) as dependent entities.

The majority of businesses in all locations were private independent companies and head offices, but there was a significant difference between locations. In Gympie there was a higher percentage represented in this group compared with the three more regional locations, where there was a higher proportion of private enterprises with a only a branch office (Table 4.1.1).

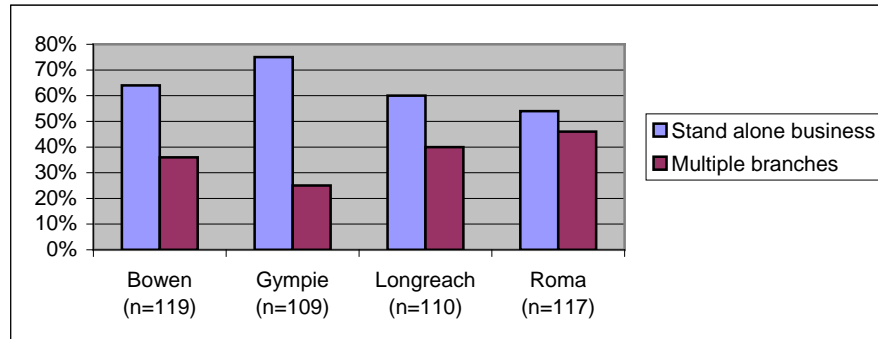
<sup>4</sup> To test for differences across locations, the results were cross-tabulated and a chi squared test for significance was applied. The same test was used in all results presented in this report. Unless otherwise stated, the 95% confidence level is reported.

**Table 4.1.1 Business classification in terms of independence in decision making**

	<b>Bowen</b> (n=119)	<b>Gympie</b> (n=110)	<b>Longreach</b> (n=111)	<b>Roma</b> (n=118)	<b>Total</b> (n=458)
Private industry independent (incl sole traders, partnerships, companies, family trusts, no other branches, or if multiple branches this is head office)	61%	81%	60%	56%	64%
Franchisee, not the franchisor	3%	2%	5%	6%	4%
Private industry branch office	20%	6%	13%	21%	15%
Govt independent (no other branches, or if multiple branches this is the head office)	3%	1%	2%	1%	2%
Govt branch	5%	4%	6%	8%	6%
Not for profit independent (no other branches, or if multiple branches this is the head office)	3%	2%	4%	0%	2%
not for profit branch	3%	4%	6%	3%	4%
Other	2%	1%	5%	5%	3%

The regional differences in enterprises are further highlighted in terms of business structure, with significantly more enterprises in Longreach and Roma being involved with multiple branches compared with Bowen and Gympie (Figure 4.1.1).

**Figure 4.1.1 Business enterprise structure**

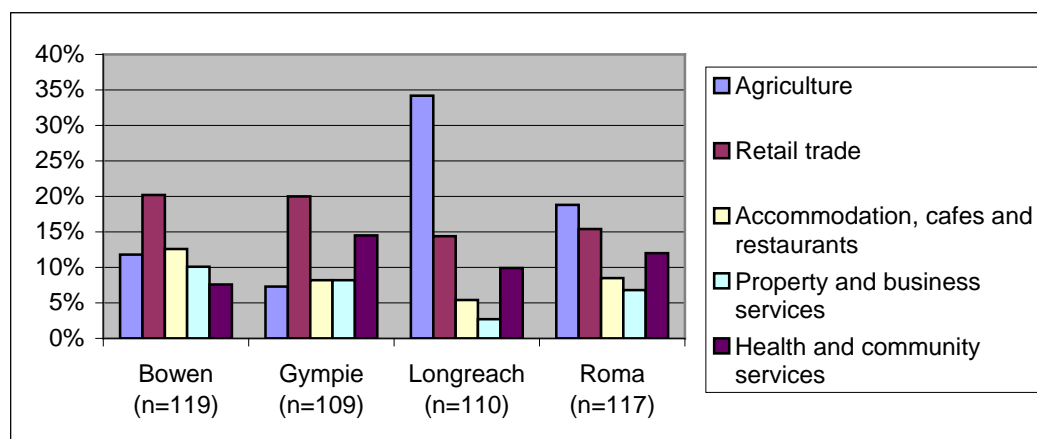


The main industry classifications for the different businesses surveyed are outlined in Table 4.1.2. The principal difference is that Longreach is dominated by agriculture; retail trade is more important in Bowen and Gympie, and Roma has a mixture of the two. The relative importance of the five main industry sectors in the different locations is illustrated in Figure 4.1.2.

**Table 4.1.2 Business industry classification**

	<b>Bowen</b> (n=119)	<b>Gympie</b> (n=110)	<b>Longreach</b> (n=111)	<b>Roma</b> (n=117)	<b>Total</b> (n=457)
Agriculture, Forestry and Fishing	12%	7%	34%	19%	18%
Mining	2%	1%	0%	3%	1%
Manufacturing	5%	8%	1%	3%	4%
Electricity, Gas and Water Supply	0%	0%	0%	2%	0%
Construction	5%	8%	2%	7%	6%
Wholesale Trade	3%	1%	3%	1%	2%
Retail Trade	20%	20%	14%	15%	18%
Accommodation, Cafes and Restaurants	13%	8%	5%	9%	9%
Transport and Storage	3%	6%	3%	6%	5%
Communication Services	0%	2%	1%	2%	1%
Finance and Insurance	3%	3%	3%	1%	2%
Property and Business Services	10%	8%	3%	7%	7%
Government Administration and Defence	3%	1%	3%	3%	3%
Education	3%	5%	7%	3%	4%
Health and Community Services	8%	15%	10%	12%	11%
Cultural and Recreational Service	3%	2%	5%	3%	4%
Personal and Other Services	7%	6%	6%	4%	6%
Other – not enough information	0%	0%	0%	1%	0%

**Figure 4.1.2 Main enterprise industry classifications**

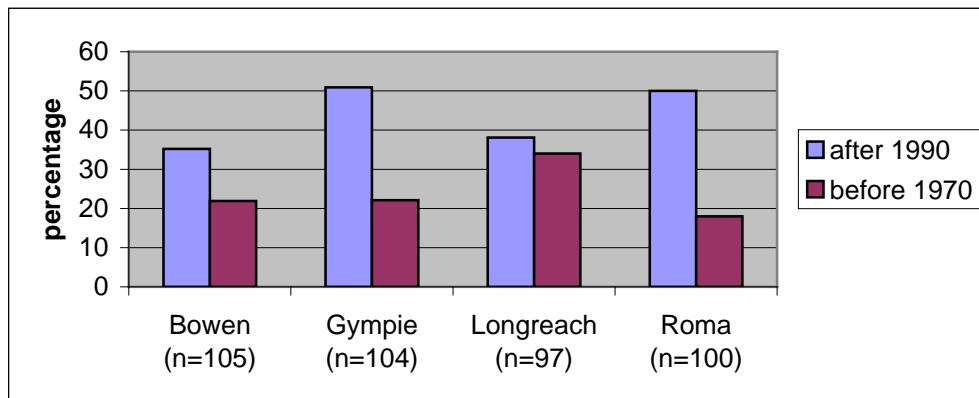


Bowen and Longreach have more well-established business communities, with a significantly higher proportion of older businesses compared with Gympie and Roma (Table 4.1.3; Figure 4.1.3). In both Bowen and Longreach, 45% of businesses were established before 1980, with a third of businesses in Longreach established before 1970. Over 50% of businesses in Gympie and Roma have been established since 1990.

**Table 4.1.3 Age of business enterprises**

Age of business	Bowen n=105	Gympie n=104	Longreach n=97	Roma n=100	Total (n=406)
pre 1970	22%	22%	34%	18%	24%
1970-79	23%	4%	11%	9%	12%
1980-89	20%	23%	17%	23%	21%
1990-99	24%	35%	28%	32%	30%
2000+	11%	16%	10%	18%	14%

**Figure 4.1.3 Percentage of new and old business enterprises**



There was also a significant difference in the size of firms (the number of staff employed) in the different locations (Table 4.1.4).

- Bowen had the highest proportion employing four or more full time staff.
- Gympie had the highest proportion employing less than two full time staff, but had more part time staff than the other regions.
- There was no significant difference between locations in terms of casual staff numbers.

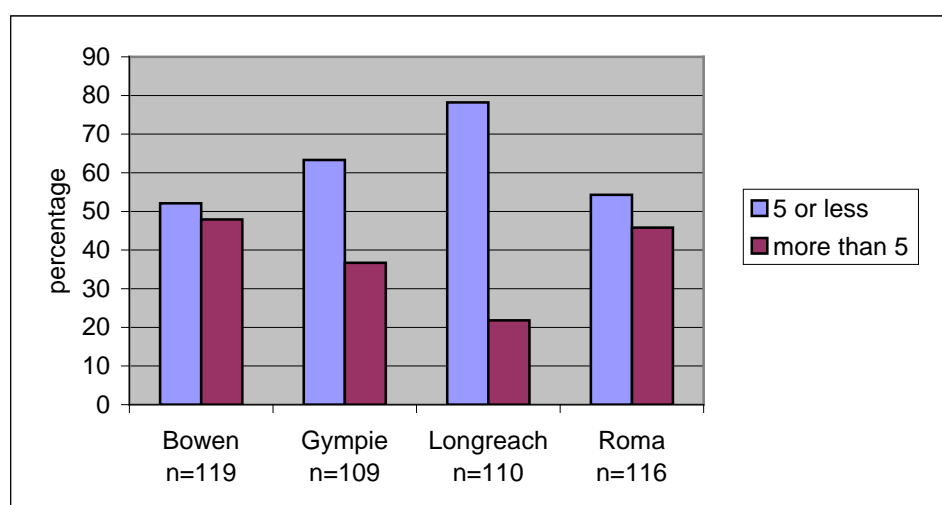
**Table 4.1.4 Enterprise size of terms of staff numbers**

		<b>Bowen</b> (n=119)	<b>Gympie</b> (n=108)	<b>Longreach</b> (n=110)	<b>Roma</b> (n=117)
<b>Median no of full time staff<sup>1</sup></b>		<b>4</b>	<b>2</b>	<b>3</b>	<b>3</b>
<b>Full time staff</b>	<b>No</b>				
	0-1	19%	31%	17%	17%
	2-3	29%	37%	47%	33%
	4-10	39%	19%	27%	33%
	11+	14%	14%	8%	16%
<b>Part time staff</b>	<b>No</b>				
	0	52%	43%	61%	54%
	1-2	28%	30%	30%	28%
	3+	20%	27%	9%	19%
<b>Casual staff</b>	<b>No</b>				
	0	55%	61%	57%	51%
	1-2	22%	23%	23%	33%
	3+	23%	16%	19%	16%
<b>Full and part time staff</b>	<b>No</b>				
	0-2	28%	31%	36%	24%
	3-5	25%	32%	42%	30%
	6-10	26%	13%	12%	26%
	11+	21%	24%	10%	20%

<sup>1</sup> median values are reported as some of the ranges were very high which affects mean values

Overall, in terms of both full and part time staff numbers firm sizes were larger in Bowen and Roma, as both had a higher proportion of firms with more than 5 staff compared with Gympie and Longreach. Firms were the smallest in Longreach (Figure 4.1.4).

**Figure 4.1.4 Firm size in terms of full and part time staff numbers**



Respondents were asked about their past and expected future business activity. Business activity in the last two years had generally been good, with over 60% of

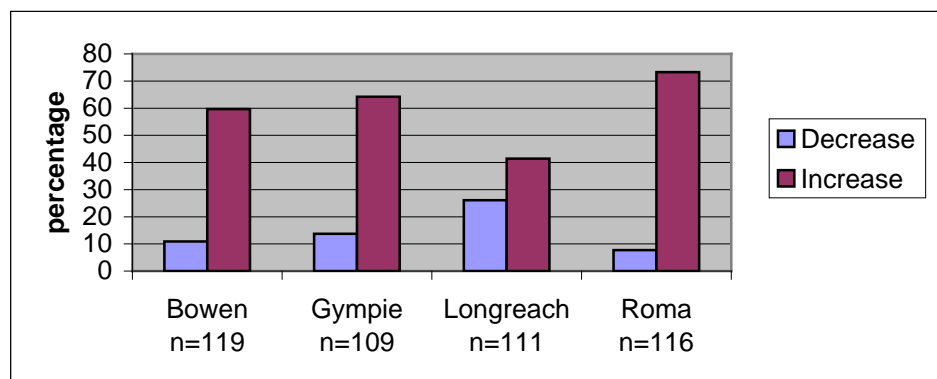


respondents reporting an increase in business activity. However, businesses in Longreach had not been doing so well, and there was significantly higher proportion of respondents in Longreach, compared with the other locations, who thought their business activity had decreased by more than 10% in the last two years (Table 4.1.5; Figure 4.1.5). This is likely to be related to the drought conditions in the region in recent years.

**Table 4.1.5 Change in business activity in the last two years**

	<b>Bowen</b> (n=119)	<b>Gympie</b> (n=109)	<b>Longreach</b> (n=111)	<b>Roma</b> (n=116)
Decreased by more than 10%	4%	7%	17%	4%
Decreased by less than 10%	7%	6%	9%	3%
Stayed the same	25%	19%	28%	16%
Increased by less than 10%	23%	20%	18%	27%
Increased by more than 10%	37%	44%	23%	47%
Don't Know	4%	3%	5%	3%

**Figure 4.1.5 Change in business activity in the last two years**

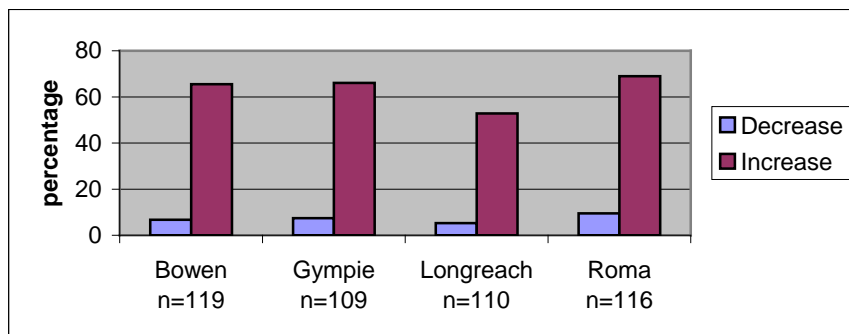


The majority of respondents thought their business activity would increase in the next two years and although there appeared to be less optimism in Longreach, there was no significant difference between locations (Table 4.1.6; Figure 4.1.6).

**Table 4.1.6 Expected change in business activity in the next two years**

	<b>Bowen</b> (n=119)	<b>Gympie</b> (n=109)	<b>Longreach</b> (n=110)	<b>Roma</b> (n=116)
Decreased by more than 10%	3%	4%	4%	5%
Decreased by less than 10%	4%	4%	2%	4%
Stayed the same	24%	19%	36%	18%
Increased by less than 10%	29%	30%	27%	35%
Increased by more than 10%	36%	36%	26%	35%
Don't Know	4%	7%	6%	3%

**Figure 4.1.6 Expected change in business activity in the next two years**

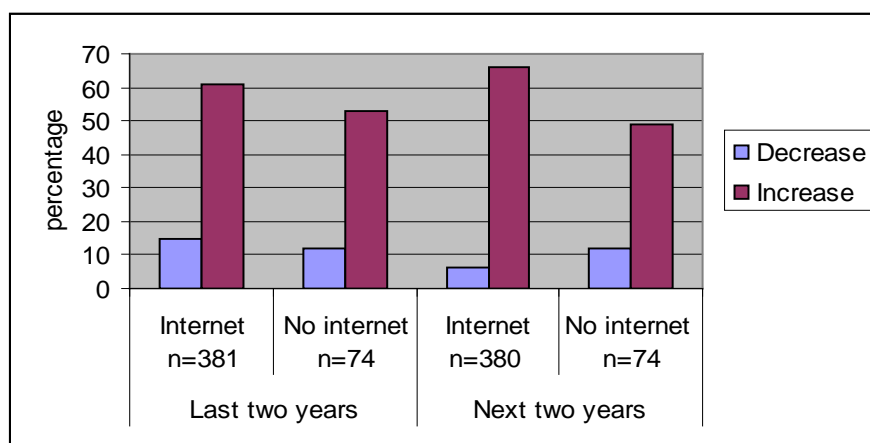


There was also a significant relationship between levels of business activity and whether the internet was used in the business. Businesses that used the internet in their business were more likely to report larger improvements in activity over the past two years, and to expect increased activity in the next two years (Table 4.1.7; Figure 4.1.7). Within the internet users group there was no difference between narrowband and broadband users. However, there was a difference in the future expectations between no internet and no computer users. 48% of “with computer but no internet” users thought their business activity would increase in the next two years compared with 38% of “no computer” users.

**Table 4.1.7 Change in business activity by internet usage**

	Last two years		Next two years	
	Internet n=381	No internet n=74	Internet n=380	No internet n=74
Decreased by more than 10%	8%	10%	3%	5%
Decreased by less than 10%	7%	3%	3%	7%
Stayed the same	20%	32%	24%	27%
Increased by less than 10%	21%	28%	31%	28%
Increased by more than 10%	40%	24%	36%	20%
Don't Know	4%	3%	4%	12%

**Figure 4.1.7 Change in business activity by internet usage**



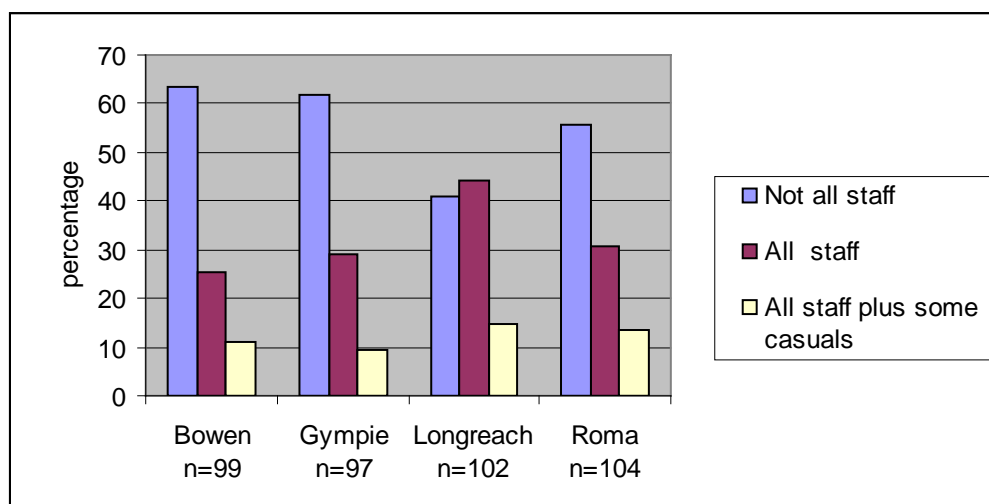
**Key finding:** Businesses that used the internet in their business were more likely to report larger improvements in activity over the past two years, and to expect increased activity in the next two years

A significantly larger percentage of all full and part time staff used computers regularly in Longreach compared with the other locations (Table 4.1.8; Figure 4.1.8)

**Table 4.1.8 Percentage of full and part time staff using computers regularly**

	Bowen (n=99)	Gympie (n=97)	Longreach (n=102)	Roma (n=104)
Less than 25%	15%	14%	3%	5%
25-50%	34%	35%	24%	32%
51-99%	14%	12%	15%	19%
All full and part time staff	25%	29%	44%	31%
All staff plus some casuals	11%	9%	15%	14%

**Figure 4.1.8 Percentage of full and part time staff using computers regularly**



The most important reason for using a computer was for financial account management (Table 4.1.9), with internal administration and client management systems also rating highly. These are functional uses, and the more extended use of the computer for market research was not rated as very important, although it had a significantly higher rating in Longreach than other locations. Using computers for personal use was also rated more highly in Longreach.

**Table 4.1.9 Percentage rating reasons for using a computer as “very important” and mean score rating**

	<b>Bowen</b> (n=105)	<b>Gympie</b> (n=98)	<b>Longreach</b> (n=101)	<b>Roma</b> (n=105)	<b>Signif diff</b>
1. Financial account management	73% (4.5) <sup>a</sup>	68% (4.3)	77% (4.6)	72% (4.5)	
2. Client management systems	51% (3.9)	52% (3.8)	48% (3.7)	58% (4.0)	*
3. Internal administration	52% (3.9)	34% (3.4)	46% (3.8)	46% (3.9)	
4. Inventory or production management	43% (3.6)	38% (3.3)	38% (3.5)	42% (3.6)	**
5. Supply chain management	31% (3.3)	23% (2.9)	27% (3.0)	20% (3.0)	
6. Market research	15% (2.6)	9% (2.5)	23% (3.1)	10% (2.6)	***
7. Personal use	15% (2.7)	12% (2.4)	20% (3.2)	14% (2.6)	**

<sup>a</sup> The mean rating score is included in parenthesis (1=not very important to 5=very important)

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

The main source of pressure to implement technology comes from inside the business (Table 4.1.10). There were 198 responses (48%) that indicated that there was a general recognition that it was necessary for the business to adopt the technology, that advantages in adoption were perceived, or that staff pressured management for implementation. Another source of pressure was from the market, from customers or competitors (86 responses, 21%). Other sources of pressure were from industry or suppliers (36 responses, 9%), from government or accountants, presumably for reporting purposes (25 responses, 6%). Seventeen respondents (4%) indicated that more than one of these sources pressured them to adopt new technology.

**Table 4.1.10 Source of pressure to implement technology**

Description	No of responses (n=409)	%
Internally driven: Internal business requirements, staff pressure, myself, general recognition the world has changed	198	48
Market driven	86	21
Industry driven changes or suppliers	36	9
Government and accountants ie likely to be reporting requirements	25	6
More than one of the above	17	4
IT department	13	3
Driven by associated organisations: head office, branches, franchisors	5	1
There is no pressure	2	1
Other	27	7

Approximately 40% of respondents worked in businesses with an intranet service, with no significant difference in usage across locations (Table 4.1.11). The large majority (over 80%) of respondents in businesses without an intranet service reported that they did not intent to get one.

**Table 4.1.11 Intranet use**

	Bowen	Gympie	Longreach	Roma
<b>Business has an intranet</b>	n=105 41%	n=98 39%	n=102 39%	n=104 39%
<b>How long has it been in use?</b>	n=43	n=34	n=39	n=37
5 years or more	56%	32%	46%	41%
<b>Is one being considered?</b>	n=62	n=60	n=61	n=63
No	87%	95%	89%	83%

Internet use did not appear to be limited by a lack of phone lines with over 90% of respondents in all locations (apart from Gympie with 86%) reporting that they had enough phone lines.

## 4.2 Businesses without computers and those without internet

### 4.2.1 Businesses without computers

Only 49 or 10% of respondents reported that their business did not use computers, with the main reasons being because of a lack of skills and because using a computer would take up too much time. The list of reasons presented to respondents is outlined below and percentages of “yes” responses are provided in parenthesis.

1. I don't know how having a computer can help me run my business (28%);
2. I think computers cost too much to purchase (19%);
3. I don't have the skills or training to be able to use a computer (48%);
4. It would take too much of my time to be able to use a computer (49%); and
5. I haven't got around to it yet (40%).

The majority of respondents indicated that they did not plan to buy a computer for their business. The majority of those who did intend to get a computer expected to get an internet connection, and most of those, a broadband connection.

#### 4.2.2 Businesses with a computer and without internet

Only 29 respondents represented businesses that used computers but did not have internet access. Although the importance of different reasons was probed, the majority of respondents answered “no” to the following reasons (percentage of respondents answering “yes” is provided in parenthesis).

1. Don’t have access to the internet from our location (45%);
2. Start-up costs are too expensive (14%);
3. Ongoing running costs are too expensive (18%);
4. Don’t have the skills to be able to set up access (21%);
5. Don’t know enough about which equipment to purchase (21%);
6. Concerned about security issues (43%);
7. Don’t think it would be reliable enough (14%); and
8. Worried that staff will waste too much time (21%).

Only two issues elicited a majority of “yes” responses in some locations; the issue of access (no.1) and concerns about security (no.6).

This group of respondents had generally mixed views on whether they would be getting an internet connection, apart from Gympie where the majority did not intend to get a connection.

#### 4.3 Business use of the internet

The majority of businesses, in all locations apart from Gympie, had been connected to internet for more than five years (Table 4.3.1). However, Gympie had a larger proportion of newer businesses (Table 4.1.3) and as expected, there was a significant correlation between the age of the business and the use of the internet.

**Table 4.3.1 Length of time businesses had been connected to the internet**

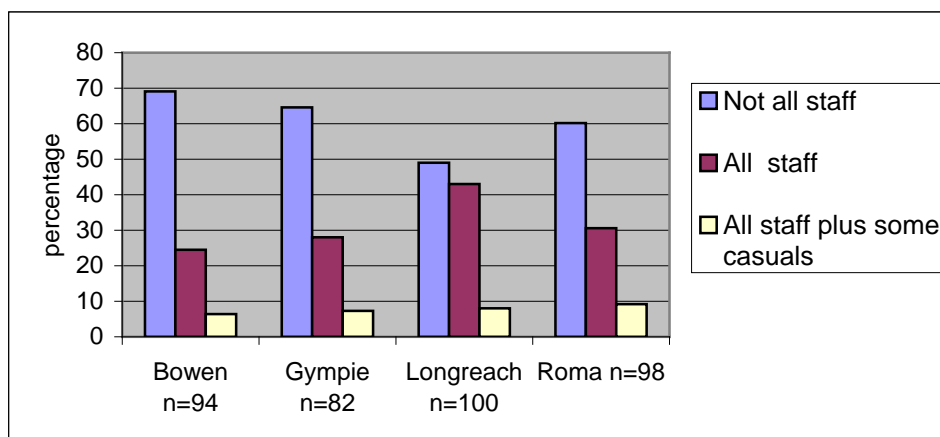
	<b>Bowen</b> (n=98)	<b>Gympie</b> (n=79)	<b>Longreach</b> (n=98)	<b>Roma</b> (n=93)
Up to 2 years	12%	17%	8%	15%
More than 2 year but less than 5 years	34%	43%	27%	37%
More than 5 year but less than 10 years	44%	34%	48%	44%
More than 10 years	10%	6%	17%	4%

Business staff in Longreach were more likely to use the internet regularly, reflecting the higher proportion of staff using computers (Table 4.3.2; Figure 4.3.1).

**Table 4.3.2 Percentage of full time + part time staff using the internet regularly**

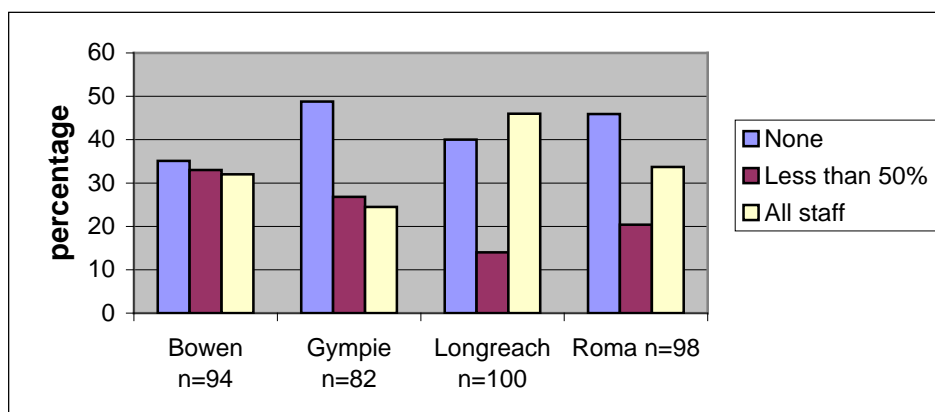
	<b>Bowen</b> (n=94)	<b>Gympie</b> (n=82)	<b>Longreach</b> (n=100)	<b>Roma</b> (n=98)
Less than 25%	26%	23%	9%	10%
25-50%	30%	28%	26%	33%
51-99%	14%	13%	14%	17%
All full and part time staff	25%	28%	43%	31%
All staff plus some casuals	6%	7%	8%	9%

**Figure 4.3.1 Proportion of full and part time staff using the internet**



Over a third of businesses did not have anyone trained in the use of the internet. Longreach had a larger proportion of businesses where all staff had been trained (Figure 4.3.2).

**Figure 4.3.2 % of staff (full + part time) trained in the use of the internet**



**Key Finding:** *A higher proportion of staff in Longreach used computers and used the internet compared with other locations. Longreach also had a larger proportion of businesses where all staff had been trained in the use of the internet.*

Nearly 50% of businesses (62% in Roma) engaged outside firms to maintain their IT systems and a higher proportion co-opted their own staff for the purpose than employed specialist staff (Table 4.3.3).

**Table 4.3.3 Responsibility for maintaining IT systems and connections**

	<b>Bowen</b> (n=93)	<b>Gympie</b> (n=75)	<b>Longreach</b> (n=90)	<b>Roma</b> (n=92)
Employing specialist staff	17%	23%	29%	19%
	n=11	n=12	n=22	n=15
Employs 1 person	6	9	8	5
2 people	1	2	8	2
3 or more people	4	1	6	8
Engaging outside firms to provide specialist operations	48%	47%	49%	62%
Coopting other members of staff with some computing	34%	31%	22%	20%

Respondents were asked to rate the importance of different reasons why their business used the internet. There was no significant difference in the opinions of respondents between locations, but broadband users tended to rate reasons more highly than narrowband users. Generally, the same issues were rated the most or the least important by the two user groups, but the broadband users gave a higher relative score compared to narrowband users (Table 4.3.4).

The two reasons for using the internet rated the most important were to get information and research (no. 1), and for on-line banking (no.2). Communicating with other businesses (no. 3) and having a web site (no. 4) also rated highly. Communicating with suppliers and other businesses were rated more highly by both groups than communicating with customers. The lowest rated options were online sales (no.14), staff education and training (no.13) and communicating with employees (no. 12).

***Key Finding: Key uses of the internet were to get information and research, and to use on-line banking. Communicating with suppliers and other businesses were more important than communicating with customers.***



**Table 4.3.4 Reasons for business using the internet rated “very important” and mean score ratings**

	<b>Broadband users (n=266)</b>	<b>Narrowband users (n=103)</b>	<b>Sig diff</b>
1. Getting information/research	50% (4.2)	36% (3.7)	***
2. Online banking	55% (3.7)	58% (3.9)	
3. Communicating with other businesses	34% (3.7)	23% (3.2)	**
4. Communicating with suppliers	27% (3.3)	20% (3.2)	
5. Access to other specialist services	24% (3.3)	16% (2.9)	
6. Customers communicating with you	26% (3.1)	14% (2.7)	**
7. Communicating with customers	25% (3.1)	14% (2.7)	
8. Allowing more technical communications and operations	20% (3.1)	11% (2.6)	**
9. To have a organisational web site	31% (3.0)	17% (2.3)	***
10. Transmitting very large data files (eg graphics/maps)	24% (2.9)	12% (2.3)	***
11. Online purchasing	20% (2.9)	14% (2.4)	**
12. Communicating among employees	22% (2.5) <sup>a</sup>	18% (2.2)	**
13. Staff education/training	16% (2.5)	9% (2.1)	
14. Online sales	12% (2.1)	7% (1.7)	**

<sup>a</sup> The mean rating score is included in parenthesis (1=not very important to 5=very important)

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

There was broad agreement that internet infrastructure was at least adequate in all locations. However, there were more respondents satisfied with the services in Roma and fewer in Bowen. Although a high percentage were satisfied (rated “adequate” or “very adequate”) with the reliability of the internet connection, the percentage was significantly lower Bowen (65%) compared with 79% in Roma. More than half the respondents were satisfied with Telstra as a service provider in Gympie and Longreach. The satisfaction rating for service was not as high in Bowen (44%) compared with Roma (66%). However, the main difference in opinions was between broadband and narrowband users (Table 4.3.5). Broadband users appeared very satisfied with their connection speed and reliability, in marked contrast to narrowband users.

**Table 4.3.5. Respondents rating internet infrastructure as “very adequate” and mean score ratings**

	Broadband (n=269)	Narrowband (n=106)	Signif diff
1. Internet connection speed	36% (3.9) <sup>a</sup>	9% (2.7)	***
2. Reliability of Internet connection	36% (4.1)	12% (3.4)	***
3. Telstra as a service provider	24% (3.7)	13% (3.3)	***
Did not use Telstra	5%	15%	
4. Other Internet Service Provider	(n=56) 13% (3.3)	(n=31) 11% (3.6)	
5. Server hosting services (e.g. for web site – could be your ISP)	23% (3.7)	11% (3.3)	***

<sup>a</sup> The mean rating score is included in parenthesis (1=not adequate at all to 5=very adequate)

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

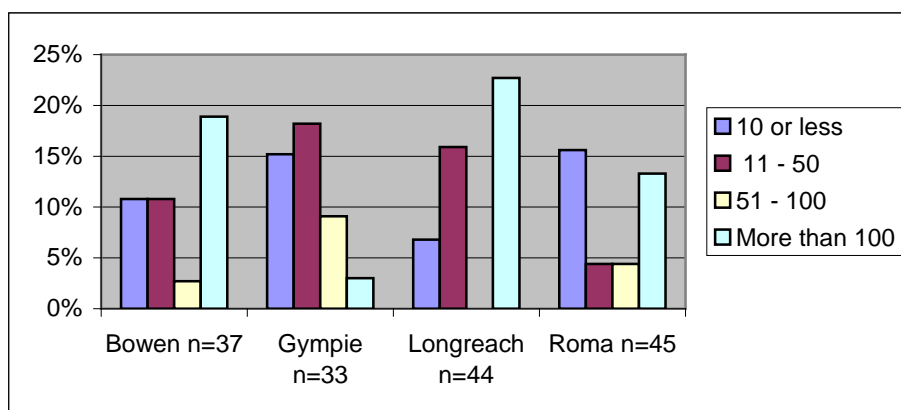
***Key finding: Satisfaction ratings for speed and reliability of internet connections were the lowest in Bowen and the highest in Roma. Broadband users appeared very satisfied with their connection speed and reliability, in marked contrast to narrowband users.***

There was no difference between locations in the use of a business website, but 47% of broadband users had a website compared with only 29% of narrowband users. The majority of broadband (68%) and narrowband users (75%) who did not have a website were not thinking of getting on in the next 12 months.

A total of 161 respondents had a business website:

- 58% of these businesses developed their own website;
- 62% managed their own site;
- Approximately a third monitored their own site (mainly though the number of hits or transactions recorded), with a higher proportion in Longreach (59%);
- Approximately a third of businesses updated their sites at least once a week with higher percentages in Longreach and Roma compared with Bowen and Gympie.
- There was no difference between locations and the number of customers using the websites each day, but more than half the respondents in all locations didn't know the answer to this question. Details are presented in Figure 4.3.3.

**Figure 4.3.3 Number of customers using websites each day**



Respondents who had a web site, rated the following as either “important” or “very important”:

- Marketing/advertising (58%);
- Receiving customer inquiries (45%);
- Receiving customer feedback (35%);
- Receiving customer orders (19%); and
- Receiving customer payments (16%).

There was a difference between locations in terms of the customer group that was targeted in designing the website. In Longreach, the existing customer base was the main target, whereas in Gympie it was new customers outside the area (Table 4.3.6).

**Table 4.3.6 Main customer group targeted in website design**

	Bowen n=37	Gympie n=34	Longreach n=43	Roma n=46	Total n=160
Your existing customer base	24%	18%	44%	33%	31%
New customers in local area	16%	24%	19%	30%	23%
New customers outside of the local area	32%	50%	21%	24%	31%
Don't know/no response	27%	9%	16%	13%	16%

There was no difference between locations in terms of how important it was for business to access the websites of other businesses. There was a difference according to the type of access, with 65% of broadband respondents rating this as “important” or “very important” compared with 47% of narrowband users.

**Key Finding:** *There was a difference between locations in terms of the customer group that was targeted in designing the website. In Longreach, the existing customer base was the main target, whereas in Gympie it was new customers outside the area.*

**Key Finding:** *It was more important for broadband users to be able to access the websites of other businesses compared with narrowband users.*

#### 4.4 Narrowband and broadband users

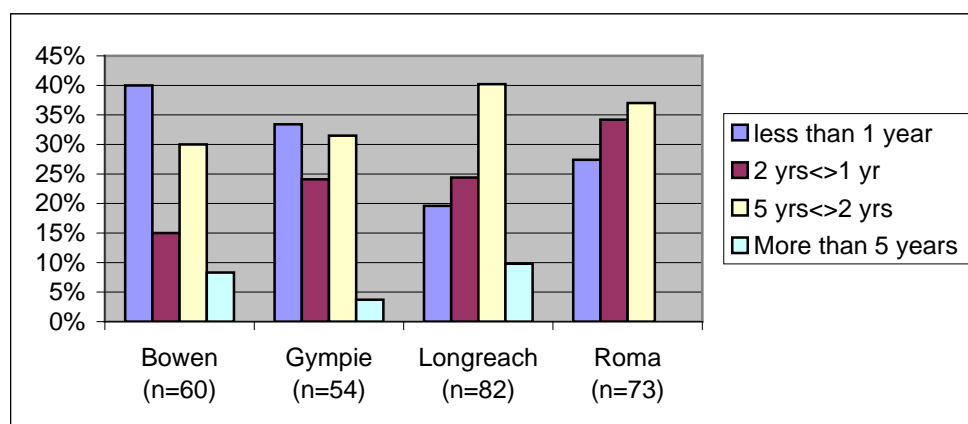
Broadband had already been adopted by the majority of respondents to the survey. A total of 106 respondents were narrowband users and 269 were already broadband users.

There was no significant difference between locations and the length of time narrowband internet users had had their connection, with nearly 50% of users being connected for more than five years. However, significantly more respondents in Longreach and Roma had their broadband connection for longer than respondents in Bowen and Gympie (Table 4.4.1; Figure 4.4.1). This was not necessarily a result of availability as all locations apart from Roma reported some businesses with broadband connections for over five years.

**Table 4.4.1 Length of time businesses had been using broadband and narrowband**

	Broadband users				Narrowband total (n=106)
	Bowen (n=60)	Gympie (n=54)	Longreach (n=82)	Roma (n=73)	
3 months or less	10%	11%	4%	1%	2%
From 3 to 6 months	17%	9%	4%	10%	5%
7 to 12 months	13%	13%	12%	16%	3%
2 yrs <> 1 yr	15%	24%	24%	34%	8%
5 yrs <> 2 yr	30%	32%	40%	37%	30%
10yrs <> 5 yr	8%	4%	10%	0%	47%
More than 10 years					3%
Don't know/no response	7%	7%	6%	1%	3%

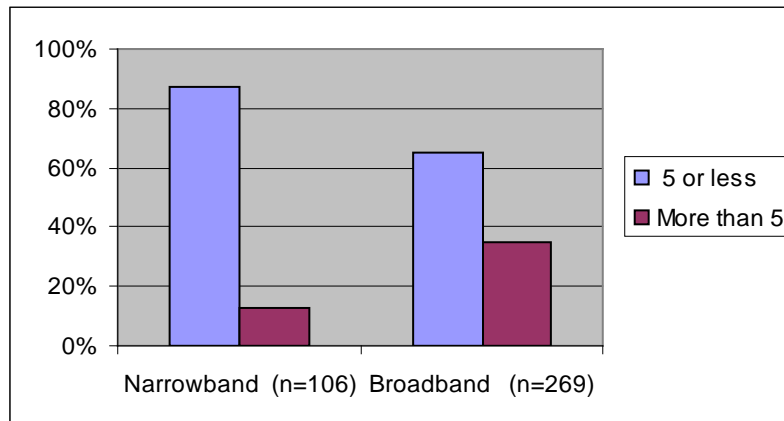
**Figure 4.4.1 Length of time businesses had been using broadband**



There was no significant difference between regions in the number of computers connected to the internet, although businesses using broadband had a larger number of

computers with an internet connection compared with narrowband users (Figure 4.4.2). This was more a function of the technology rather than firm size as there was no significant difference between the number of staff employed and the use of narrowband or broadband technology.

**Figure 4.4.2 No. of computers in business with internet access**



#### 4.4.1 Narrowband users

The large majority of narrowband users (76%) obtained their internet connection because they felt it was “something you got because you had to”, rather than being specifically attracted to the technology.

Further explanations to this question were provided by 78 respondents, with responses outlined in Table 4.4.2. The two most commonly cited reasons were because the ‘business needs it, to keep up’, and for general communication and email. On the whole, the reasons for using the internet were internally driven with surprisingly little direct reference to selling to customers although “business needs it, to keep up” might include marketing issues.

**Table 4.4.2 Reasons narrowband users connected to the Internet**

Description	No of responses
Communication email	20
Banking	12
Searching for information, research, downloading reports	12
Invoicing, accounting, record keeping	7
Suppliers, buying group, dealership	6
Contacting customers, clients	5
Business needs it, to keep up	26
Made to get it, company policy, govt require it	8
Other	2
<b>Total responses (some gave more than one reason)</b>	<b>78</b>

Narrowband users expressed the following opinions about their potential use of broadband:

- Broadband technology was generally available in all locations apart from Longreach. Over 70% of narrowband users stated that broadband was available if they wanted it, compared with 47% in Longreach.
- Only two narrowband respondents reported that they had had a broadband connection which they stopped. Both were in Bowen and one said they couldn't get it to work, while the other preferred using a dial-up connection.
- 40% said they had no intention of getting a broadband connection. However, another 40% said they expected to get broadband in the next 12 months.
- 36% indicated that a recommendation had raised their interest in connecting to broadband (68% in Longreach), and 33% had been influenced by an awareness/advertising campaign. Most respondents did not know.

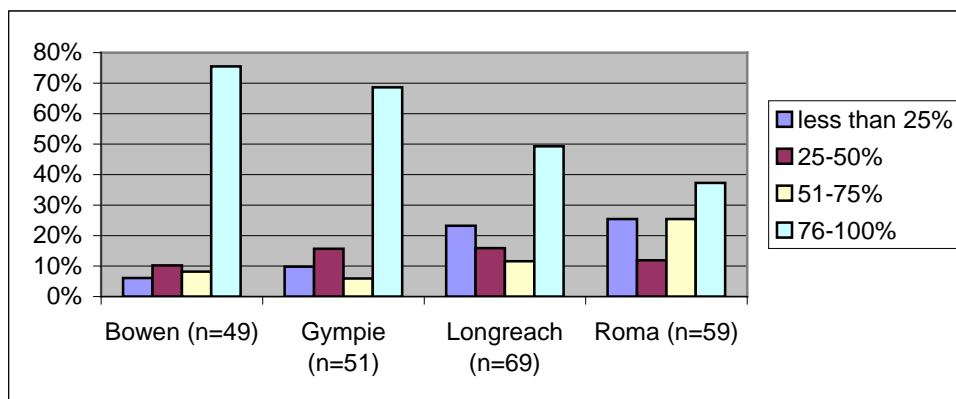
#### 4.4.2 Broadband users

The large majority (65%) of broadband users obtained their internet connection because they felt it was “something you got because you had to”, rather than being specifically attracted to the technology. Of the 35% (91 respondents) who had been specifically attracted to the technology, 24% had received a recommendation and 20% had been influenced by an awareness/advertising campaign. However, a third of respondents provided “other” reasons, of which the main one was the speed of connection.

Approximately 20% of broadband respondents indicated that broadband access had increased their level of business activity by up to 10%. However, approximately 60% did not think their business activity had been affected by broadband.

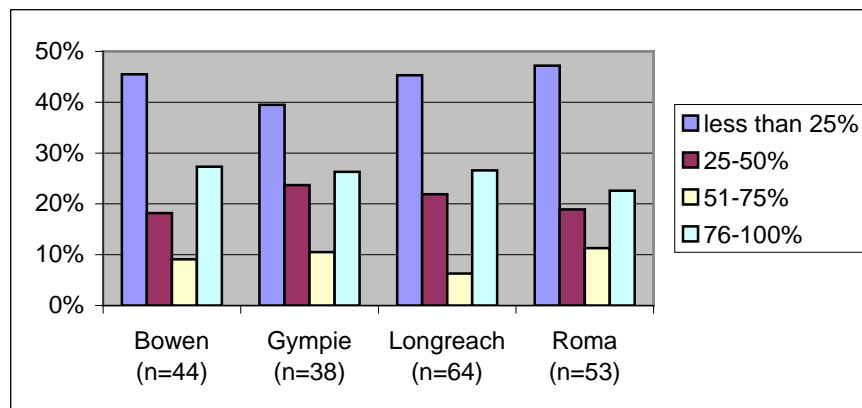
There was a significant difference between locations in terms of where the firms' customers lived. A much higher proportion of customers lived in the local community in Bowen and Gympie compared with Longreach and to a greater extent, Roma (Figure 4.4.3). This may reflect the positions of the latter centres as regional hubs, as well as the role of inland tourism for Longreach and Roma.

**Figure 4.4.3 Percentage of customers living in the local community**



In contrast, suppliers were more likely to be located outside the local community, with a similar pattern across locations (Figure 4.4.4).

**Figure 4.4.4 Percentage of suppliers living in the local community**



**Key finding:** A much higher proportion of customers lived in the local community in Bowen and Gympie compared with Longreach and to a greater extent, Roma. This may reflect the regional hub roles and the importance of inland tourism to Roma and Longreach.

**Key finding:** Suppliers were more likely to be located outside the local community, with a similar pattern across locations.

Broadband respondents were probed for their opinions on a variety of issues about broadband technology. One group of questions were focused on how business operations may have to change if users had to go back to a narrowband connection. The main impact of losing broadband connection was nominated as reduced operational effectiveness (Table 4.4.3). There was no significant difference in locational responses apart from the effect it might have on communicating with suppliers (no. 4). This was a more important issue in Longreach and Roma, compared with Bowen and Gympie.

**Table 4.4.3 Changes to business operations if connections were reduced to narrowband – %"yes" responses**

	Bowen (n=58)	Gympie (n=54)	Longreach (n=82)	Roma (n=72)	Total (n=266)
1. Our operations would be less effective	59%	61%	65%	71%	64%
2. There would be little impact on our business	33%	30%	27%	24%	28%
3. We would have to find other ways of communicating with customers	28%	28%	32%	28%	29%
4. We would find it more difficult to communicate with suppliers	22%	19%	43%	39%	32%
5. We would lose some of our customer base	16%	7%	15%	13%	13%
6. We would have to move our business to a different location	5%	6%	6%	7%	6%

When asked if how important they thought it was for their business for broadband to be available and used in the community, over 55% of respondents in all locations though it was “very important”.

Sixty four respondents (26%) provided information about the unexpected benefits of broadband. The key explanations were:

- convenience;
- ease of access or enhanced accessibility;
- ease of transmission, efficient, and reliable;
- e-commerce activities (suppliers, banks, travel);
- low cost;
- sourcing information;
- technical capability high speed data transfer, VOIP; and
- work flexibility.

Seventy two respondents (29%) provided information when asked if they expected broadband to change the way they managed their business in the future. The key explanations were:

- expand range of applications to support core functions;
- increased efficiency, enhanced access, effectiveness and timeliness of communication (streamline activities);
- lower transaction costs;
- privacy and security concerns;
- service customer needs more effectively; and
- working remotely.

Broadband respondents were also asked if they thought there were some disadvantages of having a broadband connection that they had not been mentioned in the questionnaire. Only 42 respondents (17%), provided an answer and the key issues were:

- can be a time waster;
- email overload, or junk mail;
- inability to secure full access to broadband - reliability is problematic;
- increased client demands/customer expectations;
- increased costs/chargers;
- need for a physical (hard wire) connection;
- need to upgrade computer technology;
- negatives associated with service provider switching costs ;
- not all clients are connected to broadband;
- power outages;
- requirement for a separate eftpos line;
- security issues;
- software incompatibility with ADSL modems; and
- the need to train or educate staff.



## 4.5 Attitudes to broadband

Both broadband and narrowband users were asked to rate the importance of a range of issues covering some of the advantages and disadvantages of broadband. In all the questions outlined below, there was very little difference between responses across locations, but there were differences according to whether businesses had broadband or narrowband connections. In general, business with broadband connections had much higher ratings for the impacts of broadband compared to narrowband users.

The first set of questions explored the importance of different impacts of broadband on respondents' businesses generally. Details are provided in Table 4.5.1, where the issues have been listed in terms of the highest mean rating score of broadband users.

**Table 4.5.1 Respondents rating different impacts of broadband for business generally as “very important” and mean score rating**

	Broadband (n=267)	Narrowband (n=106)	Sig dif
1. Broadband allows the phone and internet to be used at the same time	67% (4.5)	35% (3.6)	***
2. Broadband provides time savings and greater business efficiency	50% (4.3)	35% (3.7)	***
3. Broadband is reliable	46% (4.3)	22% (3.7)	***
4. The “always-on” constant connection with broadband is an advantage	54% (4.3)	27% (3.3)	***
5. The high speed of broadband is needed in your organisation	54% (4.2)	26% (3.2)	***
6. Broadband makes it possible to find new ideas on the Internet	42% (4.0)	25% (3.4)	***
7. Broadband allows reduced ongoing communication costs	38% (4.0)	13% (3.0)	***
8. Broadband makes it easier to communicate with suppliers	33% (3.7)	22% (3.2)	***
9. Broadband enables the use of certain IT applications that couldn't be used otherwise	32% (3.7)	15% (3.1)	***
10. Broadband makes it easier to find new suppliers	29% (3.5)	16% (2.9)	***
11. Broadband means better service for your customers	33% (3.5)	16% (2.7)	***
12. Broadband provides your company with new ways of doing business	27% (3.4)	15% (2.9)	***
13. Other businesses need to communicate with your business via broadband	28% (3.3)	9% (2.4)	***
14. There is competitive pressure in your industry to have broadband	18% (2.7)	12% (2.3)	ns
15. Your customers prefer you to have broadband	9% (2.6)	10% (2.3)	ns
16. Broadband can give your staff work-from-home advantages	22% (2.6)	9% (2.2)	***

<sup>a</sup> The mean rating score is included in parenthesis (1=not very important to 5=very important)  
 \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

In general, the same issues were rated the most and the least highly by both groups. However, in all cases, the benefits of broadband were rated more highly by broadband users (which had direct experience) compared to narrowband users. The greatest differences in mean score rating were found in issues no.1, 5 and 7, and related to the benefits of connection speed; reducing communication costs and the ability to use the phone and internet at the same time.

Respondents were given another list of statements about the impacts of broadband and were asked if they agreed or disagreed. The results are outlined in Table 4.5.2. In this case the rating was from '1= strongly agree' to '5= strongly disagree'. The lower the mean score rating, the more strongly respondents agreed with the statement.

**Table 4.5.2 Respondents “agreeing” and “strongly agreeing” about certain broadband impacts and mean score ratings**

	<b>Broadband (n=266)</b>	<b>Narrowband (n=105)</b>	<b>Sig dif</b>
1. There is a clear business case for your business to use broadband	69% (2.2) <sup>a</sup>	45% (2.8)	***
2. Unlimited access plans are worth the cost	52% (2.4)	33% (2.8)	***
3. Uncertainty about billing for excess usage is a real concern	38% (2.9)	44% (2.7)	ns
4. Broadband price plans that place limits on or cap usage are a concern	37% (3.0)	43% (2.6)	*
5. Most of your customers don't have broadband	27% (3.0)	26% (3.0)	ns
6. Information about broadband technology is confusing	33% (3.2)	40% (2.8)	***
7. Information about broadband costs is confusing	30% (3.2)	38% (2.8)	***
8. The ongoing costs of broadband are too high	25% (3.3)	34% (2.7)	***
9. Security is an issue with broadband	29% (3.3)	20% (3.0)	***
10. It is difficult to retain staff with good IT skills	22% (3.3)	22% (3.2)	*
11. It is difficult to find staff with sufficient IT skills	24% (3.3)	22% (3.3)	ns
12. Staff using broadband inappropriately (wasting time) is a concern	21% (3.5)	34% (3.0)	***
13. You don't have enough technical knowledge for broadband	24% (3.5)	29% (3.3)	***
14. Broadband changes the skills required of the people you employ	21% (3.5)	14% (3.7)	***
15. The installation costs of broadband are too expensive	16% (3.6)	30% (2.9)	***

<sup>a</sup> The mean rating score is included in parenthesis (1=strongly agree to 5=strongly disagree)

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

Broadband users were more likely than narrowband users to rate the use of broadband more highly. For example, the majority of broadband users agreed that 'there is a

clear business case for your business to use broadband’ and ‘unlimited access plans are worth the cost’, while less than 50% of narrowband users did so. Narrowband users were more likely to think that:

- information about broadband technology is confusing
- information about broadband costs is confusing
- the ongoing costs of broadband are too high
- inappropriate use by staff is a concern
- there is a lack of technical knowledge for broadband
- the installation costs for broadband are too expensive.

***Key finding: Narrowband users were more likely than broadband users to be concerned about installation and ongoing costs, and the technical knowledge required.***

The third set of statements referred to more specific impacts on the business enterprise, and again respondents were asked if they agreed or disagreed with each statement. The results are presented in Table 4.5.3.

**Table 4.5.3 Respondents “agreeing” and “strongly agreeing” on business specific impacts and mean score ratings**

	<b>Broadband (n=267)</b>	<b>Narrowband (n=106)</b>	<b>Sig dif</b>
1. Broadband has helped you find new suppliers	52% (2.6)	38% (3.0)	**
2. Broadband has helped improve dealings with current suppliers	55% (2.6)	27% (3.1)	***
3. Broadband has improved your business performance	54% (2.6)	35% (3.2)	***
4. Broadband has reduced administrative costs	45% (2.8)	26% (3.3)	***
5. Broadband allows local customers to trade elsewhere	40% (2.9)	33% (3.2)	***
6. Broadband has meant changing your business processes and structures	42% (3.0)	11% (3.8)	***
7. Broadband has helped attract more customers from outside your local area	28% (3.3)	24% (3.5)	ns
8. Broadband has expanded your customer base in the local area	22% (3.4)	11% (3.8)	***
9. Broadband has reduced staff costs	21% (3.4)	9% (3.9)	***
10. Broadband has increased your turnover	19% (3.5)	7% (3.9)	***
11. Broadband has increased competition from other businesses	21% (3.5)	7% (3.9)	***

<sup>a</sup> The mean rating score is included in parentheses (1=strongly agree to 5=strongly disagree)  
 \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

Broadband users were much more likely than narrowband users to agree that broadband technology generated benefits. In general, businesses with broadband indicated that there were major benefits in relation to improving supplies and business

performance, but more limited benefits in terms of attracting new customers, reducing staff costs or increasing turnover. Only 21% of respondents with broadband and 7% with narrowband thought that the presence of broadband had increased business competition. This suggests that the provision of broadband technology is largely beneficial to regional businesses.

**Key finding:** *In general, businesses with broadband indicated that there were major benefits in relation to improving supplies and business performance, but more limited benefits in terms of attracting new customers, reducing staff costs or increasing turnover. Only 21% of respondents with broadband and 7% with narrowband thought that the presence of broadband had increased business competition. This suggests that the provision of broadband technology is largely beneficial to regional businesses.*

The final set of questions asked about the impacts of broadband on the community, with results presented in Table 4.5.4. The opinions had also been gathered from two other groups of respondents – those with no computers and those with computers but without access to the internet. These responses are also included in the table below.

**Table 4.5.4 Respondents “agreeing” and “strongly agreeing” on community impacts and mean score ratings**

	Broad band (n=267)	Narrow band (n=106)	Sig dif bb/nb	Computer no internet (n=27)	No computer (n=40)
1. Broadband helps overcome some of the problems of being in a remote location.	91% (1.7)	74% (1.9)	***	86%	90%
2. Broadband helps to improve business activity in the community	73% (2.1)	55% (2.4)	***	81%	92%
3. Broadband helps to improve the infrastructure services in the community	71% (2.2)	47% (2.5)	***	78%	88%
4. Broadband will increase the skills level of people in the community	59% (2.5)	46% (2.7)	*	67%	65%
5. Broadband helps attract new businesses to locate here	49% (2.5)	42% (2.8)	**	71%	50%
6. If the town lost its broadband service some businesses might move away	39% (2.9)	31% (3.1)	ns	41%	37%
7. Broadband will reduce the amount of money that local people will spend in the area.	23% (3.2)	21% (3.4)	**	25%	22%
8. I do not know enough about broadband to answer these questions properly	21% (3.6)	42% (2.9)	***	57%	49%
9. If the town lost its broadband service there would be no impact on me or my business.	18% (3.8)	53% (2.6)	***	70%	74%

<sup>a</sup> The mean rating score is included in parentheses (1=strongly agree to 5=strongly disagree)  
 \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

While the benefits of broadband were generally rated more highly by direct users than they were perceived by narrowband users, the perceptions of businesses without

internet access rated the benefits even higher than the broadband group. This indicates that there are widespread perceptions of the benefits of broadband for the wider community.

There was strong support for broadband having broader community benefits, including overcoming some of the problems of remoteness (no.1), improving business activity (no. 2), improving infrastructure services (no. 3) and improving skills levels (no. 4).

Opinions differed the most on the impact of losing broadband. Only 18% of broadband users agreed there would be no impact on them or their business compared with 53% of narrowband users.

***Key finding: There was strong support for broadband provision having broader community benefits, including overcoming some of the problems of remoteness, improving business activity, improving infrastructure services and improving skills levels.***

***Key finding: Businesses without internet access had very high opinions about the benefits of broadband for the broader community.***

***Key finding. Businesses with broadband were more likely to think that they would suffer impacts if their town lost its broadband service.***

Broadband users were asked a couple of additional statements that were not relevant for narrowband users. The first statement suggested that the existing broadband connection speed was not adequate for business requirements, generating 40% disagreement and a further 26% strong disagreement. The second statement suggested that the connection was not reliable enough, to which 77% of respondents either disagreed or strongly disagreed.

***Key finding. The majority of broadband users are satisfied with the speed and reliability of their service.***

There were two more sets of attitudinal questions that further probed the impacts of broadband on the community more generally. These were asked in Part B of the survey. Details are reported in the next section as the results are linked to the choice modelling exercise.

## 5. Part B Choice modelling survey results

Only respondents who already had an internet connection were required to complete Part B of the survey. The main focus of this survey was to complete a choice modelling exercise. The choice analysis was designed to determine the relative importance of different components of CIT infrastructure and service, and whether this varied between locations and between narrowband and broadband users. CIT infrastructure and service was described in terms of three attributes; speed of connection, supporting services and reliability.

In addition to the choice selection component, the survey also gathered further information on respondents' opinions on the impacts of broadband in the community generally. This was designed to supplement information collected in Part A, which had focused more on the broadband impacts on the respondents' business enterprise.

The results of these and other attitudinal questions are outlined in the section below and then the choice modelling results are presented in the following section.

### 5.1 General questionnaire results

A total of 274 part B surveys were returned, but 49 (18%) were only partially completed. Forty five of the latter were completed on-line and only four had been returned in hard copy. While it might appear that the on-line mode put people off, it is hard to draw any firm conclusion. A similar proportion of respondents completing a hard copy may have been deterred at the same point in the survey, but then did not return the partially completed survey. It might simply mean that it was easier or less effort to return a partially completed survey on-line than in the mail.

There were 225 Part B surveys that were fully completed. A higher proportion of respondents completed Part B in Longreach compared with the other locations (Table 5.1.1).

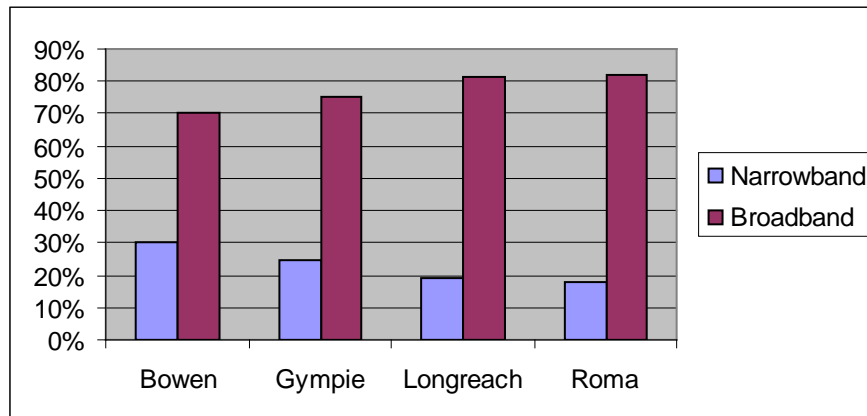
**Table 5.1.1 Part B survey collection details**

	<b>Bowen</b> (n=124)	<b>Gympie</b> (n=123)	<b>Longreach</b> (n=119)	<b>Roma</b> (n=130)	<b>Total</b> (n=496)
Completed Part A only	63 (51%)	58 (47%)	38 (32%)	63 (49%)	222 (45%)
Completed Part B	49 (40%)	57 (46%)	72 (61%)	47 (36%)	225 (45%)
Partial Part B - did not complete choice sets	12 (10%)	8 (7%)	9 (8%)	20 (15%)	49 (10%)
<b>Total surveys</b>	<b>124</b>	<b>123</b>	<b>119</b>	<b>130</b>	<b>496</b>

The majority of respondents (77.5%) completed Part B on-line, compared with 22.5% who completed the survey in hard copy and returned it in the mail. The high proportion of respondents who selected to complete Part B on-line indicates that most regional businesses were comfortable to use the internet for interactive purposes.

78% of respondents were already using broadband compared with 22% who were narrowband users, and while there was a higher percentage of broadband users in Longreach and Roma (Figure 5.1.1), there was no significant difference between locations.

**Figure 5.1.1 Respondents' CIT usage in the different locations**

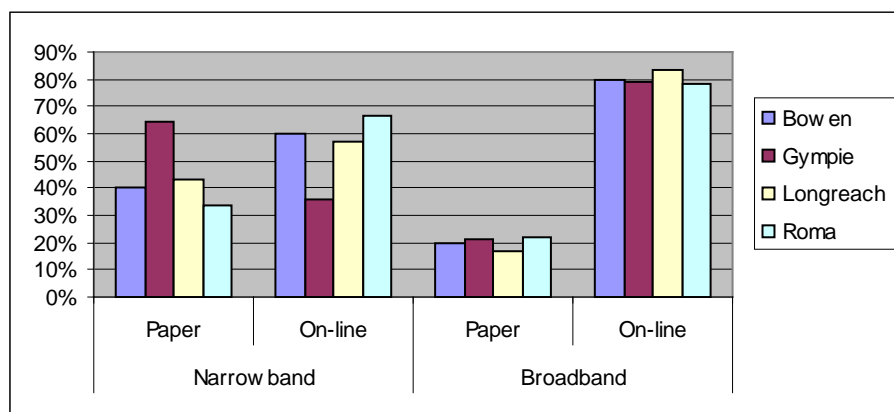


As expected, the broadband users were more likely than narrowband users, to complete the survey on-line than in hard copy (Table 5.1.2; Figure 5.1.2).

**Table 5.1.2 Survey completion mode and IT usage in the different locations**

CIT usage	Survey mode	Bowen	Gympie	Longreach	Roma	Total
Narrowband	Paper	6 (40%)	9 (64%)	6 (43%)	3 (33%)	24 (46%)
	On-line	9 (60%)	5 (36%)	8 (57%)	6 (67%)	28 (54%)
	<b>Total</b>	<b>15</b>	<b>14</b>	<b>14</b>	<b>9</b>	<b>52</b>
Broadband	Paper	7 (20%)	9 (21%)	10 (17%)	9 (22%)	35 (20%)
	On-line	28 (80%)	34 (79%)	50 (83%)	32 (78%)	144 (80%)
	<b>Total</b>	<b>35</b>	<b>43</b>	<b>60</b>	<b>41</b>	<b>179</b>
<b>Total surveys</b>		<b>50</b>	<b>57</b>	<b>74</b>	<b>50</b>	<b>231</b>

**Figure 5.1.2 Survey completion mode and CIT usage in the different locations**



### 5.1.1 Respondent opinions on the importance of having and losing broadband

In Part A of the survey respondents had been asked about the impacts of broadband on their business. The first two questions in Part B of the survey asked about respondents' opinions on the benefits of broadband in the community generally. In both cases respondents were asked to rate the importance of presented with a series of statements and asked to rate how important they thought they were. The results are presented in Table 5.1.3 below. There was little difference in opinions in the different locations, but there was between CIT usage. In general, the broadband users rated the importance of suggested broadband benefits more highly than narrowband users, and more than half the broadband respondents rated all the issues as "important" or "very important". Both groups rated the importance for young people (no.1) most highly, with the importance of using it to keep in touch with people (no 3) and for the community generally (no 2) also rating highly. Both groups gave the lowest importance rating to the benefit associated with broadband attracting new businesses to the town.

**Table 5.1.3 Respondents rating community benefits of broadband as "very important" and mean score ratings**

	Narrowband (n=49)	Broadband (n=178)	Significance
1. Broadband provides more knowledge and opportunities for young people	20.4% (4.0)	42.7% (4.2)	**
2. Broadband is good for the community	26.5% (3.8)	36.0% (4.1)	*
3. Broadband helps people keep in touch with friends and relatives elsewhere	22.4% (3.7)	41.1% (4.2)	**
4. Broadband creates new opportunities for the business community in the town	20.4% (3.6)	22.0% (3.9)	*
5. Broadband provides more opportunities for new businesses starting up <sup>b</sup>	10.2% (3.4)	23.2% (3.8)	**
6. Broadband creates new opportunities for your business	12.2% (3.1)	21.9% (3.6)	**
7. Broadband attracts new businesses to the town	8.2% (2.9) <sup>a</sup>	14.6% (3.4)	-



<sup>a</sup> The mean rating score is included in parenthesis (1= not important to 5=very important)

<sup>b</sup> This was the only statement where there was a significant difference across locations, with a higher percentage in Bowen rating it as “very important”.

\*\*\* significant at 1% ; \*\* significant at 5%; \* significant at 10%

When considering the possible impacts of losing their broadband connection, both businesses with broadband and narrowband connections ranked impacts in a similar order, but broadband users rated all specific impacts more highly than narrowband users. The community benefits arising from broadband were ranked more highly by both groups than the business and economic benefits. The three issues that were rated as most important by both groups were the impacts on social infrastructure, social isolation and the retention of young people. (Table 5.1.4).

**Table 5.1.4 Respondents rating the impacts of losing broadband as “very important” and mean score ratings**

	Narrowband (n=49)	Broadband (n=178)	Significance
1. There would be a decline in the quality of other infrastructure services such as health and education	24.5% (3.3)	38.4% (3.9)	***
2. Some people in the community would feel more isolated	16.3% (3.1)	34.8% (3.9)	***
3. Young people would be less likely to stay in the town	6.3% (2.8)	19.7% (3.3)	-
4. Some businesses in town would move out and locate elsewhere	6.1% (2.6)	14.7% (3.2)	**
5. Some businesses in the community would become unviable	8.2% (2.5)	15.7% (3.1)	*
6. There would be job losses in town <sup>b</sup>	4.1% (2.4)	12.9% (3.0)	*
7. It would increase the costs of supply for your business	4.1% (2.2)	17.4% (3.0)	***
8. Your business would face increased competition from businesses in other locations with a broadband service	6.1% (2.1)	13.5% (2.7)	*
9. Your business would lose customers	4.1% (2.0) <sup>a</sup>	16.3% (2.78)	**

<sup>a</sup> The mean rating score is included in parenthesis (1= not important to 5=very important)

<sup>b</sup> This was the only statement where there was a significant difference across locations, with a much higher percentage in Longreach rating it as “very important”.

\*\*\* significant at 1% ; \*\* significant at 5%; \* significant at 10%

***Key Finding: A significantly higher proportion of respondents in Bowen, compared with other locations, rated the opportunity for new business development as a very important community benefit of broadband technology.***

**Key Finding:** A significantly higher proportion of respondents in Longreach, compared with other locations, were concerned that the community would suffer job losses if they lost their broadband connection.

**Key Finding:** Broadband users rated the importance of both the benefits of having broadband and the impacts of losing the technology more highly than narrowband users. In other words, the benefits of broadband are not fully realised until people have practical experience with the technology.

**Key Finding:** Both user groups rated the broader social community impacts of both having, or losing broadband more highly than economic impacts on their business operations.

### 5.1.2 Respondent details of CIT infrastructure

Before respondents were presented with the choice selection questions about future options for communication, details were collected about their current levels of infrastructure. Information was collected about connection costs and speed, and the type and reliability of the service, and the information was used in the subsequent analysis of choices.

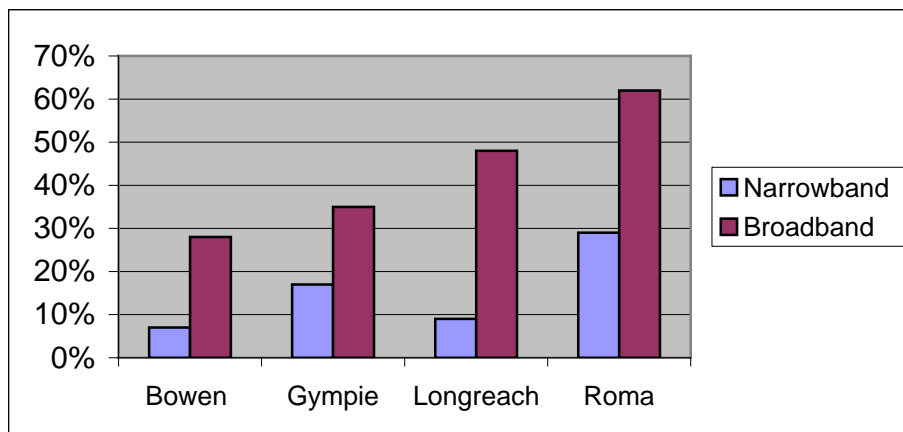
#### *Costs*

There was a significant difference in the amount respondents paid for their CIT service, both between location and CIT usage. A higher proportion of respondents in Longreach and Roma paid \$60 or more for their internet service compared with Bowen and Gympie. Broadband users were paying more than narrowband users (Table 5.1.5; Figure 5.1.3). There was considerable variation in the costs of Broadband connection across locations with more than double the proportion in Roma (62%) paying \$60 or more for their connection compared with Bowen (28%). While narrowband costs were lower, they were still much higher in Roma, where four times the proportion (29%) were paying \$60 or more for their connection compared with Bowen (7%).

**Table 5.1.5 Monthly costs of internet connection by location and usage**

Cost per month	Bowen (n=43)	Gympie (n=49)	Longreach (n=57)	Roma (n=36)	Narrowband (n=44)	Broadband (n=141)
\$0-\$29.99	32.6%	16.3%	31.6%	13.9%	50.0%	16.3%
\$30-\$59.99	46.5%	53.1%	28.1%	30.6%	36.4%	40.4%
\$60-\$89.99	11.6%	18.4%	28.1%	30.6%	2.3%	28.4%
More than \$90	9.3%	12.2%	12.3%	25.0%	11.4%	14.9%

**Figure 5.1.3 Respondents paying \$60 or more per month for their internet service**



**Key Finding:** *There was a significant difference in the costs of broadband and narrowband connection costs across locations with respondents paying the most in Roma and the least in Bowen.*

#### ***Speed of connection***

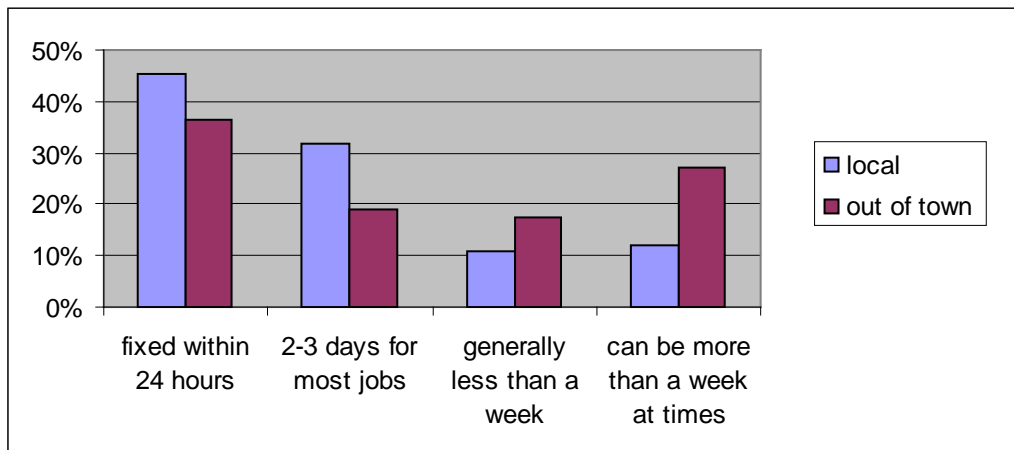
There was no significant difference in the speed of connection for narrowband and broadband users across locations, although approximately 40% in both groups did not know their connection speed. The large majority (81%) of narrowband users had a connection speed of 56 kilobits per second or less. The largest proportion (43%) of broadband users had a connection speed of between 256 and 512 kilobits per second, with a further 30% having faster connections.

#### ***Supporting services***

There was no significant difference between locations or between CIT usage in the level of support service respondents were able to access. Only 35% of respondents reported that their local service could fix 100% of their problems, with 30% accessing local services that solved 50% or less of their problems.

There were varying combinations of the use of local and out of town services, and the timeliness of the service is probably a more important consideration. While a larger proportion of respondents (45%) could get their CIT problems fixed locally within 24 hours, over a third (37%) could also access an out of town service that fixed their problems in the same time (Figure 5.1.4).

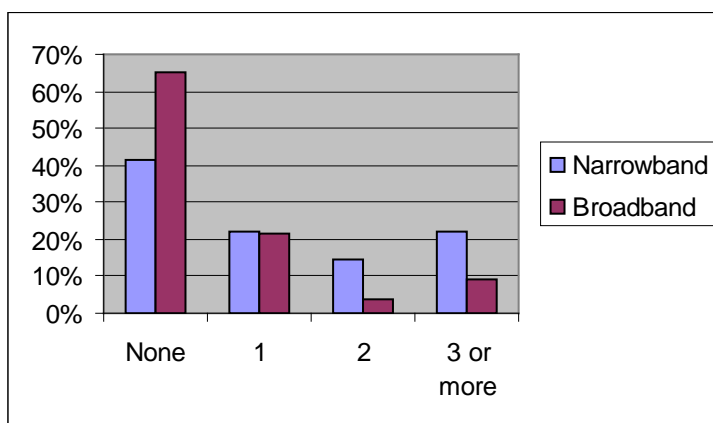
**Figure 5.1.4 Timeliness of CIT support services**



**Reliability**

Respondents generally considered service reliability in terms of the number of dropouts rather than the total connection time lost. Only 10% reported the time of dropouts in business hours, with the length of dropout varying from one minute to 4 hours. There was no significant difference between locations in the number of dropouts, but there was between CIT usage. The majority of broadband respondents (65%) experienced no dropouts compared with 42% of narrowband users (Figure 5.1.5). The number of dropouts out of business hours was not such a problem with 57% of narrowband users and 80% of broadband users reporting no dropouts, although fewer respondents were able to identify the number of out-of-hours dropouts.

**Figure 5.1.5 Number of dropouts in business hours**



**5.1.3 Respondents’ attitudes and responses to the choice selection questions**

Once respondents had completed the choice selection questions a series of follow-up questions were asked. Respondents’ attitudes to these questions could then be related to their choice preferences (analysed in detail in the following section).

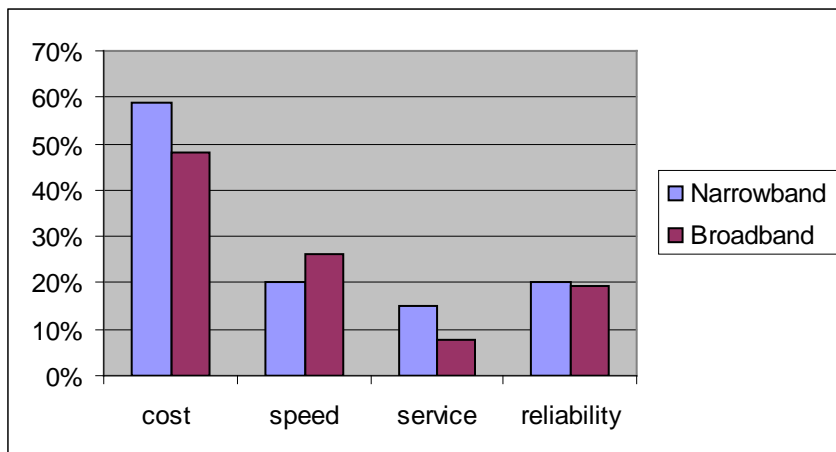
The results indicated:

- the majority of respondents (76%) were either “very” or “reasonably” confident they had made the correct choices;
- less than a third (30%) agreed that would have liked more information than was provided; and
- 38% agreed that they found the choice selection questions confusing.

Careful consideration is always given to the provision of information in a choice modelling survey, and there is always a tradeoff between providing too much information for some respondents and too little for others. The percentages of respondents reported above that wanted more information, and those that found the choice questions confusing, are quite common in choice modelling surveys. The influence of these opinions on choice selection is outlined in the next section.

The majority of both narrowband (70%) and broadband (60%) users indicated they had a preference for the different attributes. Cost was ranked first by the majority of respondents who stated they had a preference (Figure 5.1.6); speed was rated first by a higher proportion of broadband users and service was rated first by a higher proportion of narrowband users.

**Figure 5.1.6 Percentage of respondents with a preference, rating the attributes first**



*Note:* Some respondents rated more than one attribute first

## 5.2 Choice modelling application

A choice modelling exercise was contained within the Part B survey. It involved asking survey respondents to make a series of choices about alternative options for broadband infrastructure. In the questionnaire, respondents were presented with six choice sets. Each choice set involved three profiles describing the alternatives on offer. One of the profiles described the current situation or status quo option, and remained constant between the choice sets. The other profiles varied, so that respondents were being asked to make a series of similar, but different choices about their future use of CIT.

The profiles were made up of a number of attributes describing the main elements of broadband infrastructure in terms of the speed of connection, the type of back-up service available and how reliable the service might be. To generate differences between profiles, these attributes were allowed to vary across a number of different levels. These profiles then represent different options for improved CIT infrastructure. Respondents were asked to make a series of choices between a set of profiles, each outlining a different combination of levels of the attributes, at varying levels of additional cost. The current situation, at no additional cost, was always included as a choice option.

The information from a choice experiment is analysed using a logistic regression model. The probability that a respondent would choose a particular option or profile can be related to the levels of each attribute making up the profile (and the alternative profiles on offer), the socio-economic characteristics of the respondent, and their opinions and attitudes about related issues.

### 5.3 Choice modelling survey design

The choice modelling survey was designed to be completed in conjunction with Part A of the survey collection, so respondents were already focused on the use of broadband technology. There two main stages to consider in designing the survey were:

- Determining the attributes and attribute levels; and
- Designing the choice sets.

The information generated from the literature review stage (Report 1) and the semi-structured interviews with businesses in the target communities (Report 2) allowed the following attributes to be selected for use in the choice sets:

1. **Speed of connection**
2. **Supporting services**
3. **Reliability**

A cost attribute (additional cost of the service) was also included, so that the tradeoffs that respondents were prepared to make could also be assessed in monetary terms. There were four different levels for each CIT attribute and eight different levels for the cost attribute. Details are outlined in Table 5.3.1.

**Table 5.3.1 Attribute levels used in the choice profiles**

<b>Level</b>	<b>Label</b>	<b>Description</b>
<b>Speed of connection</b>		
1	Narrowband	Connection speeds of less than 64 kilobits per second (kps)
2	Broadband <i>Slow</i>	Connection speeds of 65 – 256 kilobits per second (kps) (e.g. typical satellite connections)
3	Broadband <i>Normal</i>	Connection speeds of 256 – 1.5 megabits per second (mps) (e.g. typical DSL connection)
4	Broadband	Connection speeds of over 28 mps

<i>Ultra fast</i> (e.g typical of services in US and other overseas countries)		
<b>Supporting services</b>		
1	Out of town <i>Low standard</i>	Over the phone service Visit within 1-2 weeks
2	Out of town <i>High standard</i>	Over the phone service Visit within 2-3 days
3	In town <i>Basic standard</i>	Can handle 70% of problems – external advice (30%) within 3 days
4	In town <i>High standard</i>	Can handle 100% of problems within 24 hours
<b>Reliability</b>		
1		10 mins/day – <i>in business hours</i>
2		5 mins/day – <i>in business hours</i>
3		5 mins/day – <i>NOT in business hours</i>
4		Guaranteed no drop outs
<b>Cost</b>		
1-8	\$10; \$25; \$50; \$75; \$100; \$200; \$300; \$500	Additional cost of service (\$/month)

Often in choice modelling surveys, a specified value is assigned to the status quo option or “current situation” for each attribute. However, in this case the current situation would vary between respondents as some have faster connection speeds and better levels of service than others. In the survey, the default option was simply described as ‘current situation’. To account for the variation between businesses in the statistical analysis, information about respondents’ current situation was collected in the survey and assigned in the data set.

An example choice set is shown in Figure 5.3.1. The original design included more graphics and icons were used to represent each attribute. However, this created some problems in the on-line version of the survey in terms of increased download times. To keep both survey formats the same, the icons were removed.

**Figure 5.3.1 Example choice set**

<b>Question 7: Carefully consider each of the following options. Suppose these were the ONLY ones available, which would you choose?</b>				
<b>Additional cost of service</b>	<b>Speed of connection</b>	<b>Supporting services</b>	<b>Reliability</b>	<b>I would choose</b>
(\$/month)	Refer to page 4 for details	Refer to page 5 for details	Details below	Tick one option only
<b>Option A</b>				
\$0	Current situation	Current situation	Current situation	<input type="checkbox"/>
<b>Option B</b>				
\$100	Broadband <i>Slow</i>	Out of town <i>High standard</i>	Guaranteed no dropouts	<input type="checkbox"/>
<b>Option C</b>				
\$500	Broadband <i>Ultra fast</i>	Out of town <i>High standard</i>	5 mins/day <i>in business hours</i>	<input type="checkbox"/>

*Note:* In the paper versions respondents were referred to previous pages for details about attribute levels. In the on-line version a table with the attribute levels was included in the window or frame for each choice set and respondents did not have to refer “back”.

In each choice set respondents had three choices – the current situation (Option A in the example above), and two other alternatives (Options B and C in the example above).

To allow for likely differences in current levels of infrastructure provision between broadband and narrowband users there were two splits of the survey; one for broadband users and one for narrowband users (identified in Part A of the survey). The overall format of the survey was the same in both cases, but the attribute levels applied in each split sample were varied. The broadband format involved the top three attribute levels and the top six cost levels. The narrowband format applied the lower three attribute levels and the lower six cost levels (see Table 5.3.1 for details).

An experimental design was used to select the choice profiles that will be presented to respondents. Each choice set represents a profile of different attribute levels. In these surveys, there are a large number of combinations or profiles that could be presented to respondents. As it is only possible to present a selection of profiles, an experimental design process is used to select the profiles, and then partition them into blocks for presentation to survey respondents. In this survey a total of 54 different choice sets were developed to represent the choices on offer. These were blocked into nine groups or versions of the survey, so each respondent was offered six choice sets



in a survey. When both the broadband and narrowband formats were combined, it meant there were 108 different choices sets from which details of respondent preferences could be analysed.

## 5.4 Choice modelling results

The choice modelling valuation is designed to determine the relative importance of different CIT infrastructure attributes by analysing respondents' choices and comparing their preferences for their "current situation" and other alternatives.

The first task in the analysis was to assign specific levels for the "current situation" from information gathered in the questionnaire. These details are presented here.

### 5.4.1 Assigning levels to the "current situation"

Before the statistical models could be calculated, levels had to be assigned to the "current situation" for each respondent that matched the attribute category levels (see Tables 5.1.2 and 5.2.1 for details). There were two classification tasks to consider. The first was to reclassify information to match attribute categories and the second was to assign default categories to cases where the respondent had not supplied information (missing values).

#### *Speed of connection*

Assigning levels for the speed of connection was straight forward. 81% of narrowband users reported speeds included in attribute level/category 1 and 73% of broadband users were included in attribute level/category 3. These levels were used as default values where there were missing values.

#### *Supporting services*

The information provided in the questionnaire about supporting services had first to be reclassified to match the attribute levels. Details are presented in Table 5.4.1.

**Table 5.4.1 Supporting service classification to match choice attribute levels**

Description	Choice set attribute level	% in category	% narrowband users in category	% broadband users in category
100% of problems fixed in 24hrs	4	27%	35%	24%
70-100% of problems fixed within 2-3 days	3	39%	33%	40%
50-70% of problems fixed within 2-3 days	2	16%	18%	16%
Lower levels	1	11%	6%	12%
Missing values		8%	8%	8%

There were two options for classifying missing values. The first was to classify all missing values as level 3 and the second was to classify all broadband missing values as "3" and narrowband missing values as "4". However, as there were only four missing values in the narrowband group and there was little difference in results when

the two different classifications were applied. The second approach has been uniformly adopted in the models presented in the following sections.

### ***Reliability***

The information about service reliability provided by respondents in the questionnaire was principally in terms of the number of dropouts rather than the total time of dropouts. However, some respondents provided information about both the number and time of dropouts, and the most commonly cited time per dropout was five or ten minutes. Both combinations were tried in the choice analysis and the ten minute conversion rate provided the strongest models.

The lowest attribute category for reliability was a length of 10 minutes for possible dropout time. Allocating a dropout time of five or ten minutes per dropout meant that some respondents were falling below the lowest attribute level and an additional attribute level/category = 0 was created.

The majority (65%) of broadband respondents and 42% of narrowband users reported that they had no dropouts (see Figure 5.1.5) and were classified in the highest attribute category 4. These respondents were unaffected by any changes in the time allowance for dropouts. All missing values were included in this category.

### **5.4.2 Choice models**

The application of the choice model relates the probability that respondents would have chosen a particular option to the attributes and levels describing the option, survey factors, and the characteristics of respondents and their businesses. A number of variables can be included in the statistical models, so analysis is typically a step-wise process where the insignificant variables are included. In the conditional logit models used for this analysis, the attribute levels help to explain the choices between each of the alternatives, while the other factors help explain the choice (or no choice) of the ‘current situation’ option. In the survey 31% of narrowband users and 40% of broadband users selected the “current situation” option in all six choice sets.

There are several reasons why respondents may have chosen the “current situation” option.

- They did not wish to pay the additional cost associated with the alternatives;
- The attribute levels offered in the alternatives were not considered an improvement on their current situation; and/or
- They were unsure about the choice selection process and maintaining their current situation was a risk adverse strategy.

The variables used in the analysis of the choice models are described in Table 5.4.2.

**Table 5.4.2 Description of variables used in the choice models**

<b>Variables</b>	<b>Description</b>
<b>Attributes</b>	Details are provide in table x.5
Cost	The monthly amount that respondents would pay to obtain CIT infrastructure improvements
Speed	The speed of connection
Service	Supporting service
Reliability	Reliability of connection
ASC	Alternate Specific Constant which reflects the influence of all other factors on choice of alternative options
Confidence	Confidence that made the correct choice – from ”very confident” (1) to “not very confident” (4)
Preference	Did respondent have a preference for the different attribute? Yes (1); No (-1); not sure (0)
<b>Attitudes to Broadband</b>	Statement rated from “not very important” (1) to very important (5)
Customers (wo)	(Table 5.1.4; no 9 - without broadband) Your business would lose customers
Unviable (wo)	(Table 5.1.4; no 5 - without broadband) Some businesses in the community would become unviable
Unemploy (wo)	(Table 5.1.4; no 6 - without broadband) There would be job losses in town

Three different models were estimated for the analysis: the responses of broadband users, the responses of narrowband users, and the pool of all responses. Model results are outlined in Table 5.4.3.

It was desirable to identify values for specific improvements in the attributes. To compare preferences for the different attribute levels, one level had to be held as the base. A comparison could then be made between preferences for each level, as compared to the specified base.

- In the “All combined” group sample the lowest level was held as the base
- Broadband users were faced with the highest three levels. As they were not faced with the lowest level (level 1), this was not included and level 2 was held as the base. A comparison could be made between:
  - Levels 2 to 3
  - Levels 3 to 4
- Narrowband users were faced with the lowest three levels and so Level 4 was not included and Level 1 was held as the base. A comparison could be made between:
  - Levels 1 to 2
  - Levels 2 to 3

**Table 5.4.3 Multinomial logit models with split level attributes**

	All combined			Broadband users			Narrowband users		
	Coeffic	St Err		Coeffic	St Err		Coeffic	St Err	
Cost	-0.005	0.001	***	-0.005	0.001	***	-0.013	0.002	***
Speed1_2	<b>-0.015</b>	0.169		0.000			<b>0.803</b>	<b>0.262</b>	***
Speed1_3	<b>0.607</b>	0.151	***	<b>0.583</b>	<b>0.128</b>	***	<b>1.605</b>	<b>0.276</b>	***
Speed1_4	<b>1.101</b>	0.204	***	<b>1.015</b>	<b>0.150</b>	***	0.000		
Service1_2	<b>0.294</b>	0.163	*	0.000			<b>0.298</b>	<b>0.228</b>	
Service1_3	<b>0.143</b>	0.158		<b>-0.124</b>	<b>0.116</b>		<b>0.104</b>	<b>0.217</b>	
Service1_4	<b>0.455</b>	0.166	***	<b>0.113</b>	<b>0.121</b>		0.000		
Reliability1_1	<b>0.569</b>	0.208	***	0.000			0.000		
Reliability1_2	<b>0.363</b>	0.214	*	0.000			<b>0.061</b>	<b>0.274</b>	
Reliability1_3	<b>0.576</b>	0.222	***	<b>0.213</b>	<b>0.147</b>		<b>0.083</b>	<b>0.292</b>	
Reliability1_4	<b>0.705</b>	0.184	***	<b>0.307</b>	<b>0.113</b>	***	0.000		
ASC	-2.875	0.293	***	-3.210	0.346	***	-3.385	0.692	***
Confidence	0.640	0.088	***	0.735	0.101	***	0.984	0.232	***
Preference	0.762	0.089	***	0.712	0.095	***	1.690	0.284	***
Customers (wo)	0.311	0.066	***	0.307	0.073	***	0.293	0.162	*
Unviable (wo)	-0.400	0.095	***	-0.306	0.107	***	-0.649	0.201	***
Unemploymt (wo)	0.369	0.098	***	0.357	0.108	***	0.129	0.229	
<b>Model statistics</b>									
Log Likelihood	-973.39			-745.05			-211.24		
R sqred Adjusted	0.299			0.315			0.287		
Observations	1350			1044			306		
Skipped observ	78			48			30		

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%

The interpretation of choice models usually focuses on three components:

- if a variable is significant;
- the coefficient value which gives an indication of the strength of preference; and
- whether the coefficient has a positive or negative influence.

The following aspects of the model are worth noting:

- The cost attribute is significant and negative (as expected) which indicates higher levels of cost were not preferred.
- The speed attribute is significant in all models and is positive so higher levels were preferred.
- Coefficient values for speed were higher (preferences were stronger) than those for the other CIT attributes. Narrowband users had stronger preferences than broadband users.
- Supporting services was not a significant attribute for narrowband or broadband users.
- Reliability was significant for broadband users (high levels only) but not for narrowband users.
- The ASC constant values are very high and negative, indicating that there were other factors than those outlined in the models influencing respondents' preferences away from the alternatives. This may have been because many respondents were already experiencing high service and reliability levels.

- There was a significant difference between broadband and narrowband users, with the former more likely to select the current situation.
- The method of completion (internet or paper based) was not a significant influence on choice.
- Broadband respondents from larger firms (in terms of staff numbers), were more likely to select the alternatives for improvement.
- The location of respondents was not included in the model as it was not a significant variable.

Considering the “all combined” model (which is dominated by responses from broadband users) most of the attribute levels are significant. All level 4 attributes are highly significant as are Level 3s, apart from service. A comparison of the coefficient values for the difference levels shows an overall increase for all attributes, although there is a midway drop off (Figure 5.4.1). With speed there is a sharp increase in preferences from level 2 to levels 3 and 4. With both service and reliability there is a sharp increase from the lowest level to the next and then again for the higher levels.

***Key finding: Respondents preferred improvements in connection speed more than improvements in supporting services and reliability. However, many respondents were already experiencing high levels of service and reliability, which is likely to help explain this finding.***

***Key finding: Improved reliability was more significant for broadband users than for narrowband users.***

The use of the Choice Modelling framework allows monetary values to be assigned to potential tradeoffs. To assign a dollar value to the preferences for a change in one attribute, the coefficient value (or change in value from one level to another) is divided by the cost coefficient. Values were only calculated for changes in attribute level that were significant (Table 5.4.3) and the results are presented in Table 5.4.4. Only values for significant attribute changes are estimated.

**Table 5.4.4 Willingness-to-pay for service improvements**

	<b>Broadband users</b>	<b>Narrowband users</b>
Speed 1_2		\$61.64 ***
Speed 2_3	\$116.03 ***	\$61.62 ***
Speed 3_4	\$85.89 ***	
Reliability 3_4	\$18.81 ***	

Speed was the main feature of CIT infrastructure that was important to both broadband and narrowband users, with both groups willing to incur additional costs to improve their current connection speed.

- Narrowband users were willing-to-pay an additional \$62 per month to improve their speed of connection from:
  - Speeds of less than 64 kps to speeds of 65 - 256 kps; and
  - Speeds of 65 - 256 kps to speeds of 256 kps – 1.5mps
  
- Broadband users were willing-to-pay an additional:
  - \$116 per month to improve their speed of connection from 65 - 256 kps to speeds of 256 kps – 1.5mps; and
  - \$86 per month to improve their speed of connection from speeds of 256 kps – 1.5mps to an ultra fast service of over 28 mps.

Many respondents were already experiencing a high level of supporting service and this was not something most people were willing to pay more for. However, Broadband users were willing-to-pay an additional \$19 per month to improve reliability to ensure a guarantee that there were no dropouts.

***Key finding: Broadband users put a higher value on improved speed than did narrowband users. There was some evidence of diminishing marginal values for increased speed.***

### **5.4.3 Latent class model**

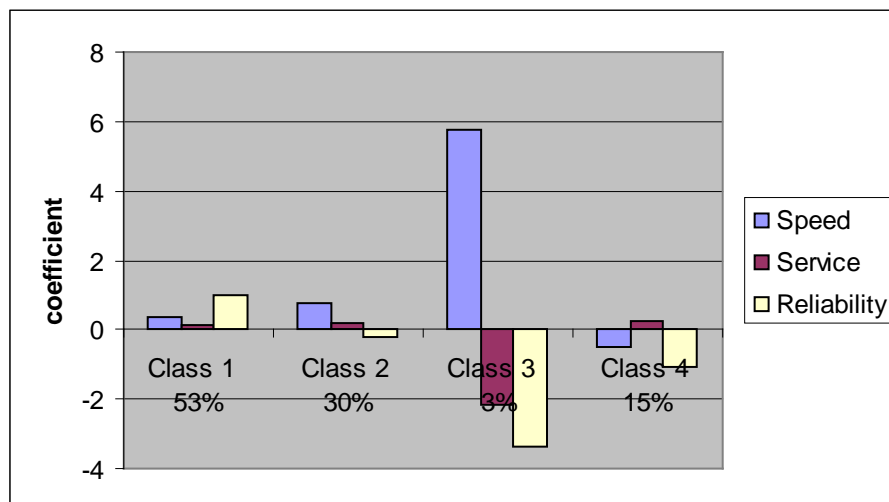
Latent class models are a mechanism to test if the respondents to the choice surveys can be classified into particular groups according to their choice behaviour. The models provide a different way of categorising the respondents instead of defining them in terms of location and other factors (as reported in the models above). Since a number of groups can be estimated and no restrictions are placed on membership probabilities, latent class models allow for a wider range of preference heterogeneity.

For this data set, a latent class model was estimated, where cost was held as a fixed variable and different classes of responses were determined based on preferences for the three CIT infrastructure attributes. It was possible to run a model that identified four distinct classes of respondents and the results presented in Table 5.4.6 and Figure 5.4.2 below. The model had high explanatory power, with all attribute coefficients being highly significant.

**Table 5.4.5 Latent class model for all respondents combined**

	<b>Class 1</b>	<b>Class 2</b>	<b>Class 3</b>	<b>Class 4</b>
	coefficient	coefficient	coefficient	coefficient
Cost	-0.01	-0.01	-0.01	-0.01
Speed	0.38	0.78	5.78	-0.48
Service	0.16	0.17	-2.16	0.24
Reliability	0.98	-0.21	-3.36	-1.06
Probability of being in the class	53%	30%	3%	15%
Log L	-1034.864			
Rsqr adj	0.298			
Observations	1350			
Significance	All values and probabilities were significant at the 5% level of significance			

**Figure 5.4.2**



The characteristics of the different classes can be described as follows:

**Class 1 (53% probability)**

- Over half the respondents were likely to be in this class;
- positive preferences for all attributes; and
- stronger preferences for reliability.

**Class 2 (30% probability)**

- stronger preferences for speed
- positive preferences for service
- negative preferences for reliability

**Class 3 (3% probability)**

- only a small proportion of respondents were likely to be in this class;

- very strong preference for speed; and
- strong negative preferences for service and reliability.

**Class 4 (15% probability)**

- negative preferences for speed and reliability; and
- weak but positive preferences for service.

There was no significant difference across locations or CIT usage, with a similar proportion of respondents from each location and each CIT user group represented in each class.



## 6. Discussion and conclusions

The research generated from the survey of businesses in Bowen, Gympie, Longreach and Roma about the current and future use of broadband has generated a number of broad groups of research findings.

First, the results indicate that there are many more similarities between the business communities than differences in the takeup and use of CIT. Longreach was a little different to the other communities with higher levels of takeup and use, perhaps reflecting an older and more stable business community. In most cases, little difference in usage could be detected between communities.

Second, there are clear differences between usage and attitudes according to whether businesses have broadband or narrowband connections. Businesses with broadband tend to have much more positive views about the usefulness and importance of broadband, and to be concerned about the impacts of any potential loss of service or connection. In comparison, narrowband users tend to have a much more conservative view of the benefits of broadband, tend to be more confused about its cost, and more concerned about its misuse. This may help explain why they have not taken up the new technology.

The benefits of broadband do not appear to be fully realised until people have practical experience with the technology. Even among adopters of the technology, it appears that many may have been unsure how it would affect their business operations at the time of adoption, indicating that it was “something you got because you had to”. Over a quarter of users could then identify ‘unexpected benefits’ and a similar number were expecting positive changes to their business operations in the future.

Third, the key uses of the internet by businesses were to get information and research, and to use on-line banking. Communicating with suppliers and other businesses were more important than communicating with customers. Businesses with broadband indicated that there were major benefits in relation to improving supplies and business performance, but more limited benefits in terms of attracting new customers, reducing staff costs or increasing turnover. The findings are quite similar to earlier studies of broadband usage in the limited use of broadband for marketing purposes, and the impact in reducing costs rather than increasing sales.

Fourth, there are generally high satisfaction levels for the speed and reliability of internet connections. Satisfaction was lowest in Bowen and highest in Roma. Broadband users appeared very satisfied with their connection speed and reliability, in marked contrast to narrowband users. However around one third of broadband users express confusion about broadband technology and confusion and concern about its cost, which suggests that further information support is needed.

Fifth, business respondents did not appear to be concerned about improved technology increasing outside competition. Only 21% of respondents with broadband and 7% with narrowband thought that the presence of broadband had increased business competition. This suggests that the provision of broadband technology is perceived to be largely beneficial to regional businesses. However the main customer

group targeted by both Gympie and Bowen respondents was new customers outside their local area, so there may be a failure to recognize the threat of new competitors.

Sixth, respondents generally viewed the social benefits of broadband very highly, rating these as more beneficial than the business benefits. There was strong support for broadband provision having broader community benefits, including overcoming some of the problems of remoteness, improving business activity, improving infrastructure services and improving skills levels.

Seventh, broadband users put a higher value on improved speed than did narrowband users. There was some evidence of diminishing marginal values for increased speed of connection. There appears to be little value for further improvements in service levels, and modest values for further improvements in reliability.