UNIVERSITY OF SOUTHERN QUEENSLAND

Central Western Queensland Digital Connectivity Project

Assessment of the Social and Economic Impacts of Digital Connection in Remote Communities

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Executive Summary

Overview of Impacts of Digital Connectivity

Introduction

Digital connection – fast broadband internet and mobile phone access – is crucial for economic development, access to services and social connection in rural and regional Australia. Investment decisions about the considerable cost of expanding internet and mobile phone coverage in rural and remote areas, are limited by lack of data on the social and economic benefits of connection, particularly longitudinal studies that assess impacts over time.

This report describes the results of research on the social and economic impacts of digital connection in remote communities in far western Queensland – Jundah, Stonehenge, Windorah in the Barcoo Shire; and Birdsville and Bedourie in the Diamantina Shire. Digital connection involved the underground installation of fibre-optic cable and the establishment of mobile phone coverage within about a 20kms radius of towns. People located outside the towns, on extensive pastoral properties, accessed the internet via the Telstra Skymuster satellite service which provided much faster speeds and capacity than previous satellite services.

Key services in these communities – the police station, health clinic, primary school, and local government offices - have "fibre to the premises". This is where the fibre optic cable connects directly to each location allowing high data volumes and transfer speeds. The rest of each community – businesses and residential buildings - have "fibre to the node" access to the cable. This means that the fibre optic cable is connected to each town's telephone exchange and the final connection to the cable is made through cooper wire cables from the telephone exchange to each premises.

Methodology

An assessment of social and economic impacts these impacts was made in 2016 (prior to fast internet and mobile phone connection), in 2017 (one year after connection) and in 2019 (2.5 years after connection). A range of over 30 indicators were assessed under the following categories:

1. Reliability and performance of voice telephony and digital connection,
2. Digital capacity,
3. Changes in social/community characteristics as a result of digital connection,
4. Changes in economic characteristics as a result of digital connection.

Information and experiences of the impacts of digital connection were gathered using a mixed methods approach involving detailed interviews with key informed respondents, likert scale scores and data such as internet speeds and costs. Interviews were conducted throughout each of the five case study communities and with landholders outside towns. This included a broad cross section of community members including representatives of police, education, health, businesses, local government, emergency services, landholders, resources companies, Indigenous people and key community people.

Respondents were identified as “informed people”, that is, people who were connected enough in each community to respond about the broader impacts in the community, not just personal impacts on them individually. Hence the interviews gathered information about observations of the whole community and was not a sample of individual experiences. A total of 171 people were interviewed over the 3.5 year study period. However, many of these people were repeat interviews with the same people from the year before.

Interviewees also rated indicators of social and economic change due to digital connection on a likert scale from zero (no change in the indicator) to 6 (major change in the indicator). This allowed average scale scores for each indicator to be compared across time.

With consent, interviews were recorded. All interview recordings were transcribed and coded based on the points raised by each respondent in their answers to interview questions. These codes were collated under themes and assembled under the topics being investigated in the research framework such as internet use, impact on employment, social connection etc.

The assessment was jointly funded by the Queensland Department of Housing and Public Works (HPW), the Remote Area Planning and Development Board (RAPAD), the Local Government Association of Queensland (LGAQ) through the Telstra Innovation Development Fund, Barcoo Shire Council and Diamantina Shire Council.

Key Findings

This section of the report provides an overview of the social and economic impacts of digital connectivity across the full time period of the study from 2016. It describes the key changes highlighting the main impacts that stood out from all the other indicators assessed in the assessment framework. It later also describes the details of all the changes assessed over the study period following the list of indicators in the framework.

The following is a summary of the key social and economic impacts of digital connection in remote communities shown in the study.

Greater Digital Connectivity but Recent Problems with Access

Internet upload and download speeds markedly improved and the reliability of connection was also vastly better with few dropouts or interruptions. Mobile phone service was also very reliable with good reception within towns. People noticed a much-improved internet experience with business operators, service providers and residents being able to use the internet reliably for a wider range of things particularly internet banking, shopping, entertainment such as accessing video streaming services such as Netflix, education and social connection with friends and family.

However, there were issues that need to be investigated and addressed. The Fibre to the Premise service at key service locations allowed much improved use of the internet and greater access to internet-based data and the transfer of large files. However, in the 2019 assessment, it became clear across the two shires that internet speeds had become quite limited at schools, health clinics and at police stations. While internet speeds of approximately 100mbs per second would be expected with fibre connected directly to the

premises, these government services experienced quite slow speeds, under 5mbps. This was unexpected and the research team was informed that payment plans for data access apparently had not been adjusted to accommodate fast broadband. Interviewees perceived that the budget available for individual schools or health clinics to access broadband was limited to the point where they can't effectively access high speed broadband. It may also reflect departmental regional internet access policy, that is the 'class of service' which may impact the speed an end user experiences. This protocol is used to fix the required bandwidth at a site to constrain data usage to a level the Department deems acceptable without consideration of the available NBN connection and capacity.

Another issue was that there appeared to be little awareness of the Barcoo and Diamantina Scheme with telco service providers outside the region. For example, community members who enquired with Telstra about NBN service were referred to satellite services with Telstra staff not being aware of the presence of fibre optic cable connection in the region.

Improved Business Efficiency but Change to Business Culture is Needed

Improved internet connection allowed businesses to improve their efficiency such as using web-based inventory management and ordering software, have reliable EFTPOS, promote their business on the internet and provide internet connection for clients. Businesses also noticed benefits in advertising for staff and screening applicants on-line, doing internet banking and in seeking contractors and suppliers. In agriculture, pastoral stations were better able to manage cattle herd information, order parts and services and arrange transport and stock transactions. For businesses that saw the opportunity, and developed their digital literacy, these changes made a marked improvement on business operation.

Improved internet connection and mobile phone access made little impact on the establishment of physical businesses, but by 2019, some notable examples of internet-based businesses had developed. An internet shopping business in one community had the important collateral impact of maintaining cash flow at the local post office. The development of internet-based businesses remains a key opportunity in these communities.

A major factor limiting the impact of digital connectivity for business is business culture. Some businesses more motivated to gain digital skills and better use digital access to promote and operate their business. However, a range of other businesses appeared to not be motivated to take full advantage of digital connection. This appeared to be due to business operators not necessarily seeing the need to use digital connection, not being familiar or competent with it, and a general culture of maintaining operations as they are and not really wanting or needing to change.

Important for Tourism

Digital connection was particularly important for the ongoing development of tourism in the region – an important existing sector and a developing opportunity for economic diversification. Tourists sought digital connection and prior to connection, lack of connectivity dissuaded visitors and caused them to stay. Poor connectivity also created difficulties for tourism businesses such as limiting access to EFTPOS and not being able to promote products and services on-line. After connection, tourists saw these remote communities as being more "liveable" for them during their stay. Many "Grey Nomad" tourists found connection important to stay in touch with family and friends, to manage businesses and other activities while travelling, and they were able to enrich their experience by sharing their travels on social media. Travellers appeared to feel safer and were better

able to access information about weather, road conditions and camping sites and facilities. For major events such as the Birdsville Races and the Big Red Bash, digital connection allowed the races to be live-streamed for the first time and the large numbers of tourists at the events are now able to access mobile phone coverage, and social media.

Digital connection also allowed tourism-based businesses to promote services and facilities and use web-based booking services. The shire councils were also better able to promote the region to tourists and tourism operators. They were able to maintain tourist information on web sites and promote the region on social media. Real time sharing of experiences on social media by tourists was also very good publicity and promotion for the region.

Greater Social Connection without Limiting Face to Face Contact

Digital connection enhanced social connection for people in remote communities and didn't interfere with traditional face to face contact in small communities. Prior to connection, there was concern that mobile phone access, would create what people saw as a "capital city issue" where people would forgo face to face conversation in favour of texting and using their mobile phone. The results show that this hasn't happened. There remains a strong local culture of face to face contact and people still interacted with each other personally. The use of mobile phone was discouraged in some social situations such as in hotels, to encourage face to face communication. However, the convenience of mobile phone contact was a very important addition to personal contact which expanded people's social lives. They were able to connect with friends on social media and videolinks and connect with people outside the region.

Importantly, internet and mobile phone coverage had the major advantage of allowing people in remote communities better maintain contact with distant friends and family. People who moved to these remote communities to live or take up work positions were able to keep in touch with children, grandchildren and other relatives and friends. Residents who often had children away at boarding school could also keep in regular contact with them. This greatly improved people's lives and reduced one of the factors that leads to staff and resident turnover in remote areas.

Community Organising Made Easier

Digital connection, especially mobile phone coverage in towns, made it a lot easier for people to manage and run community organisations such as the school P and C, service clubs and sporting groups. It also made it much easier to organise community events such as gymkanas, shows and fundraisers. Prior to connection, community organisations relied on word of mouth, flyers, and the fixed telephone to organise meetings and activities. This was effective in small communities but took a lot of time and effort and was somewhat "hit and miss". With reliable mobile phone coverage and good internet connection for email and messaging services, community members found it a lot easier communicate and make arrangements for the effective operation of community organisations.

People still used Local Services, but those Services ould do More

The impact on people's access to services was focused on improved use of services outside the region and improvements to what local services could do. People still accessed local physical services in communities. For example, if a health issue arose, people would phone or attend the local clinic. Access to the internet did not change this. However, digital access greatly expanded what local services could provide. For example, telehealth, where local

patients can videolink with specialists in major centres was possible, large medical image files could be transferred and regular health clinics could access the internet and mobile phones. Shire Councils could also provide better services and be more efficient by accessing web-based databases, having consultants accessing data, having Cloud backup of servers and by using on-line timesheets for staff. Schools (with adequate internet speeds) could access a range of web-based learning tools and experiences for students. Police could access state-wide databases and more effectively communicate with regional and head offices.

Another major impact of digital connection was allowing people to access services that they could directly access themselves. Internet banking and shopping are two key examples. People were able to use internet banking and have security codes sent to their mobile phones. Internet shopping also improved people's quality of life. This did not replace goods and services offered by local businesses. People still had a strong ethic of shopping locally and they used internet shopping to buy goods that were not available locally such as clothes, electronics and more specialist items. This shopping contributed to freight operators and local post offices. A range of other services were also available such as children's dance classes and specialist coaching.

Big Impacts on Education

Digital connection had a major impact on people's access to education. Digital connection allowed students at the primary schools in the region to access a much wider range of learning materials and experiences such as web-based mathematics, music and foreign language programs. This was limited in 2019 by slow internet speeds detected at schools and some schools were accessing faster data via mobile phone towers. It is important for this to be resolved.

Prior to digital connection, it was virtually impossible for residents to study online by distance education. Fast internet connection has now made TAFE and university courses available to residents and several people that were interviewed were studying remotely. People were also able to participate in shorter professional development courses and seminars. This is a major benefit that contributes to people's ability to remain in these remote communities and progress their skills and careers.

Improved Emergency Management and Public Safety

Digital connection also markedly improved preparation for, and management of, emergencies and community safety incidents such as fire, floods and vehicle crashes. In the preparation phase, texting, email, social media and access to internet information made it much easier to organise Disaster Management Committees, prepare and review community safety plans and to communicate with community members about plans and procedures. When an incident was actively being managed, mobile phone coverage was an additional way of communicating together with UHF radio and satellite phones. Texting and Facebook updates for the community were also seen as a key way to communicate in the event of an emergency. Real time data and information could also be accessed during an emergency and coordination with central headquarters was also seen to be much easier.

Digital Connection was a Major Factor in Attracting People

The attraction and retention of population is very important in the vitality of the region. There are many factors that influence a person's decision to relocate, stay, or leave these remote communities such as family, weather, employment, housing, social connection,

lifestyle, opportunity, income etc. However, having fast broadband and mobile phone coverage is critical in attracting and retaining people, particularly young people and families. While it may not be a major determinant of people's location, it is important for communities to offer digital connection to have any real hope of attracting and retaining staff. Without it, people would not be attracted, nor retained in these communities.

There were also some key lifestyle aspects of digital connection that people felt particularly overcame, to some extent, the isolation of the communities. These included access to streaming services such as Netflix, access to instant social connection with distant contacts such as Facebook and having access to "outside" information and services on the internet.

Improved Digital Literacy Needed

How effectively people in these communities use digital connection, and draw benefits from it, depends largely on their digital literacy – their familiarity, skills and motivation to use digital platforms. This is far more than skills. It is really about people's acceptance of change, their capacity to challenge themselves with something that is not part of their culture and overcoming perceptions and fears of technology.

Almost all people using digital connection were self-taught and of a generation that did not grow up with digital technology. While some people have become very familiar and practiced at using digital technology, it is a major change for many others. A series of activities, such as peer learning arrangements, promotion of online training services in how to establish online businesses, tips, apps and advantageous business possibilities could appropriately build people's confidence and familiarity with digital connection across the communities.

Future Opportunities

While the focus of digital access has largely been on internet access and communication via mobile phones, a major opportunity lies in the broader application of digital capacity. This lies in using digital platforms to use technology in agriculture, tourism, planning and in business. For example, the use of agricultural technology such as virtual fencing and drones to monitor water points is possible with digital connection. Information systems such GIS databases can also be used in planning and management.

Details of Findings

The following section describes the details of the overall findings of the study across the three-year timeframe.

Internet Connection and Use

Type of Connection

When the baseline study was conducted in 2016, prior to fast digital connection, most respondents accessed the internet through Activ8, Harboursat or a temporary Telstra satellite dish or aerials. In some communities, internet was provided to the community through a satellite dish. Many people used ADSL dial up to connect.

In 2017 and 2019 the connection was a mix of:

- Fibre to the Node – with fibre optic cable to the telephone exchange and individual connection to premises through existing copper wire telephone lines from the exchange or "node".

- Fibre to the Premises for key government services i.e. Clinics, Schools, Council and Police Stations – the fibre optic cable connects directly to the premises providing fast speeds and high data transfer capacity.

- Satellite through Sky Muster – two satellites were launched in late 2016 and provided much higher speeds and data transfer capacity than previous satellites.

- Fixed Wireless connection using data transmitted over radio signals to connect a premise to the broadband network through an antenna.

- Hot-spot tethering from a mobile phone (4G data)

In 2019, some participants reported that they had difficulties with accessing services because staff in telecommunications companies were not aware that they had access to fast internet technologies. For example, a significant service-oriented business at Birdsville was advised to remain on a highly constrained satellite internet service, because head office company staff were not aware that a fibre to the node service was available.

Telstra Air Services were not available in any community, though public phone booths were present. Telstra Air allows visitors to access their own data through public hotspots and this could be a valued service for tourists and visitors to these communities.

Use of Digital Connection

In 2016, common uses were:

- Email,
- Access to services from local government and state government,
- Accessing information including information searches, weather information and accessing news,
- Internet shopping,
- Social networking/social media.

The findings in 2019 showed that the use of online services had greatly expanded and was much more habitual. Information searching was an everyday function and could now include video-streaming, an expanded range of social media tools and live streaming on social media. Speed and reliability had markedly improved making tasks and services easy and accessible such as shopping, banking and online education or access to government portals. Previously it had either not been possible to access these services or only with a very slow and unreliable connection. Internet banking was a key service that people could now access.

In 2019, 63% participants reported using government portals for services such as tax returns or car registrations. 65% were active users of social media including Snapchat, Instagram and Facebook. Messenger was a widely used messaging service, with closed groups used for private communications with family and friend circles and within community organisations.

75% of respondents were using online shopping, 80% were paying bills online and 56% were streaming television or video content. 45% were studying online.

Costs

Throughout the study, people were quite uncertain about the cost of their internet and mobile phone access. Quoted costs varied too greatly to be reliable in all assessment periods. People were often unfamiliar with the detail of the components, or the connection type, in their telecommunications packages.

Younger residents particularly tended to rely on their mobile phones for internet access because mobile data speed was much cheaper, faster and more reliable than ADSL connection.

Time of Use

The time of use of digital connection depended on what hours different aspects of the community operated in. Businesses, Council and Service Providers accessed the internet largely during daytime business hours. Private users mostly used the internet after hours during evenings. Many people in 2016, mentioned delaying access to off-peak times when internet access was less congested, and speeds were higher. Times of use in 2017 and 2019 were more spread out during the day and evening but the time of use did not substantially change over the period of the study.

Internet Connection Quality

Reliability of Connection

In 2016, dropouts were regularly experienced during high demand periods particularly during stormy weather. On some occasions, the internet was reportedly unavailable for days at a time. When people were connected, speeds were very slow reducing the ability of businesses and residents to effectively use the connection. Community members and tourists found internet connection points provided by Councils (such as at Visitor Information Centres) very helpful.

In 2017 and 2019, after fast broadband connection, the reliability and speed of connection was greatly improved allowing people to access internet banking, shopping and a wide range of services and entertainment. This had a marked impact on livability and economic opportunity. However, some issues related to speed and capacity remain. Some people still experienced slow internet speeds and it may be that poor speeds were due to Wi-Fi modems in their premises rather than the overall fibre to the node system. It was unclear if this was causing slow speeds and some people overcame this by using mobile phones as tethered hotspots, where data speeds were considerably faster.

Many residents often did not understand the technical aspects of enhancing or facilitating fast internet access and when speeds were poor, they were are inclined to accept it, rather than follow it up with the telecommunications provider.

In 2019, some people also noted that mobile phone ‘service bars’ had decreased from being at four early on, to now being at two in the same locations. Other reports were given of varying strengths of mobile service over time and some queried whether this may be a result of illegal

boosters, maintenance issues in the mobile tower/infrastructure or just more people using the service.

Speed of Connection

The speed of connection markedly improved but some issues affecting speed need to be resolved. In 2016, connection to the internet was characterised by poor capacity and low download speeds. This meant that some services were accessible only in off-peak periods or a great deal of patience was needed to wait for loading to complete.

In 2017 and 2019, speeds were greatly improved allowing access to internet banking, shopping services and education. However, in 2019, some issues with speed were reported. Many younger people were using mobile phone data connection as it was consistently faster than ADSL internet. Mobile phone access speeds were in the vicinity of 68-116mbps download (ping 48-72) in the main street of communities.

Some government services with fibre connected directly to the premises, particularly schools, experienced very slow speeds, under 5mbps and often under 2mbps download speeds. This impacted on their effective use of digital connection. We suspect that this is due to funding constraints rather than a technical issue.

People often accepted slow speeds. For those who mentioned contacting Telstra, they did often notice a resultant improvement in connection and speed.

Satellite connections in 2017 and 2019 were much improved from previous satellite access. However, speed was sometimes slow. This was perceived to be due to Skymuster being oversubscribed and data being often constrained as on properties both employees and family members were often all accessing a home data package. Notwithstanding ongoing issues with the quality of satellite connection and data availability, staff and managers on properties saw major social and business benefits from improved internet access.

Overall, people in remote communities felt that they could not do without internet access, having now experienced the benefits.

The likert scale assessment of connection reliability and quality over the study period (Figure 1) show considerable improvement in both the reliability and quality of internet and mobile phone connection.

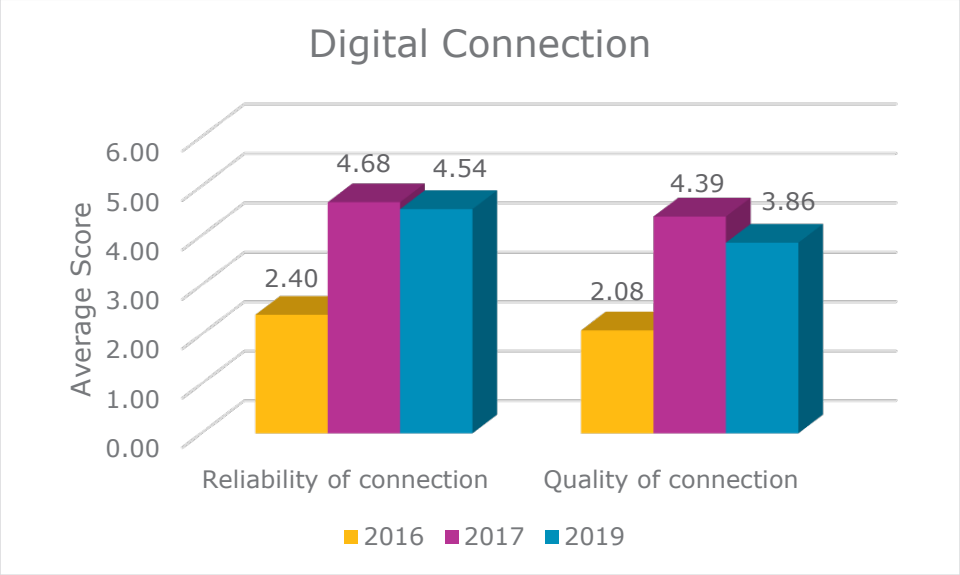


Figure 1. Change in the reliability and quality of digital connection before connection (2016) and after connection (2017 onwards).

Digital Capacity

People had improved their digital skills and familiarity largely through practice and trial and error. In 2016, people rated their online skills as moderate and all were self-taught. Almost all expressed interest in learning more through formal or informal learning opportunities.

By 2019, people felt that their skills had increased due to participants making use of online resources to self-teach (such as in information searching) and through experimentation, practice and from input from younger residents or relatives. While people had achieved a level of digital competence, many people were not aware what was possible with online services, online portals, apps and accessible information. Many people lacked confidence and even some were afraid to experiment or explore online. Some people even saw resistance to the use of digital technology as strength of character. They didn't know how to construct business services online or how to make use of online services and support. Hence, some people were not taking up opportunities to make use of services, apps and programs online. They were also not aware of, nor prepared for cyber-risks and were vulnerable. Reluctance to use digital technology and poor awareness of its capacity could potentially be overcome by demonstrating the personal advantage and convenience of digital connection.

The likert scale assessment of people's digital skills and interest in developing more skills over the study period in shown in Figure 2.

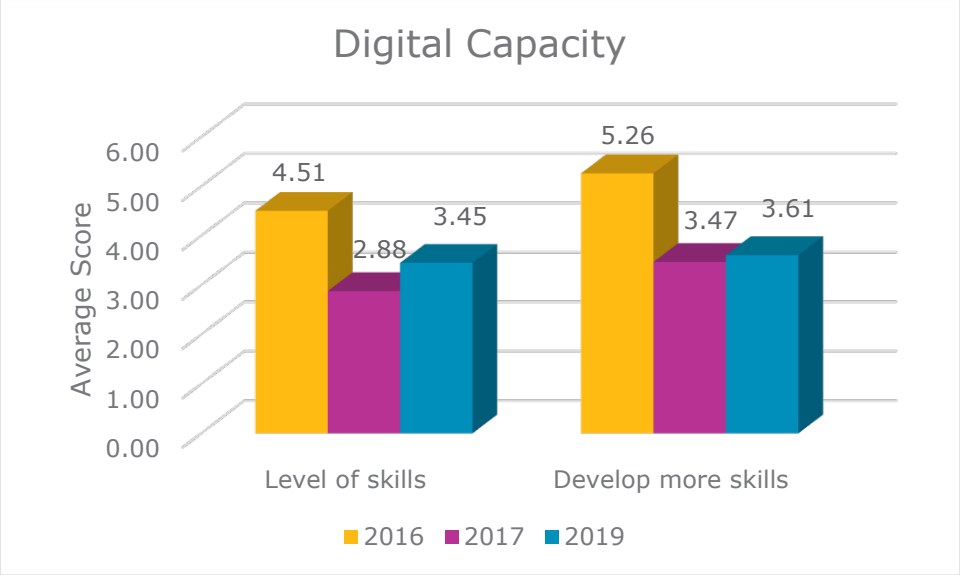


Figure 2. connection reliability and quality over the study period (Figure 1) show considerable improvement in both the reliability and quality of internet and mobile phone connection.

Figure 2 shows a reduction in how people assessed their digital skills and their interest in developing more skills from before connection to after connection. This may be because before connection, could not do much with the internet because of poor speeds and reliability. This may have caused them to overestimate their existing skills. Also, without fast connection there was a strong interest in developing more skills leading into fast broadband connection being available. After connection, people perhaps realised that there was a lot that could be done on the internet and that their skills needed considerable improvement. Strangely, however, there was a reduction in people's interest in developing more skills, though it remained relatively high.

Voice Telephony

Fixed landline

In 2016, fixed landline telephones were the primary mode of voice communication. It was considered either quite reliable though dropouts were reported on an occasional to frequent basis and voice quality was variable with some people reporting that is was quite unreliable. Some people had experienced periods of several hours or even days when the landline was not functioning, and this was associated with maintenance or stormy weather.

By 2019, landline communication was still essential on pastoral properties, however in towns, mobile phones were routinely used, and landlines were used as a backup or not at all.

Mobile Connection

There was no mobile connection except in Birdsville in 2016. By 2019, most people owned a smart phone. In towns, they had become the preferred and primary mode of communicating through voice, text, messaging, social media and other options, including email and video calling. Most people used a mobile phone for these multiple purposes. However, some people only basically used their phone as a portable handset and did not turn on their mobile unless they wanted to speak to someone.

Likert scale scores for voice telephony are shown in Figure 3.

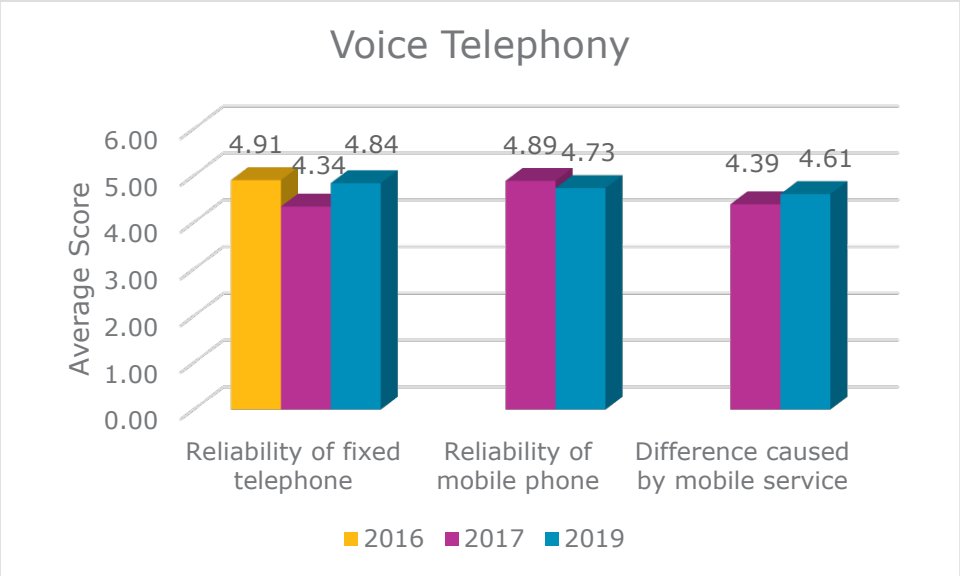


Figure 3. Average likert scale scores for voice telephony over the period of the study. (No data about mobile phones was recorded in 2016 because mobile phone connection was unavailable (except Birdsville))

Figure 3 shows that the reliability of fixed landline phones was consistently high. The reliability of mobile phone connection was also very high and having mobile phone connection had a major positive impact on people's lives.

Social Connection

How Local People Socialise

In 2016, respondents reported connecting with friends regularly every week or fortnight in person. There were four usual ways of meeting and conversing with people:

1. by chance while running errands in town,
2. through social gathering hubs such as at the information centres, hotels or roadhouses,
3. through community events such as rodeos, races, gymkhana, sport,
4. social media, where this was accessible.

By 2019, while people still met regularly by chance around town and at social locations and events. However, texting, social media and mobile phone calls added to this regular social connection. Respondents often observed how people had quickly adopted the habit of having the mobile with them at all times, including in social spaces. While there was concern that mobile phone access would interfere with face to face communication, this largely had not occurred and people maintained face to face contact.

Quality of Social Interaction

In 2016, almost all respondents noted that people interacted socially on the internet when they had connectivity, mostly via Facebook. Others rejected this form of communication entirely. People emphasized the need to maintain personal communication and interaction and they tried to attend social events and talk with each other.

By 2019, the communications options available through mobile service and internet had greatly enhanced personal and community information sharing and engagement. People often mentioned that the expanded options for communicating had added frequency, quality and depth to those exchanges reducing isolation and keeping people in touch with family and friends. Those who did not engage in social media felt nothing had changed or that personal conversation had diminished in social situations. They also complained of 'poor provision' of local information from Council, now primarily using social media forums. In another example, one respondent mentioned regret at the loss of the regular 'galah' sessions over the UHF radio, that once occurred regularly three times per day.

People Interacting with New People

Many respondents in 2016 observed that the communities were closed, and that social engagement was constrained to friendship circles. Travelling was required to meet new people. Interaction with new people was not common and more likely to be seasonal and associated with tourists visiting the communities. To some extent this relied on the willingness of local people to engage and was often associated with their role in community. People on properties were often socially isolated until they attended local events or were in town for services.

In 2019, social media was being used regularly as a form of communication, information exchange, and social interaction. People were not just interacting online. They were also using digital connection to arrange face to face gatherings. People took and shared photos together, updated, checked in, engaged with others not physically present. It became clear that online there is a significant increase in frequency and quality of interaction that represents major change. Newcomers were using digital connection to become informed of the local social landscape and of what was happening socially. Mobile phones were being used to coordinate gatherings from impromptu plans to meet for fitness, for socializing, for practical arrangements and queries. One young person spoke of a Messenger group who watched a streamed reality television show while simultaneously participating in a closed group running commentary which was described as fun and funny. People described that young workers on properties would find each other through Facebook pages and then engage and coordinate to meet in person at local events. This removed the social uncertainty of choosing to attend events hoping to meet someone by chance.

Community Organisations and Local Events

Digital connection greatly helped people organise community events and run community organisations. It was also being used as a communication tool itself. In 2016, community events like rodeos, races, sport etc. were important to people connecting with each other. People noted that the social calendar was very busy with many local events. These events particularly led to interaction between "town people" and "property people". Coordination occurred through landline phone calls, regular face to face meetings, flyers to promote events and emails.

By 2019, digital connectivity had made a positive impact on the ease with which community events could be coordinated, managed, recorded and reviewed. Mobile phones, email, social media groups and messaging were being used to share information, make decisions and coordinate logistics. It was much easier for residents to organise meetings and community activities through texting, messaging and email and mobile phone contact. People were conducting meetings and communication through digital communication and replacing the

need, to a large extent, for face-to-face meetings. One person remarked that their group may become in breach of their constitutional requirement for 'meetings' in the traditional sense, as these were replaced with online engagement for decisions and direction. Digital services allowed fast and convenient exchanges, saved time and travel, and increased the speed of decision-making. Some people noted increased numbers attending community events, which they attributed to more effective promotion via digital connection. However, the use of digital communication alone, excluded people who were not on social media as they might not receive social and community information.

Interactions with Organisations and Institutions

Digital connection allowed people to better seek information from organisations largely through information searches, use of websites and through conducting business and interactions via the internet or mobile phone apps. In 2016, respondents differentiated between local organisations, such as the Council or regional Agforce office, and "outside" organisations such as state government departments or banks. Interaction with local government was more frequent than other organisations because local issues were more relevant and there were personal relationships with staff and Councillors. Most residents used the phone, email or face to face contact to interact with them. For "outside" institutions, residents would try the internet for information on websites or some submitted forms through portals.

In 2019, more people used websites to answer questions, seek information and to conduct transactions with organisations. Others used portals to submit time sheets and reports, to check school rolls and to complete forms or applications. People used interactive options for real-time chat and reported that response times with email were much quicker. Email or email forms were often regarded as much more convenient and user-friendly than using the phone, which involved long wait times and were often frustrating experiences. Internet access has allowed people to research at times convenient to them, rather than coming in to use the landline phone during work or during business hours. They can now research in the evenings or early mornings as enquiries can be sent at any hour without inconvenience to either party and there is a written record.

Changes in social characteristics, as assessed by interviewees in likert scale scores, are shown in Figure 4.

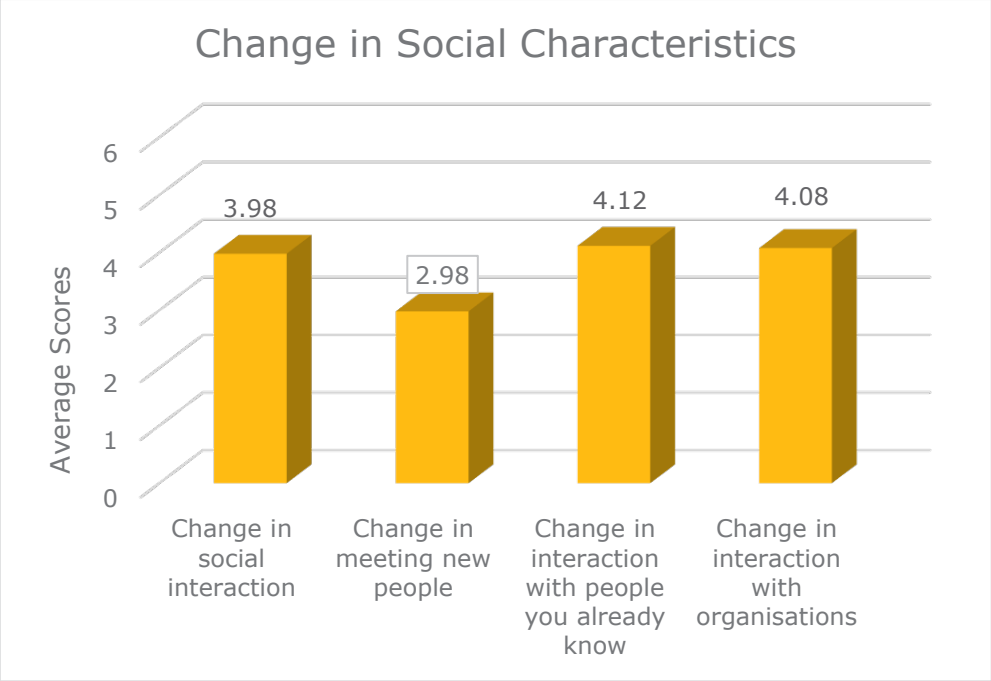


Figure 4. Average likert scale scores for change in social characteristics due to digital connection assessed in 2019.

Figure 4 shows that digital connection changed social connection considerably in terms of people being able to socially connect on the internet, by mobile phone and on social media.

Access to Services

Access to Health Services

For local health needs, people still contacted their local clinic. However, digital connection greatly enhanced access to health services through telehealth, improved access to medication and improved information searching.

In 2016, local clinics and the Royal Flying Doctors' Service (RFDS) were critical for people accessing health services. Appointments were made by landline or in person. Lack of reliable internet capacity reduced and constrained services – diagnostic images could not be shared, telehealth was not available. Preventative health services such as fitness classes or professional development for health staff such as webinars on chronic illness management, were not accessible. Emergencies relied upon UHF radio, landlines or satellite phones to seek and arrange assistance.

By 2019, most communities had access to telehealth services such as for the management of chronic illness, or for post-treatment follow up consultations. Telehealth, where available, saved a great deal of money, time and inconvenience in avoiding long distance travel and associated accommodation and other costs. There was demand for extended services that are not yet available, such as mental health support. Several respondents admitted that they use online information searches to enquire about symptoms before seeing a medical practitioner. Clinic staff advised that their record keeping has been much more efficient and easier since they have had an improved internet service. Triple zero calls and access to specialist and allied health support are now available services in the community.

Pharmacy products were ordered either directly, or through the Clinic and paid for online, delivered by post or by the RFDS. They are also able to use mobile phones to speak with the RFDS, and if necessary, get codes and access to the local community Medical Chests, such as for antibiotics. Others used online services to invest in wellbeing, accessing apps to support fitness, nutrition, calorie counting and fitness and reminders for preventative check-ups.

Access to Education Services

Professional Development

Digital connection vastly improved access to education including expanding learning at schools and making distance education and professional development possible. In 2016, there was better access to online training resources through Council offices, however, one report was that a 15-minute company induction took 2 hours to complete because of slow digital connection speed.

By 2019, many people were able to attend online courses or to gain specialty skills. Video conferencing and meetings were used for training and information sharing. Information searches were being regularly used.

Some people mentioned the need for mentoring or support to help them become familiar and confident in using digital connection and the internet services. This was a barrier to the use of digital technology.

Tertiary Education

Prior to digital connection, TAFE courses for trades and apprentices, professional development training and university courses were virtually impossible for people to participate in due to unreliable connection and very poor speeds. People could not access resources or lectures, they could not upload assignments.

By 2019, people could routinely access distance education due to high speed internet. Several participants in the research were undertaking tertiary study with effective access to online lectures, readings and related materials and uploading assignments.

Schools

In 2016, schools were not able to offer children extensions to the curriculum such as language programs or extended mathematics. Classes online for children on stations were interrupted with poor connectivity. School staff found it difficult to organise school events and email communication was unreliable for accessing parents and Education Queensland.

In 2019, schools were able to offer a range of learning that was not otherwise effectively available, including languages other than English, and music, speciality technology and science classes. Teachers could offer online classrooms and an expanded range of classes is offered including science, languages and robotics. E-Kindy was able to be offered as an at-home kindergarten program for children. One school received thousands of dollars in donated supermarket vouchers for sporting equipment from connections made online.

However, in 2019, access to the internet for schools was slow with very slow upload and download speeds recorded. This made it very difficult to access online programs and to log on multiple students at the same time. Some schools chose to use separate modems to make

use of mobile data. It was unclear what was causing these slow speeds but the research team suspects that it was due to inadequate funding and purchase of data to match the increased NBN capacity. This needs to be resolved.

Preparation for, and Management of, Emergencies

Digital connection markedly improved emergency management. Emergency services in 2016 relied upon UHF radio, landlines and satellite phones for coordination and preparation for critical events. Poor weather and black spots were impediments. It was difficult to coordinate with statewide activities and to readily access shared materials such as digital maps. Community information such as warnings and alerts were shared using websites, community boards or radio announcements. Some people reported attending the police station in person to access updates on local events such as flooding.

In 2019, Councils used Facebook pages to share relevant information to the wider community. There was capacity for regular timely updates from Council on road conditions on the location and flow of floodwaters through Google Earth, Bureau of Meteorology and Facebook updates from local property owners. Emergency Services used closed Messenger groups to coordinate responses and solve problems. People could be informed by text message if there are exercises, maintenance or training requirements, or if an emergency was occurring. Mobile phones improved residents' sense that help was more accessible, where that connection was available. However, SMS (text) community alerts were not available in any community.

Access to Other Services

Prior to connection, access to online services such as banking online, shopping, travel bookings, and freight bookings was very poor. By 2019, access to banking was most frequently mentioned as a very great benefit arising from mobile phone and internet access. People appreciated the convenience, accessibility and certainty. Access to EFTPOS was a key benefit for businesses. This was particularly important during large events such as the Birdsville Races in at other community events where organisations had previously been required to manage large amounts of cash. Many mentioned the benefits of online shopping to access items not available locally.

People also mentioned the convenience of accessing Centrelink and other government services through online portals. This removed the need for long periods waiting on landlines or the need to travel for in-person appointments. Other benefits included access to cloud data storage, online programmes for accounting and the capacity to send attachments on emails which was not possible previously.

Figure 5 shows likert scale scores for changes in access to services due to digital connection.

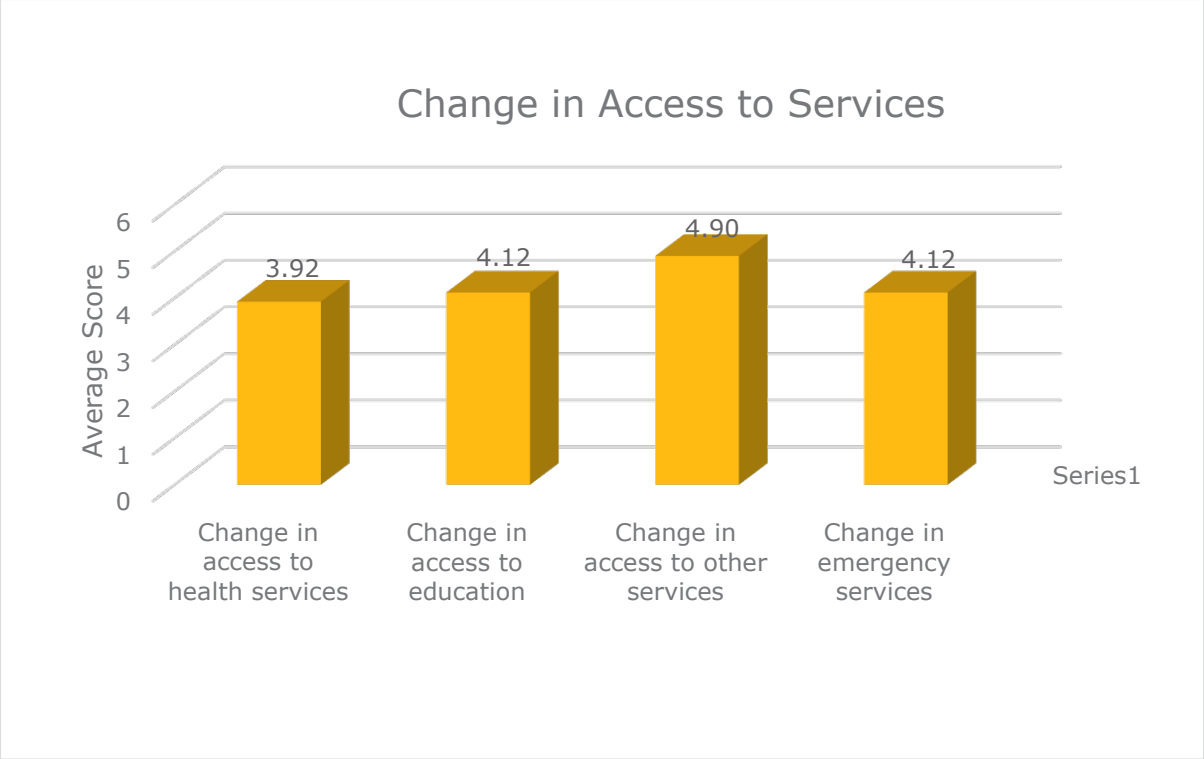


Figure 5. Changes in access to services due to digital connection (assessed in 2019).

Figure 5 shows that people assessed that digital access had led to considerable improvements in accessing services such as health, education, and banking. It had also helped considerably in preparing for, and in managing, emergencies.

Economic Impacts of Digital Connection

Small Business and Retail

Small business in the communities largely consisted of retail general stores, petrol station/roadhouses, hotels, post offices, and contractors to pastoral stations and to Councils. Small business activity relied on local custom and seasonal winter tourism. It was influenced by drought, Council spending often through grants income, reconstruction after floods etc. and tourism numbers, spend, and the length of the tourism season. In 2016, businesses relied on communication via landline telephone, some email and promotion by word of mouth.

By 2019, internet and mobile phone connection had provided a significant range of benefits to businesses that were willing to embrace it. Businesses mentioned that following benefits:

- EFTPOS – and with disruption when internet connection is lost,
- Prepayment for services such as accommodation, drinks and tickets,
- Online booking systems,
- Communication with clients and customers via email and social media,
- Diversion of landline to mobile reducing missed calls,
- Calendars for coordination of community events,
- Promotion of specials, products that have come in, visiting services that are available; sporting and social events; community celebration; and footy tipping,
- Sending company accounting to professionals,

- Online ordering using apps and websites,
- Streaming music, sports events in restaurants and hotels,
- Flexibility to offer/promote unexpected opportunities such as to a bus of visitors,
- Advertising and recruitment of staff.
- Digital connection also helps to retain staff,
- Ordering parts to repair equipment, organising service, maintenance,
- Training staff,
- Being contactable when away from site for queries from staff or customers,
- Price comparisons,
- Equipment search,
- Emailing photographs of parts or product brands or types required,
- Accessing online solutions and Youtube videos for problem-solving
- Accessing and placing catalogues online.

The importance of digital connection was emphasised by the painful impact that businesses noticed when there was any interruption to internet access. A growing issue is also vulnerability to cybercrime. The research team noticed little awareness or preparedness in managing online scams and threats. Indeed, one business owner had been the victim of an online scam.

In each community, there were some businesses which did not take advantage of digital connection. They did not have a mobile phone or email address (that is shared publicly) and did not access the internet. This clearly is a personal choice, but it can have an impact on economic development in communities if a key business, for example in the tourism sector, doesn't promote itself and offer digital connection to patrons.

Agriculture and Pastoral Stations

Satellite internet connection improved communication and the operation of pastoral stations. With poor satellite capacity in 2016, connectivity was limited. This meant that operations such as stock records, communication with head office, ordering of goods and parts, and arranging transport had to be done manually often through landline phonelines or very slow email.

In 2019, connectivity was not as fast as expected but it had improved with access to new satellites. Connectivity remained limited and data accessed via satellite was expensive. Data accessibility was improved but still limited for workers and managers. Having children home from boarding school was reportedly a time of peak data pressure.

Most properties were beyond mobile phone range and did not have mobile phone connectivity beyond VOIP services at the homestead. Where there was mobile connectivity on properties close to town, the internet use within our sample was markedly higher, with internet access used for training, problem solving, price searching, and online marketing services and for social connection.

Economic activity mentioned as being facilitated by internet connectivity included:

- Wands and scales auto-data collection and uploaded at night as reports,
- Wi-Fi on watering points, speed limiters on vehicles, GPS,
- Cameras for security,
- Resources for children at school,

- Social connection for workers – internet and email,
- Banking and paying bills, staff,
- Accounting book-keeping programs, online,
- Shopping – groceries, parts, plant and equipment, clothing,
- Convenient mobile communication – don't have to wait by the landline,
- Access to services online at home – counselling, speech therapy, OT home and distance schooling,
- Tracking flood waters,
- Advertising online for employees,
- Auctioning stock,
- Advertising unique products such as on Instagram,
- Virtual fencing for cattle (not cost effective for sheep),
- Use of drones to check waters, calving cattle etc.

Tourism

Tourism is a crucial element of the economy in the region including "grey nomads" and major events. Tourists expect to have access to the internet and mobile phone coverage. Prior to digital connection in 2016, tourists needed to physically walk in to Visitor Information Centres to access wi-fi or go without connectivity. Lack of digital service meant that opportunities to share videos, update websites or sell online bookings were not available or problematic and tourists were reportedly concerned that they could not easily 'check-in' with family, and share their experiences online.

By 2019, social media, webpages and email were routinely being used to provide information, answer questions, promote the region and arrange tourism events. Tourists and visitors used digital connection to exchange information, share photos and access services and supplies. Social media was being used to organize a wide range of events and activities such as footy tipping competitions, promotion of business products and services, pizza nights, and live-streaming of a novel tourism events. Social media was also used to rapidly correct misinformation that might lead tourists to avoid a community, such as fuel not being available. It was useful to provide advance information for tourists. Other businesses posted pictures of the landscape but may not appreciate the importance of also providing information on local products, services and activities. Two new tourism businesses were founded, run and promoted entirely online in one community.

Social media was a two-edged sword for some. It was very effective for promotion, engagement and live-streaming of activities, however, if false or inaccurate information was posted it could be damaging, difficult to correct and take effort to manage. Now that the internet is readily accessible on mobile phones in communities, visitors do not need to access free WiFi at Visitor Information Centres, which noted an estimated 10% reduction in walk-in rates. As the count of physical attendance of tourists at Centres is a measure for funding, potential reduced funding on this criterion is a concern.

New Business

Many factors beyond digital connection affect the establishment of new businesses and the low local population has traditionally limited business opportunities. It was reported that there were no new businesses in each town in 2016. With improved internet access, some people mentioned the potential of online businesses to provide fitness support, photography and other online services.

By 2019, the researchers found a range of new internet economic activities. These included:

- Foreign Exchange trading,
- Financial services business offering services to government agencies,
- Handmade accessories for sale through a Facebook page,
- Online retailing of specialty clothing and accessories,
- Sound engineer, providing services online,
- Two new tourism businesses that have no shopfronts (offering tourist experiences),
- Photography services and product – promoted/sold online,
- Bore pumps and water gear – sold online,
- Artist – using Facebook to promote her exhibition in a regional gallery.

One online business was placing 20-50 parcels through a local Post Office each week.

Interestingly, many respondents were not aware of these new businesses which were largely not visible to them and indicated that no new businesses had started in their community as a result of digital connection.

New products/services

In 2016, all respondents noted that no new products or services were being offered in each community. This was also often reported to be the case in 2019, however the researchers found examples of several new online products and services being offered because of good internet connectivity. These were:

- Dance classes for children, offered from Barcaldine through video conferencing,
- One hotel was able to offer Keno,
- Tours of the local area promoted and with bookings online,
- A new tourism experience promoted and offered online,
- Buy, swap, sell site established for a community,
- New café and free camping ground promoted online,
- Pre-bookings were available for major events, facilitating efficiencies during busy periods,
- Fitness instructor in major centre could access uploaded personal training data from an internet connected worn device and give direction on training schedule.

Investment

Public and private investment is limited by many factors and in 2016 investment in the region was limited to some expansion of accommodation offerings with caravan parks and hotels making more rooms and sites available.

By 2019, digital connection had influenced investment. Residents felt that greater tourist numbers and their own activities online (such as internet shopping) had generated a greater flow of money. Some people felt that improved internet connectivity was allowing effective promotion of destination events that were drawing increasing numbers of visitors to the region. This, in turn, was building a case for government investment in better roads, better services and local facilities.

Improved internet connection led to tourists staying longer and spending more in communities. Many people felt that have access to EFTPOS facilities and ATM's also encouraged tourist spending.

One example of investment mentioned was the recent auction of local land, sold to investors from outside community bidding remotely, online or over mobile phone. This was seen to be as a result of local event promotion and digital communication of the sale and awareness of high-profile tourism events.

Employment Availability

Digital connection, of itself, had not significantly affected employment but it allows employers to better advertise positions and screen applications. It also made communities more livable for new employees. Respondents felt that any person seeking employment could find work in the region. However, the type of work available was limited and wages may not be high. Councils were major employers in the region and many factors influenced people's choices to seek employment in the region. These included the availability of quality housing, the quality of employment, income, entertainment and isolation. The absence of mobile phone and quality internet connection, in 2016, were cited as additional deterrents to attracting and retaining people and employees.

By 2019, digital communication was being used extensively to acquire staff. Positions were advertised almost exclusively online and not in newspapers at all. Researchers found in this sample four young couples, who stayed in their remote community because they had fast internet access through their mobile phones. Usually one partner had work or a reason to be locally based and the other partner joined them, studying, creating business, finding work and using the mobile phone and online connectivity to maintain social relationships and connections within and beyond their community. The joining partners would not remain without fast internet. These young couples noted that fast internet mitigated the impacts of remoteness from social and economic connection that would otherwise draw them away. The changes in the local economy due to digital connection are shown in Figure 6.

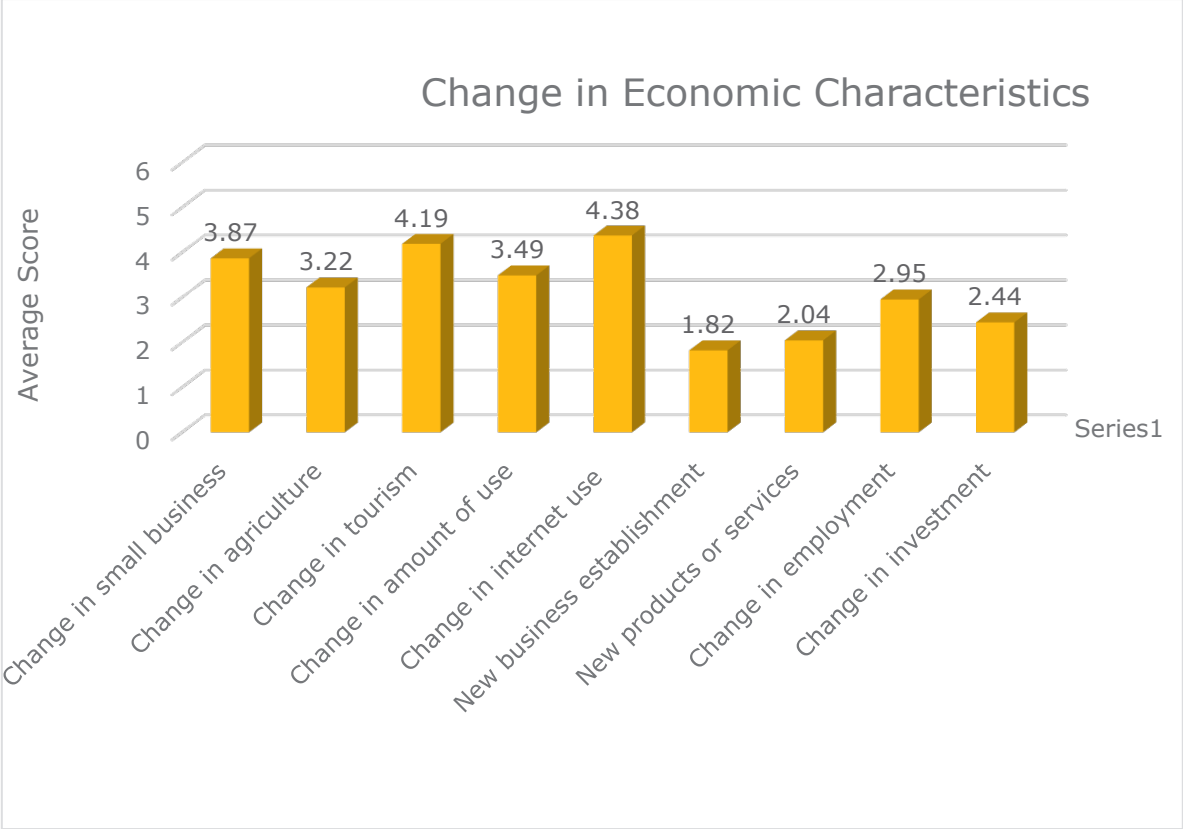


Figure 6. Change in economic characteristics from digital connection (assessed in 2019).

Figure 6 shows that digital connection was assessed by residents as having a particular impact on tourism, the use of the internet by businesses, small business activity and on agriculture.

Conclusion

The digital connectivity project has demonstrated substantial social, economic and civic benefits through enhanced digital connectivity. The cable infrastructure has led to markedly improved internet connection and 4G mobile service has been particularly beneficial.

Some business enterprises are energetically adopting the technology and others are not. There is room to improve and build capacity by more in-depth knowledge of how to extend the reach and effectiveness of social media, to understand the potential savings and convenience through portals and apps, to know where to look for online learning and skills development. There is potential to develop and extend the skills and awareness needed to create online business activities. This is evident in efficiencies for tourism, agriculture and several new enterprises have been now possible online. However, in 2019, it appeared that state government services were not able to make the most of the technical enhancements, possibly because of constraints on access to data.

Digital connectivity removed one of the barriers to people being attracted and retained in these remote communities. The expected disadvantages of living remotely have been mitigated by connectivity. People can stay in touch, be entertained, educate themselves, shop and bank and make a living with online access. They would not stay without online access. Community organising is enhanced, social connections are building, and quality personal communication is possible because of a range of personal and adaptable communication options, facilitated by online access.

The capacity to access online services through digital connectivity infrastructure has created a substantive and meaningful positive change to the quality of community and social life in these remote communities and has created and enhanced productivity and throughput of some economic ventures.

Introduction

While digital connection in rural Australia is improving, many rural and remote communities have poor internet connection, with unreliable connection and low upload and download speeds. Many rural and remote communities also have limited or no mobile phone coverage.

For many rural and remote communities, access to high-speed broadband internet connection and mobile phone coverage is crucial to economic development, access to services and social vitality. Digital connectivity can allow business operators to improve business efficiency, access broader markets and participate in the digital economy. It allows community members to better access services such as education, banking and a wide range of other government and private sector services. It also potentially can improve social connection linking people to distant friends and family and making local communication and the operation of community organisations more effective. This can greatly enhance the liveability and attractiveness of rural communities, potentially contributing to the attraction and retention of population.

While these social and economic improvements are intuitively expected from improved digital connectivity, there is very little data about the actual impacts, how broad-based they might be, how they come about and how improvements might be supported or enhanced. Investment decisions about the considerable cost of expanding internet and mobile phone coverage in rural and remote areas, are limited by lack of data on the social and economic benefits of connection, particularly longitudinal studies that assess impacts over time. To establish greater confidence and certainty about the value of investing in digital infrastructure and technology, there is a need to identify, map and assess the socio-economic characteristics, processes and impacts resulting from digital connection.

An assessment of these impacts was made in remote communities in Central Western Queensland. The results of this work inform future investment in expanding digital connectivity in rural and remote Australia. The project involved the underground installation of fibre-optic cable to five communities – Jundah, Stonehenge, Windorah in the Barcoo Shire; and Birdsville and Bedourie in the Diamantina Shire. This was the key outcome of the Connecting Remote Regions in Central Western Queensland project funded by the National Stronger Regions Fund, Royalties for the Regions, the Queensland Government and the Barcoo and Diamantina Shire Councils.

People located outside the towns, on extensive pastoral properties, accessed the internet via the Telstra Skymuster satellite service which provided much faster speeds and capacity than previous satellite services. People on properties also had access to landline and satellite telephones.

Broadband internet connection and mobile phone access was established in all five communities in November and December 2016. Key services in these communities have "fibre to the premises" – the police station, health clinic, primary school, and local government offices. This is where the fibre optic cable connects directly to each location

allowing high data volumes and transfer speeds. The rest of each community – businesses and residential buildings – were provided "fibre to the node" access to the cable. This means that the fibre optic cable was connected to each town's telephone exchange and the final connection to the cable was made through cooper wire cables from the telephone exchange to each premises. The project also included the installation of a mobile phone tower in each community with mobile phone coverage extending to approximately a 20 km radius around each town.

The Study Shires

The Barcoo and Diamantina Shires, that were the subject of the study, are remote extensive pastoral areas in far central western Queensland (Figure 7)

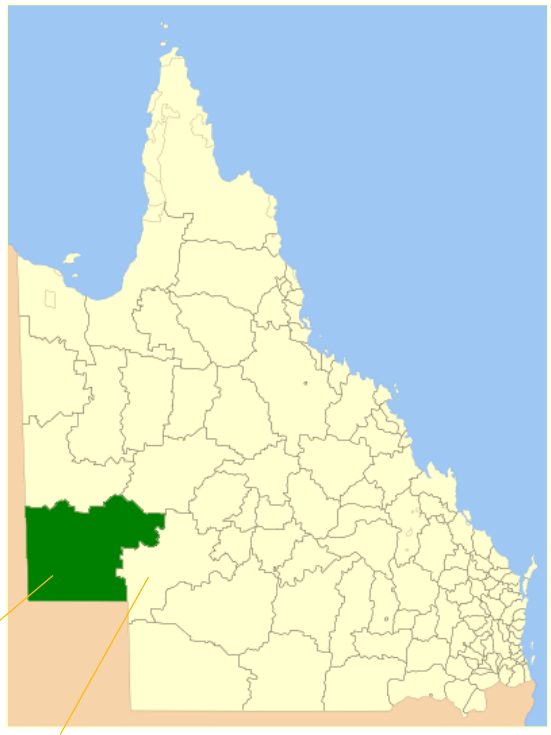


Figure 7. The location of the study shires in central western Queensland

Basic characteristics of the areas are shown in Tables 1 and 2.

Table 1. Characteristics of the Barcoo and Diamantina Shires

Local Government Area	Population 2018	No of Businesses 2018	Median total income* ($) 2016	Unemployment rate (%) 2016	Median Age 2018
Barcoo Shire	267	35	45 006	2.3	46.0
Diamantina Shire	292	27	55041	3.5	32.5

* Excluding government pensions and allowances

Table 2. Percentage of the employed workforce by industry of employment in Barcoo and Diamantina Shires (2018)

Industry of Employment	Barcoo Shire (%)	Diamantina Shire (%)
Agriculture (%)	40.7	31.7
Public administration and safety (%)	31.1	24.4
Accommodation and food services (%)	7.8	10.4
Education and training (%)	4.8	4.3
Retail trade (%)	5.4	2.4
Construction (%)	3.0	6.1
Manufacturing (%)	1.8	1.8
Electricity, gas water and waste services (%)	1.8	--
Transport, postal and warehousing (%)	4.2	--
Professional, scientific and technical services (%)	1.8	1.8
Administrative and support services (%)	--	3.0
Health care and social assistance (%)	2.4	3.0
Arts and recreation services (%)	--	1.8
Wholesale trade (%)	--	--
Total persons employed (no.)	167	164
Inadequately described or not stated (%)	--	2.4

Source: Australian Bureau of Statistics (2019) Queensland Data by Region (LGA) – Barcoo and Diamantina Shires. www.abs.gov.au

Both shires have low populations in vast areas of pastoral rangeland used for extensive beef cattle grazing. A combined population of 559 occupies a combined area of 156700 square kilometres. The Barcoo Shire has three towns – the agricultural and public administration centre of Jundah (106 people), the agricultural and tourism community of Windorah (115

people) and the small community of Stonehenge (30 people). The shire features the "Channel Country" where, after rain locally and to the north, Cooper Creek spreads out into extensive riverine channels providing high quality feed for breeding and fattening beef cattle.

The Diamantina shire is semi-arid, bordering the Simpson Desert National Park. It has two towns – the major tourism destination of Birdsville (140 people) with the famous Birdsville Hotel and the iconic tourism events of the Birdsville Races and the Big Red Bash. The races attract over 6,000 visitors. Bedourie (122 people) is the administration centre of the shire. The extensive pastoral operations in both shires include properties owned and operated by families, family partnerships and companies, and large pastoral companies who often own properties in the shires as part of an integrated series of holdings in inland Australia. The major industry is pastoral grazing, but tourism is a major economic base for Birdsville and it is becoming increasingly important across both shires. Public employment, through both Councils, health clinics, police and schools, is very important economically together with retail businesses largely serving residents, pastoral properties and tourists.

The Assessment of Impacts

The assessment of the community impacts of access to fast broadband and mobile phone was jointly funded by the Queensland Department of Innovation, Tourism, Industry Development and the Commonwealth Games (DITIDCG), the Remote Area Planning and Development Board (RAPAD), the Local Government Association of Queensland (LGAQ) through the Telstra Innovation Development Fund, Barcoo Shire Council and Diamantina Shire Council. The University of Southern Queensland's Institute for Resilient Regions conducted a three-year longitudinal study of the impacts of improved digital and communications infrastructure. The study extended from November 2016 (prior to broadband and mobile connection), to a mid-term assessment in 2017, and a final assessment in March and June 2019.

Information sign for optical fibre cable connection

The fibre optic cable connections routes for the five communities are shown in Figure 8.

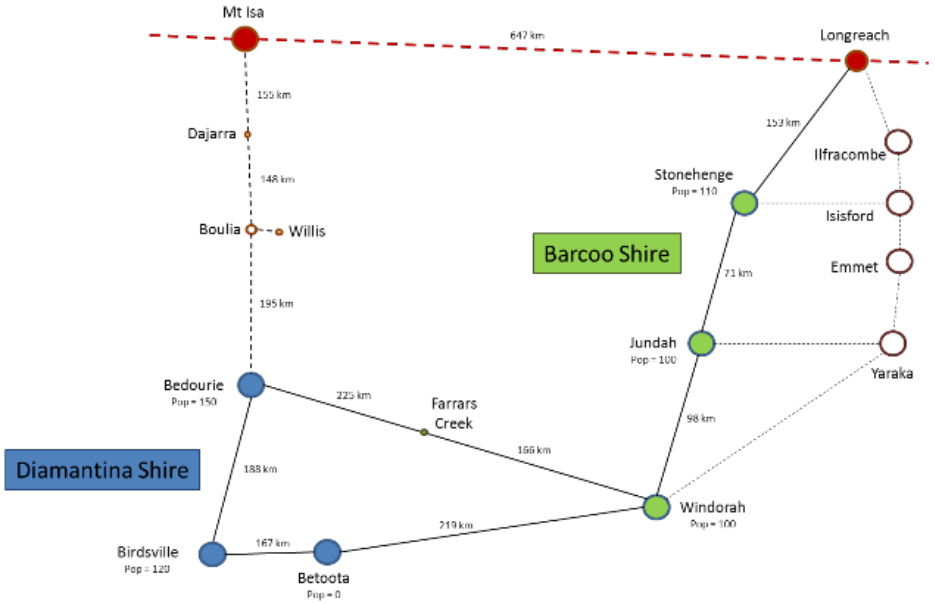


Figure 8. Underground fibre optic cable routes connecting the study communities

This report describes the findings of the study. It includes comprehensive feedback about the social, economic and broader community impacts of digital connection and includes an overview of impacts across the three-year study period and detailed assessments of impacts at each of the assessment times. These times were a baseline assessment conducted in November 2016 prior to digital connection, an assessment of community change in 2017 one year after connection, and a final assessment of impacts in 2019.

The baseline assessment describes the situation with connectivity, and the social and economic characteristics of the five communities prior to improved internet connection and mobile phone availability in November and December 2016. The assessment of community impact, after one year of connection in 2017 and after 2.5 years in 2019, described the *change* in social and economic characteristics resulting from digital connection.

Cable installation in November 2016

Aims

The study aimed to:

1. Identify, record and map the socio-economic profile of five localities before the activation of ADSL 2+ broadband services and 4G mobile services;
2. Assess the reliability and performance of voice telephony and digital connection;
3. Identify and measure changes (if any) in any socio-economic characteristics over time, following the activation of digital connection in the case study communities;
4. Better understand how digital connection may contribute to social and economic change;
5. Identify and describe implications for the future socio-economic development of the Barcoo, Diamantina and broader Central western Queensland region; and
6. Draw out any conclusions that bear on future digital communications policy and programs in regional Australia.

Methodology

The assessment used a mixed methods approach involving detailed interviews with key informed respondents, likert scale scores and data such as internet speeds and costs. The combination of these methods allowed results to be "triangulated" improving the reliability of measures of social and economic characteristics.

These qualitative and modified quantitative methods (likert scales) were chosen because of the nature of the social and economic information in the communities. Many of the likely impacts involved changes to people's lives, work and access to services and this is best measured as qualitative descriptions of experiences and changed behaviours. Researchers gained detailed qualitative information from residents, business operators, services providers etc. Not all impacts could be measured in a quantifiable way. Likert scale scores were used to quantify the extent of changes and qualitative measures, when taken as a whole, are still reliable in demonstrating impacts. While much of the data is qualitative, rigorous qualitative research is well established and reliable and it differs greatly from "anecdotal" feedback.

Newly installed mobile phone tower in Bedourie (on right).

Research Framework

A framework of indicators was developed and refined. It consisted of assessing changes in five main characteristics of communities or "topics" that could be practically measured. These were derived directly from the aims of the study. For each topic, a range of indicators were developed that would, together, indicate change (if any) in each of the topics. The topics and key indicators are as follows:

Topic 1: Reliability and performance of voice telephony and digital connection

- Characteristics of digital connection
- Characteristics of voice telephony

Topic 2: The development of digital capacity

- The level of skills and development of skills

Topic 3: Changes in social/community characteristics as a result of digital connection

- Social connection
- Access to services

Topic 4: Changes in economic characteristics as a result of digital connection

- The situation of key sectors – agriculture, tourism, small business and public services
- Business activity
- Employment
- Investment

Topic 5: Implications for future socio-economic development

These measures provide a comprehensive assessment of social and economic characteristics together with indicators of the quality and accessibility of internet and mobile and fixed telephony. The full framework is shown in Appendix 1.

Interviews and Group Discussions

Interviews were conducted throughout each of the five case study communities and with landholders outside towns. The framework of indicators was used to develop a set of 31 interview questions shown in Appendix 2. Some additional questions were asked specifically for business operators about impacts in their own businesses.

Respondents were identified as "informed people" i.e. people who were connected enough in each community to respond about the broader impacts in the community, not just personal impacts on them individually. Hence the interviews gathered information about observations of the whole community and was not a sample of individual experiences. Respondents were identified through local networks and local government and provided a broad cross section of community members including representatives of police, education, health, businesses, local government, emergency services, landholders, resources companies, Indigenous people and key community people. Interviews took between 1 and 1.5 hours. With consent, interviews were recorded, and notes were taken.

A total of 171 people were interviewed over the 3.5 year study period. Many of these people were repeat interviews of people interviewed previously. The number of people interviewed in each of the study communities is shown in Table 3.

Table 3. Interviewees in each year of the study

Community	No of Interviewees by Year			Total
	2016	2017	2019	
Jundah	16	16	15	47
Stonehenge	6	4	7	17
Windorah	14	14	16	44
Bedourie	8	13	12	33
Birdsville	7	11	12	30
Total	51	58	62	171

Interviewees were drawn from a range of sectors (Table 4).

Table 4. The number of interviewees by sector

Sector	No of Interviewees by Year			Total
	2016	2017	2019	
Householder	12	14	14	40
Business	18	14	15	47
Rural Landholder	7	9	10	26
Local government	5	11	12	28
Other e.g. School, Police	9	10	11	30
Total	51	58	62	171

There were also open invitations for any residents to participate in group discussions to provide feedback. In the baseline assessment in 2016, 3 group discussions were held. These were not well attended, and they were discontinued in the subsequent impact assessments in 2017 and 2019.

Likert Scale Scores

Interviewees also rated indicators of social and economic change due to digital connection on a likert scale from zero (no change in the indicator) to 6 (major change in the indicator). For example, interviewees rated the impact of digital connection on the extent of social interaction between people ranging from no change if social interaction at all (0) through to major change in how people interacted (6).

This provided some triangulation between verbal responses and ratings as a way of improving the reliability of data. It also provided average scale scores for each indicator that can be compared across time. Average likert scale scores were calculated for each indicator and are presented as histograms in the results. The likert scale scoresheet used in the research is shown in Appendix 3.

Quantitative Data

Quantitative data, such as internet speed and the cost of service were gained where possible. Not all respondents were able to provide these data.

Ethics

The project had full ethics approval from the University of Southern Queensland and was monitored for ethical compliance. All respondents and their responses were confidential, respondents were de-identified and data is presented across all respondents. Consent was obtained from respondents for all interviews and other input and all respondents received an information sheet that explained the project and the conditions of their consent.

Data Analysis

For the 2016 baseline assessment, all interview recordings were transcribed into NVivo qualitative data analysis software. The transcriptions were coded based on the points raised by each respondent in their answers to interview questions. These codes were collated under themes and assembled under the topics being investigated in the research framework such as internet use, impact on employment, social connection etc.

For the 2017 and 2019 assessments of community change, detailed and verbatim interview notes were taken, and responses were manually coded using previously identified themes, as well as new themes that may have emerged from the data.

Baseline Assessment
Prior to Digital Connection
2016

Baseline Assessment Prior to Digital Connection 2016

This report describes the findings that emerged from interviews and group discussions held in communities to establish a baseline of community characteristics prior to access to fast internet and mobile phone. The baseline for community characteristics was established so that comparisons could be made after communities obtained access to broadband and mobile phone services.

Baseline interviews were conducted by Jim Cavaye and Michael Erdiaw-Kwasie in Jundah, Stonehenge, Windorah, Bedourie and Birdsville in November 2016 prior to broadband and mobile connection. Communities had only limited access to internet through a basic satellite service, dial up connection or local arrangements such as a "dongle" aerial in Stonehenge.

A total of 42 detailed interviews were held involving 51 people across the five communities. The following interviews and group discussions were held:

Jundah	14 interviews involving 16 people – 3 at group discussion	
Stonehenge	5 interviews involving 6 people	
Windorah	10 interviews involving 14 people	
Bedourie	7 interviews involving 8 people	Group discussions with Council staff
Birdsville	6 interviews involving 7 people	

The interviewees were:

Householder	12 people (Some local government staff were interviewed as householders given the context of the interview)
Business	18 people
Rural Landholder	7 people
Local government	5 people
Other e.g. School, Police	9 people

Internet Connection and Use

Average likert scale scores for the extent of digital connection are shown in Figure 9.

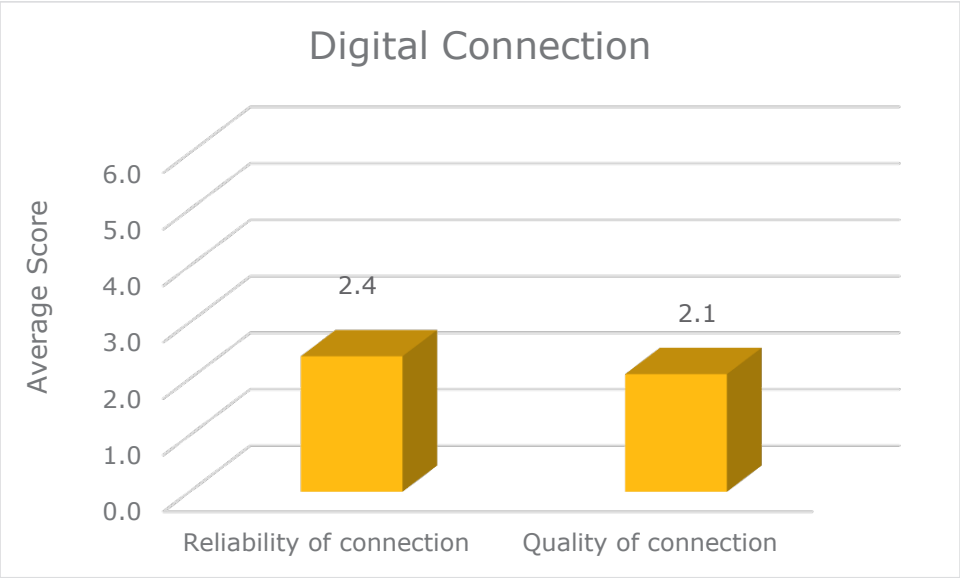


Figure 9. Average likert scale scores for digital connection

Type of connection

All respondents had access to the internet but not to the Telstra mobile phone network. Most respondents accessed the internet through old satellite networks such as Activ8 and Harboursat or through local arrangements such as a temporary Telstra satellite dish at Bedourie and a local aerial at Stonehenge. In communities where local government provided a satellite dish for access to the satellite, many people used this service. One third of respondents used ADSL dial up to access the internet.

Use of Internet

The most common uses for the internet were:

- Internet banking and paying bills,
- Email,
- Access to services from local government and state government,
- Accessing information including information searches, weather information and accessing news,
- Internet shopping,
- Social networking/social media.

Businesses used the internet for ordering, banking, paying bills. Very few business operators used a website or social media in managing or promoting their business.

Less common uses were:

- Video-conferencing,

- Education services and professional development,
- Accessing health services or information,
- Playing games.

Few respondents used internet access for downloading music or videos, or for gaming.

"We usually use it for many other things like government services, shopping, weather maps, emails, paying bills, banking, etc." – Business operator.

"I use the internet for diverse things including skype, government services, health, banking, shopping etc." – Householder.

"I use the internet pretty for everything including internet banking, weather maps, cattle selling, social media, government services, emailing, shopping, paying bills, getting educational materials for our kids." – Grazier.

Cost

The cost of access to the internet varied widely. This may be because respondents often were not sure of exact costs and only about half the respondents were able to provide a cost. A common cost was $150 per month for 20 gigabytes. Costs quoted by respondents varied as shown in table 1. The average cost per gigabyte is $12 if there were equal numbers of respondents on each of the plans shown in table 5.

Table 5. Costs of internet access quoted by respondents

Cost	Cost per gigabyte
$150 for 10 gigs	$15.00
$150 for 20 gigs	$7.50
$60 for 30 gigs	$2.00
$60 for 45 gigs	$1.33
$30 for 1.5 gigs	$20.00
$40 for 8 gigs	$5.00
$35 for 1 gigs	$35.00
$110 for 10 gigs	$11.00
$300 for unlimited	Not applicable

Time of Use

Almost all respondents noted that the time of day that people used the internet varied depending on their role and situation. People in business or other employment used the internet throughout the day for work purposes. People who were not working also used it during the day. The peak use for private purposes was in the evening and many people noted that this was when the speed was slowest due to demand. Many people delayed their use to off-peak times, particularly those that were studying or doing business or work tasks from home.

"Often people have to get up early in the morning if they have important work to do on the internet. It's just too slow at other times, particularly in the evening when everyone wants to get on (the internet)" – Council staff.

Internet connection

Current internet connection was assessed using criteria of:

- Reliability - being able to access the internet when wanted and maintaining connection without dropouts.
- Speed of download and upload.
- Quality of connection – such as the quality of use such as being able to videolink without interruption

Reliability of Connection

Most respondents experienced reasonable ability to connect to the internet when they needed to. However, the ability to use it effectively was greatly limited by poor capacity of the system and low download speeds. Many people experienced dropouts particularly during busy demand periods and periods of stormy weather. Others felt that connecting to the internet was reasonable with few dropouts, but that the main problem was poor speeds.

"In terms of reliability, I'd say it's 50:50. In terms of speed, it's terrible" - Community member.

"It's reasonably easy to connect ant time that you want to. The problem is that it is so slow and using the network can take forever." – Householder.

"It's pretty good in that you can connect and its rarely drops out. The problem is the speed" – Householder.

"Sometimes it's not easy to connect but more recently it's been pretty stable, and it hardly drops out" – Health worker.

Several respondents noticed systems failures where common and access was not possible while the network was being maintained or repaired. On some occasions, internet access was not possible for some days.

"There are times when the internet is down completely, and we are not connected for days" – Community member

Many respondents recognised the role of both local government in providing internet access and that reliable access was available at the council in each community.

Speed

The overwhelming difficulty that people experienced with internet connection was poor download and upload speeds. Every respondent noted that internet speed was extremely poor, preventing them from either accessing websites and downloading documents, or not being able to access websites at all. This was a problem at all times, but it was particularly poor during peak demand periods. Many of the dropouts noted by respondents appeared to be related to poor speeds and high demand.

Many people avoided peak demand periods in the evening by scheduling their use of the internet in off-peak periods. People mostly accessed the internet in the morning and evening, but early evening access was greatly reduced because of demand. Peak demand on the internet during these times degraded the service to a level that was basically unusable. Some people even got up in the early hours of the morning to have reasonable internet speeds.

"We try and do our book-keeping on on-line accounting software, but it keeps dropping out. It can take minutes to upload a single file and, in most cases, bulky attachments can't be sent by email at all. It has just been impossible to work effectively with the current connection speeds" – Business operator.

Quality of Connection

The quality of use of the internet, such as searching websites, conducting video links etc. without interruption, was related directly to poor download speeds. Generally, respondents noted that the quality of their use was poor with websites taking time to load. This became worse as demand increased.

Digital Capacity

Almost all respondents rated their skills at using the internet as moderate and all were entirely self-taught. People of all ages had gained skill through use of the internet and trial and error. This was either through having to use the internet through a work or business role or through using it in their personal life.

"In terms of my skills, I am not an expert, but I have all I need to run my business. My skills are basically self-taught and sometimes my children teach me some things. I would love to improve my skills." – Business operator.

"I would say that my skills are pretty good but I'm looking forward to stepping it up once we have better internet." – School teacher

Almost all respondents wanted to improve their skills. Some respondents had formal training in internet use and many expressed interest in participating in informal and formal training once internet access improved.

Average likert scale scores for digital capacity are shown in Figure 10.

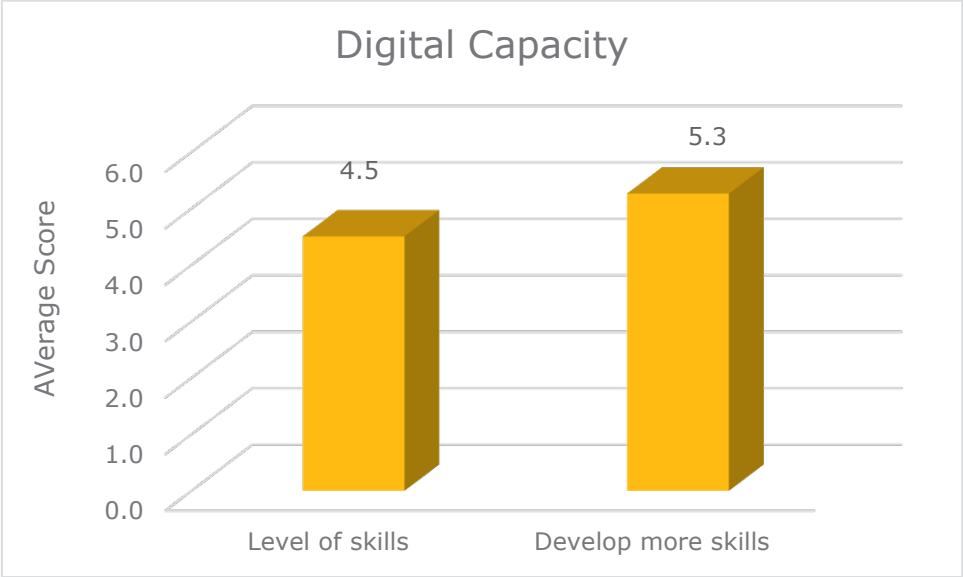


Figure 10. Average likert scale scores for digital capacity.

Impacts of Poor Connection

Poor internet speeds and sometimes unreliable connection had major impacts on businesses, local government, tourism, community services and on the liveability of communities.

Business

For business, slow internet speeds and poor reliability has a range of impacts. Business operation was affected. Businesses could not reliably offer EFTPOS transactions meaning that customers must use cash which they often didn't have. Ordering usually required on-line procurement software which these businesses effectively couldn't access. Ordering and inventory management was done on spreadsheets faxed or emailed for manual processing. Business operations take additional time. Emailing, human resources management, banking and paying bills takes considerable time interfering with business operation. Ordering parts and participating in on-line livestock auctions was difficult for landholders.

"At the moment we can't do any of our general ordering, receiving or even general administrative roles" – Business operator.

"It's hard to do any staff learning, access quotes or upload reports" – Health worker

The development of the digital economy was limited. Several people expressed interest in establishing or expanding an on-line business. This was severely limited by internet speed preventing video calls with suppliers and clients, and the development of on-line functions. Poor internet capacity also limited the ability of businesses to promote themselves on-line and on social media.

Businesses found it hard to attract and retain workers. There were many reasons for this in remote communities, but lack of good internet and mobile phone connection was an added disincentive. Staff being able to maintain contact with family and friends, and to access the

internet for entertainment, services and social connection was important to them settling in remote communities. Contractors and backpackers also visit the communities to provide important services and they were disappointed by poor connection.

Tourism

The growing tourism sector in the region was limited by poor internet connection and lack of mobile phone reception. Tourists expect reasonable internet and mobile phone reception and they were dissuaded by poor ability to connect with friends and family, to post information about their travel, inability to research locations and tourist information, and some have safety concerns about being out of mobile phone reception.

Tourism businesses were impacted by limited ability to promote themselves and the region on the internet and through social media, and poor ability to manage websites and on-line bookings. Respondents felt that poor internet and mobile phone connection contributed to tourists not being attracted to the region or their stay being limited with them moving on to other areas.

"We had some videos to put up on you tube to advertise our business, but the current connection didn't allow us to do that. If you don't have good connection, tourists just tend to move on."– Business operator.

Social connection

Many respondents noted that poor connectivity limited the liveability of remote communities. They found it hard to maintain contact with family and friends and to access services and contact with others via the internet and mobile phone.

"The poor connection has really discouraged my use of social media since the network is not clear and fast, so it is killing my social connections" – Community member.

"I feel the absence of the internet really limits my ability to stay connected with the news, stay in touch with family and grandkids outside the community" – Householder.

"From the point of view of my personal life, I am unable to stay in touch with my family as I am originally from Brisbane. At times of birthdays and family events, I really can't reach friends and family through video calls or any kind of thing like that, which really makes me feel isolated." – Local government staff member.

"In terms of basic life errands like shopping and banking, it is hard to do all these services and that makes living out here quite a challenge." – Community member.

Education

Poor connectivity greatly limited access to distance education. At schools in the region there was limited ability to access on-line learning and education resources on-line.

For higher education, poor connectivity effectively prevented people from participating in professional development or formal training. Many of these courses were based on-line with significant documents and resources needing to be uploaded and downloaded.

"The impact of the poor service makes things very hard. For example, my children have online courses to help build their skills in numeracy and literacy and at most times they are unable to connect to their online instructors. This affect the kids in a lot of ways." – School Teacher

"I enrolled in a couple of courses through distance education, but the poor internet speeds just made it too hard. I have had to put a halt to my courses till things got better." – Community member.

Access to services

People used the internet frequently to access services and poor speed and capacity was a major limitation. Banking and paying bills were very slow and to transfer funds banks require an SMS code to be sent to a mobile phone as a security measure. Lack of mobile service made this redundant and interfered with people's ability to do banking.

Filling in forms was also difficult. Forms were slow to load and after filling them in, the connection was so slow that sessions timed out before information on forms was uploaded meaning that input was lost.

Health services were unable to send large electronic files such as X ray images or do video links with external medical practitioners.

Voice Telephony

Fixed Landline

People throughout the five communities used the fixed landline phone for most of their communication such as contacting children and family members, business calls, grocery calls etc. Respondents varied in their view of the reliability of the landline. Some noted that it was generally reliable with few drop-outs and good voice quality. Others reported frequent drop-outs, poor voice quality and sometimes an inability to receive incoming calls. Almost all reported periods when the landline was inoperable for hours and sometimes days. The landline was also often interrupted and "crackly" during periods of poor weather.

"The fixed phone keeps dropping out al, the time. The main problem is that it is connected to the EFTPOS machine and once it is down, there is no transaction that can go on. Usually I have told my customers to go and come back later." – Business operator.

"I use my landline for basically everything. It is reasonably reliable, but it can be really bad. At sometimes, it wouldn't work for days and heat and bad weather can really affect it." - Householder

Likert scale scores for voice telephony are shown in Figure 11.

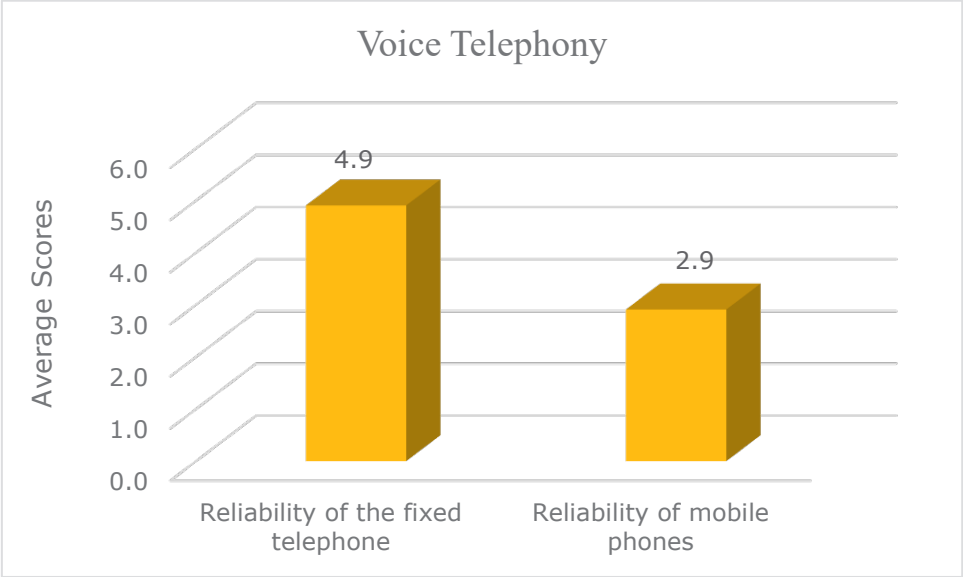


Figure 11. Average likert scale scores for voice telephony

Mobile Phone

At the time of the baseline assessment, only Birdsville had mobile phone service. Bedourie had very limited mobile phone access in town. Windorah, Jundah and Stonehenge had no connection. Because of this, few people could comment on the reliability of the mobile phone service in 2016.

All respondents noted the lack of service and looked forward to having mobile connection. Some noted that not having mobile reception contributed positively to social cohesion in communities, without the distraction of mobile screens. However, many business people noted negative impacts on their business including an inability to respond to customer enquiries and missing the convenience of being able to manage aspects of their business on a mobile device. Some people noted anticipated improvements to community safety and the ability to manage major tourism events once mobile coverage was available.

"The absence of a mobile service makes it hard to stay in touch for help during emergency situations. Once the service is improved, it helps a lot to improve the safety of the community." – SES volunteer.

"Without mobile coverage tourists find it had to stay in touch in our communities since they feel that their life and security is affected. Improved internet and mobile services will help address all these disadvantages – for tourist and for locals." – Council staff.

"Without mobile service, I have quite a few customers that complain about my late response to their enquiries and that affects our business. I'd really like to overcome this with better connection." – Business operator.

At the time of the baseline assessment, only Birdsville had a mobile phone service. Windorah was connected just after the baseline assessment in November 2017 and Bedourie had very limited mobile phone access in town. Jundah and Stonehenge had no connection.

Social Connection

Average likert scale scores for social and community characteristics are shown in Figure 12.

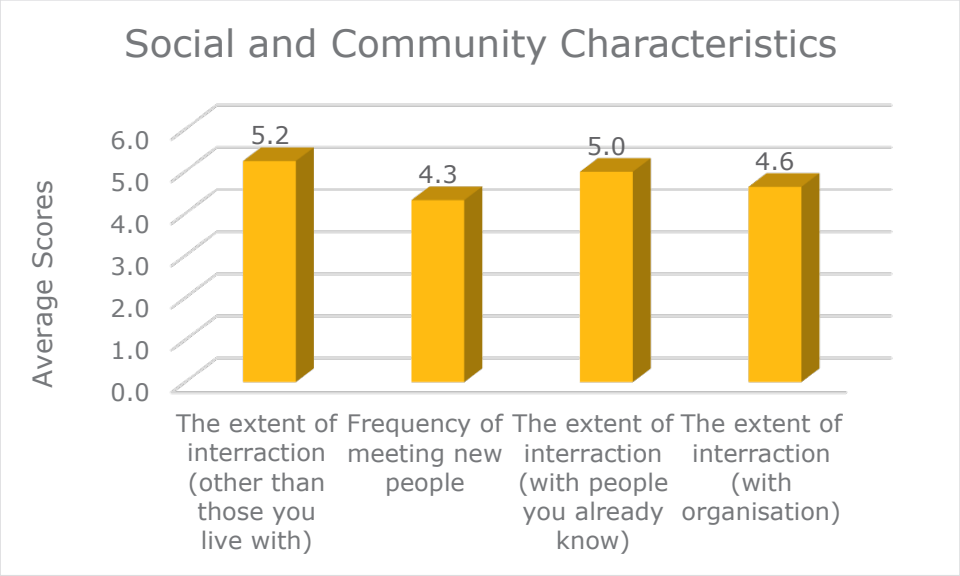


Figure 12. Baseline likert scale scores for social and community characteristics.

How Local People Socialise

"Bonding" social capital consists of the social connections between people who know each other or who have some commonality. There was very consistent feedback about how people in the two shires interacted socially. Almost all respondents saw that local people mentioned that they would connect with friends on a regular basis about once each week or two weeks.

All respondents identified that there were four main ways that people connected with each other. First, people meet others in the normal run of interaction in a small community – seeing people down the street, people coming into businesses, and planned catch ups with friends. This routine connection maintained relationships and social cohesion in the small communities.

Second, local "hubs", particularly the local hotel, were identified as important sites for many people to meet and interact. The hotel on a Friday evening was a social location where people spoke with each other. Another social hub mentioned was the information centres.

"Usually Friday at the pub draws a lot of people together and they share experiences of the past week. This has been really effective for a long time." – Business operator.

"People socialise at the pub, the roadhouse and at social events such as the Council end of year party and lots of other events." – Community member

Third, community events like rodeos, races, sport were also important to people connecting with each other. People noted that the social calendar was very busy with many local events. These events particularly led to interaction between "town people" and "property people".

"Usually during times of social events, we do meet together as a community. During these times. We move out of the properties and catch up with friends in town." – Landholder.

"There is something on almost every weekend – that many social events that it is sometimes hard to find a spare date. It has even been hard to claim a date for our school graduation." – School teacher.

Finally, almost all respondents noted that people interacted socially on the internet mostly via Facebook.

Connection between People on the Internet

Many people used the existing internet connection for online social networking which consisted almost entirely of using Facebook. People used it to post local news and personal activities, for sending out information about community organisations and events, and for keeping in touch with local and distant friends and family.

Respondents felt that many people used Facebook at least to some extent but some community members didn't use it nor any other social media. Community organisations used Facebook and other social media to promote events and activities and keep in touch with members and the community generally.

"Lots of people catch up on line on Facebook. They are posting photos and videos and people like them and respond." – Business operator.

"People are connected everywhere – through the pub, social events and people are also strongly connecting online like through Facebook. So, both face to face and online connection are all active." – Council staff.

"People usually go out to see each other at their houses or at the pub etc. Almost everyone is on Facebook and there is a lot more happening on line (than before). Many local interact by sharing photos of their daily activities." – Householder.

"I think it depends on the age group. Many of the young ones meet at the pub, while the older ones prefer to stay home and talk." – Householder.

There was some concern about technology affecting personal ways of interacting.

"At the moment, people socialise at the pub and most of the social networking is done that way. There is some concern about how mobile phones will affect our traditional way of socialising." – Business operator

People interacting with others they don't know

The interaction and links between local people and people they don't necessarily know represents "bridging" social capital. Respondents noted that the opportunity for residents to interact with new people was highly seasonal. Overall, many people felt that the communities were rather "closed" where people interacted mostly in local friendship circles. The only new people that most interviewees mentioned that they met were tourists.

"The town is pretty much an enclosed community and unless people travel it is hard to meet new people. However, during the tourist season, locals are more likely to meet new people." – Council staff

"Meeting new people is not a usual thing. This happens during the festive season when tourists pass through the community and locals meet up with the, to say hello. Apart from that, it is hard for people to connect with new faces." - Householder

During the tourist season, which coincided with a lot of tourism events, local people interacted a lot with tourists – mostly """"grey nomads""""" in the winter. With many tourists travelling through each community, respondents noted that many residents met with tourists and were happy to share local stories, provide information and generally social connect.

"During the tourist season, many people get the chance to meet new people. Tourists love to talk to the old people in town to understand the stories surrounding the towns and locals love to talk with tourists." – Business operator

"People meet strangers during the winter season when there are a lot of people in town. During the events season, like the Red Bash, the races etc. A lot of people are drawn in that locals interact with." – Health worker.

However, some respondents felt that the level of interaction with tourists and other "new" people depended on individual willingness to be outgoing, and on the role they had in the community. For example, people in local businesses, and at social hubs such as the information centre and the hotel, were most likely to interact with tourists. Respondents noted that people on properties interacted with town residents during community and tourism events.

"It depends on the person, because if you want to meet people all the time, then you are likely to meet people. But if you think you are ok with yourself, then you may not be that keen to meet people." – Council staff.

"In terms of meeting strangers, it depends on the type of work that you do. If you work in tourism such as at the Information Centre, then you are more likely to meet new people. But myself as a stay at home Mum, it is hard to come across them." – Householder.
"Those (people) on properties are not seen regularly but they do come into town during the tourism period and for community events." – Information centre staff.

Interaction with organisations and institutions

"Linking" social capital is the extent to which residents interact with organisations and institutions such as local government, state government, and "outside" businesses. A characteristic of a vibrant community is having a mix of bonding, bridging and linking social capital.

Respondents saw a difference between local organisations, such as the Council or regional Agforce office, and "outside" organisations such as state government departments or banks. For local organisations, people contacted these organisations when they needed to, such as when they had an enquiry, or they wanted to access information or a service. Interaction with local government was more frequent than other organisations because of local issues being more relevant and people knew the staff and Councillors in person. Most residents used the

phone, email or face to face contact to interact with them. People would call the Council, for example, or simply arrange to visit Council staff or Councillors face to face.

"Locals contact local organisations like the Council by phone or email. At other times they just go up to the premises of these organisations to discuss issues that locals consider needs attention." – Community member

For "outside" institutions, most residents used the internet and typically searched for information or submitted forms. They would call if they knew someone and felt they could get direct information or advice.

"In contacting organisations, you can go onto the internet and just put material into their portal. It is much easier though, if you know someone there and you can call and get a direct response." – Community member

"People are more into personal searching on Google about something they are looking for rather than calling the institutions directly." – Council staff.

Access to Services

Services that residents needed or wanted access to

The main services that people needed to access were health, education for children and local government services. Other services such as emergency services, banking and business support services, were accessed to a lesser extent.

Average likert scale scores for how respondents were able to access services are shown in Figure 13.

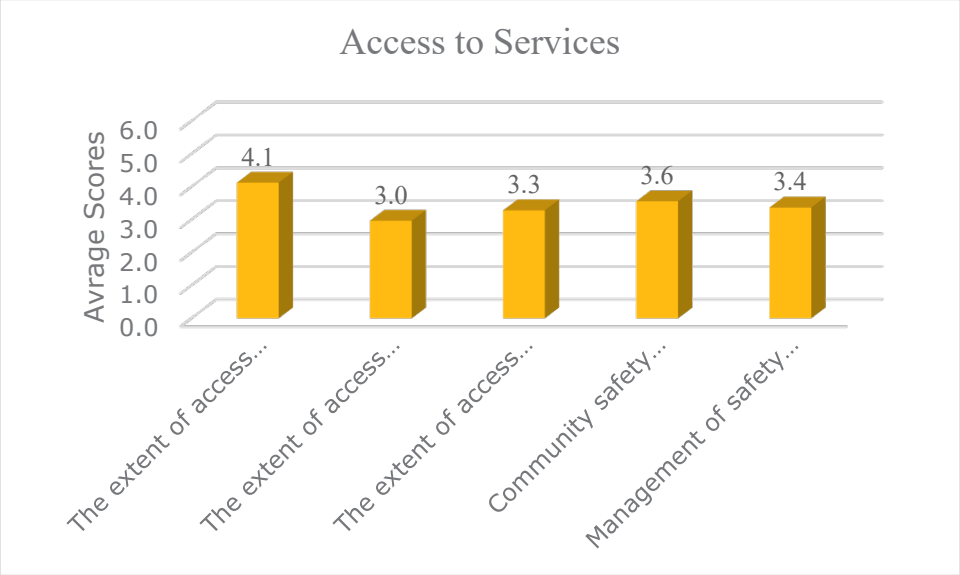


Figure 13. Baseline likert scale scores for access to services.

Access to Health Services

All respondents mentioned that people access health services by attending the clinic in their community, and /or attending the regular clinics conducted locally by the RFDS. People arranged appointments by phone and or in person. For emergencies, they accessed their local clinic and the RFDS was able to provide emergency or schedule evacuation. Many people noted that their access to their local health clinic, and the service they received, was excellent. They relied closely on their local clinic.

Poor internet and lack of mobile phone coverage had major impacts on health services. Electronic files, such as diagnostic images, could not be emailed or uploaded to the internet. Telehealth video-links with specialists in Longreach, Brisbane or elsewhere could not be conducted. Preventative health activities that required broadband internet, such as fitness classes or webinars on managing chronic illness, cannot be supported. Without mobile phone coverage, emergency medical situations relied on access to UHF radio, landline phone or satellite phone.

"Health is a critical thing. Telehealth initiatives are on the increase and they can really strengthen the link between practitioners, specialists and patients. Improving the internet and adapting the technology will allow more expert consultation remotely and efficient use of existing services and equipment already available in these centres." - Councillor

"There are cases in these communities of people needing telehealth connection with specialists outside their community, but the current situation with the internet makes this very problematic" - Landholder

"Patients still face a lot of delay in receiving services due to our poor internet connection. All our orders have to be sent to Longreach in order to get proper assessment of x rays sent about a patient due to the poor internet." – Health worker

Many respondents noted likely benefits of improved connection. They saw that many of the existing difficulties with providing internet-supported services could be overcome such as hosting telehealth video links, transferring diagnostic files and providing internet-based preventative health programs.

"As technology and service get better, I think locals with health conditions will feel much more confident to contact their doctors for help. Getting (internet) service improved will strengthen telehealth services which will help build community confidence." – Community member

"The current nature of the connection to the internet means that the clinic is not doing as much as it could. We have all the sophisticated machines to take scans, but radiologists can't use it. Improvement in the internet will change things hugely." – Council staff

Access to Education Services

Many respondents felt that education was one of the main areas that was most impacted by poor internet connection – and a key aspect of community life that would be improved by broadband connection.

Local schools are crucial for primary school aged children and children on properties are taught by governesses and by School of the Air. Secondary school students are in boarding schools in Toowoomba, Brisbane, Charters Towers and elsewhere. Vocational higher education occurred through apprenticeships mostly with local government. Many tradespeople and businesses must access professional development to comply with requirements such as health and safety training, but also to maintain and improve skills. People in these remote communities are attempting to undertake TAFE and university courses by distance education.

Schools

The access schools have to specialist program is very limited by poor internet connection. In several communities, schools were looking to access on-line input such as introductory language courses or maths programs. The management of schools was also affected with limited ability to organise school events via the web and unreliable email communication with parents and Education Queensland.

"For schoolchildren, there is a struggle in getting online instructors since the network is not reliable. Imagine if my child was in grade 6 and the lesson was always being interrupted by poor connection – I'd move town with my children. This is why many children are in boarding schools elsewhere." – Parent.

"My child is doing distance education from Longreach and wit the current network it is sometimes a pain. You can overlook this is they are in the early years, but if your children are of age and in their early grade education then poor connection would really be a problem. The cameras don't work, videos pixelate and the internet is slow." – Parent.

Higher Education

Poor digital connection has major impacts for people studying via distance education. People across the communities are attempting to access TAFE trading (largely for tradespeople and apprentices), professional development, such as safety and induction programs, and some are undertaking university courses. In all cases, people mentioned major difficulties due to the lack of speed and capacity of digital connection.

"Locals involved in online courses or training continue to struggle. Online courses come with downloading videos and uploading assignments which are simply not supported by the network. This really makes things difficult." – Council staff.

"Most of my graphic design materials are online and the current situation makes it extremely difficult. I know a few people who are doing professional development programs online who are constantly sharing their frustrations about the situation. I'd say that the current network doesn't support distance education in any form." – Student.

"When I was doing the induction program for a mining company what was expected was a 15-minute online program, but it lasted over 2 hours because the internet was so slow." – Resources industry worker.

"My son is running a mechanical engineering business and wanted to enrol in an online training course, but the current network simply didn't support it. He was told that he could

participate through Skype and do Facetime, but people just don't understand that we can't do this with such as dodgy network connection." – Business operator.

Access to Emergency Services

Communication is vital in preparing for, and in managing, emergencies. As of 2016, emergency management relied on satellite phones, UHF radio and landline phones. While these communication methods have sustained emergency management for years, they can be unreliable particularly during poor weather and in some black spots for remote communication.

The communities have well-established arrangements for preparing for, and for managing, emergencies such as fire, flood, storm or accident. The Councils maintain emergency management committees that oversee emergency management plans and that coordinate services for emergency response. In each shire, rural fire brigades, police, SES and ambulance services are available and strongly supported by volunteers, but emergency response is constrained by distance and the limited capacity of each service.

"The use of Sat phones has made it easier for locals to be informed during emergencies. However, I feel that mobile service will be very helpful particularly where there is an emergency on the road where the Sat phone and the UHF may not be readily available." – Landholder.

"During emergencies we basically use Sat phones and the fixed landline service. During bad weather, communication can be affected having it difficult sometimes to coordinate during emergency situations." – School teacher.

Improved internet connection and mobile phone service was expected to greatly improve emergency management. It would allow much more timely and comprehensive information to be distributed to community members particularly through email, web links, Facebook and other social media. Local emergency committees and emergency services would be able to communicate with each other more effectively both in terms of organising meetings and preparing for emergencies and in communicating during emergencies.

It was thought that emergency responders could also better access web-based information such as maps, weather reports etc. They could also better communicate and coordinate activities with central emergency coordination centres in Brisbane and elsewhere.

"In planning and preparing for emergencies, it is basically done on local knowledge. During emergencies we use sat phones and UHF radios. The introduction of mobile phones will make a lot of improvement. At the moment it is hard to link with state-wide activities and access materials such as maps in order to manage emergency situations." – SES volunteer.

"During emergencies we put notices on the website, community boards and sometimes on the radio. The strategy used is outdated and we are looking forward to better strategies where we can develop a blog and use social media for emergency warnings. Will help a lot of people, both locals and tourists. Because of the internet services at the moment we avoid putting attachments on emails and big files on the web just so that we can get information through to people." – Emergency committee member.

"I think the introduction of mobile phone will make things a lot easier. There are a lot of black spots and this makes the use of UHF very difficult during emergencies. The mobile service will really help this situation." – Landholder.

"The poor internet service makes things a bit daunting especially when you are waiting for the next line of action. During the last flooding event in the shire we had to walk down to the police station to get updates on the situation." – School teacher

Mobile phone coverage was anticipated to be important for police. While police officers, often responding to calls alone in remote situations, have high quality radios in their vehicles, once away from their vehicle, they are effectively out of communication range. Mobile phone coverage would greatly improve their safety and effectiveness.

Access to Other Services

The main other services that people accessed were government-related services or services from private businesses. Local services, such as the Council, were relatively easy to access. Other services were contacted via fixed phone or email. People accessed these when they needed to. Internet-based services, most commonly internet banking, online shopping, travel bookings and freight bookings, were difficult to access because of poor internet speed and unreliable connection.

"Locals always complain about being logged out of banking sites because the network is so slow. People get logged out midway through a transaction and they don't know whether it has gone through or not." – Council staff.

"In terms of banking and shopping we are always logged off/timed out from the process given that the internet is so slow." – Resources industry worker.

"Most people use internet banking, but it is just that things are very frustrating as it keeps timing out." - Landholder.

"I have never been able to do any internet transactions. At the moment all my banking has to be done through the post office. When I have used internet banking it kept dropping out and it's hard to know if a transaction has been successful or not." – Health worker.

Economic Characteristics

The economy in both shires is based on extensive grazing of cattle and sheep, tourism in the winter months including major tourism events, local government funding (and spending on local contractors) and visiting contractors providing services in the communities.

Average likert scale scores for economic characteristics are shown in Figure 14.

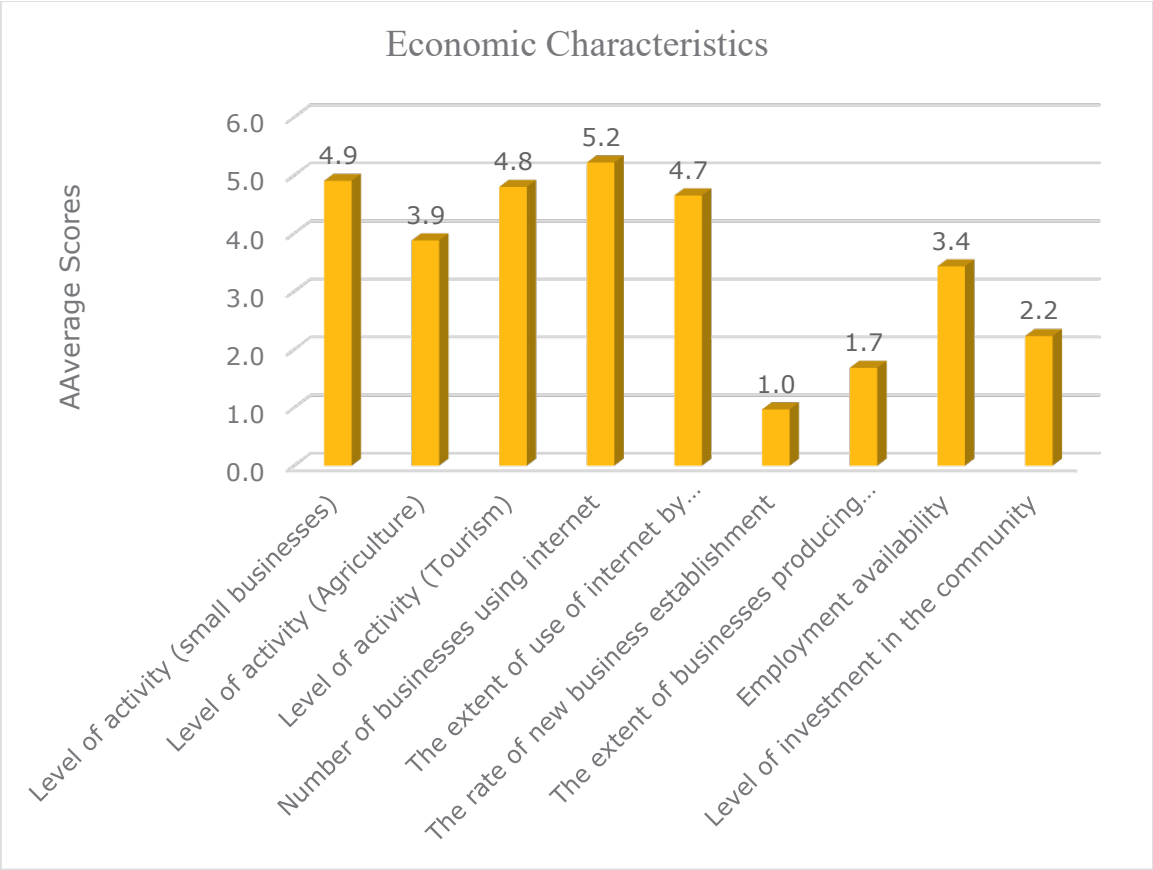


Figure 14. Baseline likert scale scores for economic characteristics.

A**ctivity of Existing Businesses** (turnover, number of customers etc.)

Small business/retail

Small businesses largely consisted of retail stores, service stations, post offices, hotels, accommodation providers, tourism operators and personal service providers. The activity of small businesses in the two shires is highly seasonal. During the winter tourism season, turnover is far higher than during the summer where businesses largely cater to local demand.

Respondents varied in their assessment of the activity of small businesses. Some noted that business activity was stable or slowly improving. However, most saw that small businesses had reduced turnover due to drought, reduced council grants and a shortening tourism season. This had reduced cash flow and increased the level of business debt in these communities.

"I would say that most local businesses have been struggling for some time now. With unstable tourism numbers and the drying up of government funding, it has been hard for businesses to cope." – Landholder.

"Generally, I think business is going downhill. The council is not getting the big grants that it did enjoy in the past so businesses are struggling." – Council staff.

"After the drought, I think the whole town has been gradually declining. Many people have started losing employment and businesses are "grey" at the moment." – Health worker.

Some respondents mentioned the need for business owners to be more innovative and enhance the appeal of their business.

"I would say that businesses are experiencing gradually increasing turnover and things are pretty stable at the moment. Businesses need to think outside the box and incorporate new ideas in the business cycle." – Council staff.

"Tourists are staying a bit longer lately which is a good boost for businesses but having said that I think local businesses need to market themselves more in order to look more attractive to tourists." – Community member

Agriculture

All respondents noted that grazing properties were all recovering from prolonged drought. Many were restocking and were largely relying on breeding to increase numbers because of high cattle prices. High prices, for those with cattle to sell, were a major benefit. Smaller properties were impacted more than large corporately owned properties. Respondents saw that while properties were still impacted financially by the drought, there were prospects for a good recovery with agriculture stimulating local business activity.

"The 4-5 years of drought was a big blow, but I can see that all of them are now recovering so agriculture is picking up, but it is still not particularly good." – Business operator.

"Agriculture is still recovering from the long drought. There is still some struggle in addressing restocking problems, auctioning and market challenges. While there has been rain there are many factors that are required before you could say that the sector is doing well." – School teacher.

"Agriculture has started to have a positive turn. People are still struggling but they have started to have a bit of hope and have started putting money back into the community to get things running." – Health worker.

Despite a recovery situation, some people felt that drought and general economic decline led to reduced employment and less opportunities particularly for young people.

"In the middle of the drought we lost about 400 head and were spending a lot to keep breeders going. Things are slow and labour has reduced totally." – Landholder.

"Prices are going higher and prospects are ok for coming years. The problem is that there are not a lot of young people on properties and that really leaves a lot of doubt around the

sector at the moment. There are a lot more young people that are leaving that people coming in, basically due to the opportunities that are available in the community." – Landholder.

Some respondents noted that drought and variation in rural income was normal and that communities simply coped.

"Property people have always coped with drought and while it has a big impact, their lifestyle ultimately is not changed. Their kids are still at school." – School teacher

Improved internet connection was seen as an opportunity for improved efficiency.

"Embracing good technological strategies with better internet can help property owners to compete efficiently online in terms of auctions, sales of stock and in many other ways." – Property manager.

Tourism

Almost all respondents noted that tourism was consistently growing, and it was a major contributor to the economy. This included general "grey nomad" tourism as well as the popularity of major events such as the Birdsville Races and The Big Red Bash. Tourism was supported by improved infrastructure, Council promotion and development of tourism and by businesses being more oriented to tourism. Some people noticed that any variation to tourism numbers, such as due to weather events or changes in tourism preferences, would have a major impact on the communities.

Tourism was a considerable growth opportunity in both shires with people seeing the possibility of tourism expanding by diversifying into other tourism segments in addition to "grey nomads".

"Tourism is booming. More accessible roads have meant that many people realise that our countryside is accessible, and they are more likely to visit." – Community member.

"The sector is increasing but restricted to the domestic market. If you go to Longreach, their tourism includes the international market whereas ours is almost entirely domestic which is restricted." – Council staff.

"In terms of tourism, I'd go so far as to say that there would be not much of a community here without it. The vast majority of my turnover is from tourism." – Business operator

"Tourism is getting bigger and bigger and things have significantly changed over the last few years. This is pulling a lot of tourists to the region and that is really good for the local economy." – Business operator.

"Tourism is definitely getting better. The councils are awake to it and both of them are good at it and always improving what they do to support tourism." – Landholder.

Many people felt that improved broadband access and mobile phone coverage would make a major difference to tourism, allowing the region to continue to attract tourists that sought digital connectivity.

"The expectation that tourists have about the internet and mobile phone is a challenge. They have concerns about the lack of quality internet access in this area and this seems to put a lot of them off." – Council staff.

"We are focusing a lot on tapping into digital markets. We are developing products that we can sell online and also have live streams, good websites etc. We were planning to start a YouTube channel, but the internet service didn't support it." – Business operator.

Use of the Internet by Businesses

All respondents noted that virtually every business in both shires used the internet. People thought that businesses used the internet most of the time, if not all the time. However, the extent to which they used it, and what they used it for, varied markedly across businesses. This depended on the familiarly and skills of business operators in using digital technology and software, and the nature of the business. Current poor connectivity limited internet use.

"All the businesses in town use the internet. The problem is internet quality. Apart from that, the use of the internet depends on the skill base of whoever is running the business and those with good skills are more likely to use the internet to best effect." – Council staff.

"All businesses make use of the internet though the usage varies among individual businesses. A lot depends on the age of the business owner, their skills and their understanding of the prospects of the service for their business." – Council staff.

"I would say that all the businesses are using the internet. They are using it as much as they can with the restrictions we all have at the moment." – Community member

Most respondents saw poor speed and unreliable connection as major problems for businesses. People saw the main advantages of improved access as improved ordering online and improved business systems, improved ability to promote businesses on the internet, and the resulting need for businesses to improve their digital competence and embrace the internet.

New Businesses

Many respondents mentioned that there were no new businesses in their respective community. However, several felt that new internet-based businesses were developing and that with improved access, these home-based businesses would quickly develop further. They also saw that improved internet service would support new physical businesses being established.

"There are no new businesses. It is same old, same old with not a lot of incentive for people to start a new business." - Householder

"There are new businesses coming up that are all basically internet based. Some of my friends run fitness and photography businesses online and these will take off once we have good internet." – Community member

"There are new businesses being thought of and this is likely to really progress when the internet is improved." – Community member

"With the introduction of fast broadband, I can see a lot of self-established businesses developing, particular online ones." – Council staff

New Products and/or Services

All respondents felt that there were no new products or services being offered by business. However, some respondents noted that particular existing businesses were developing new products or services for tourists and also looking to diversify services with better internet connection.

"There are no new businesses in town, but existing businesses are looking forward to expand their products and services once the internet connection is improved." – Landholder.

Investment

Almost every respondent noted that no investment was being attracted to the region. Virtually all investment was public via local, state or federal government. There was concern over the conclusion of flood recovery funding. However, some respondents noted the importance of tourism in attracting investment.

"The hotels are investing in accommodation facilities. Generally, businesses believe that improving their business will allow it to attract more tourists." – Council staff

"There is no new investment, but I know that the council is chasing funding opportunities to undertake more tourism projects with will have a big impact." – Resources industry worker.

"There are no new businesses, products or investment in the community, but the Council is always in discussion to help push tourism in the area given the prospects of the sector." – Community member

"The caravan parks are being expanded to accommodate more tourists. Pub owners are planning expansions and introducing more products and services to meet the expected tourism population." – Community member

Availability of Employment

Employment was generally available, but people mentioned it may not be the job that people were looking for. They felt that everyone who wanted a job could get a job.

"Anyone who wants a job can get a job."- Business operator

"It is easy for everyone to get a job. It just may not be they job they want nor the number of hours that they would like." – Business operator

"Most people who want a job in the town are employed." – Council staff

"Almost all the people in the community are employed. The truth is all those looking for jobs will always end up securing one." – Business operator

Economic conditions limited the type of work available and the ability of employers to pay high wage rates.

"Most of the properties do not have enough money to put people on the property. So, employment is patchy. Here, employment is mostly through the Council." – Business operator

Local government is the major employer in each shire.

"The Council directly or indirectly employs about 80% of the local population while others are employed on properties or in local businesses." - Landholder

"The Council is the key employer in the community." – Council staff

The availability of suitable accommodation affected the ability of new employees being attracted to work in the region.

"I have a vacancy at the school and there is no one to pick up the position because accommodation is limited. The problem is that for young people to come in and take up such positions, all supporting entertainment like internet and other social life are very limited and that makes the region less attractive." – School teacher

"I would say that accommodation is the biggest challenge and that limits people coming over to work." – Landholder

Economic Characteristics – Business Owners

If respondents operated a business, they also answered questions in the interview where business operators answered the same questions as above specifically for their business. Average likert scale scores for business owners are shown in Figure 15.

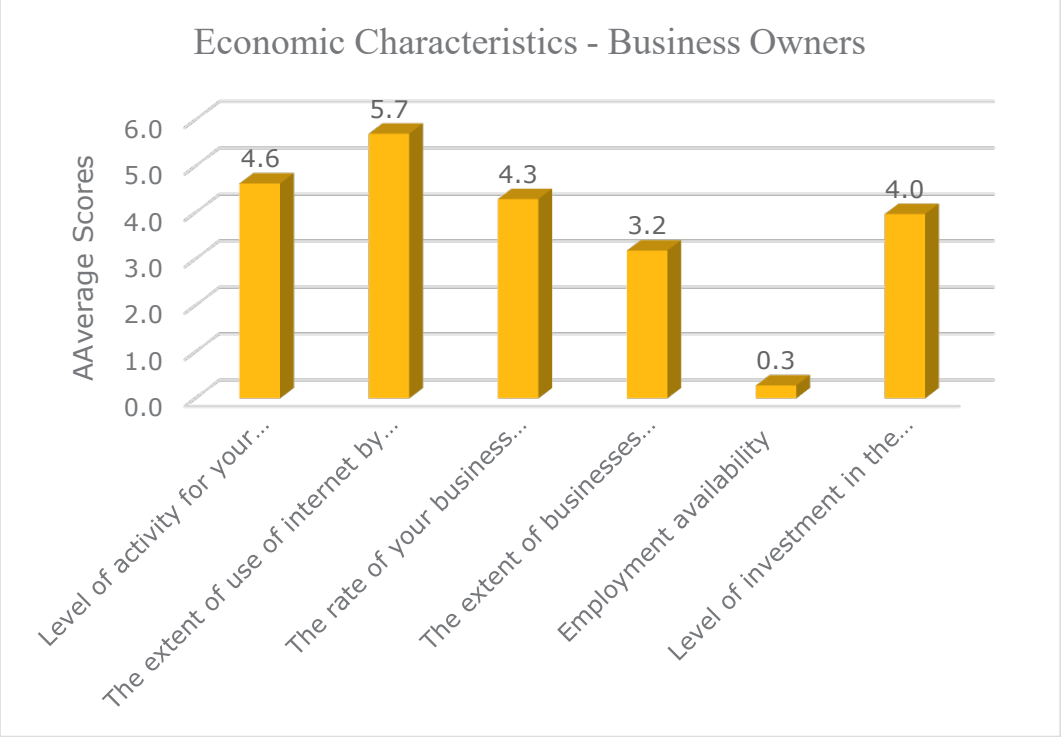


Figure 15. Baseline likert scale scores for economic characteristics of selected businesses as expressed by business owners.

Assessment of Change Due to Digital Connection

2017

Assessment of Change Due to Digital Connection 2017

This section of the report describes the community changes in the five study communities that have occurred as a result of fast broadband internet and mobile phone connection from November 2016, when connection occurred, to November 2017. Information was gained about same connectivity and community characteristics as in the baseline assessment allowing a year on year assessment of change.

Interviews were conducted by Jim Cavaye and Michael Erdiaw-Kwasie in Jundah, Stonehenge, Windorah, Bedourie and Birdsville in November 2017, a year after broadband and mobile phone connection. A total of 49 detailed interviews were held involving 58 people across the five communities as follows:

Jundah	14 interviews involving 16 people
Stonehenge	3 interviews involving 4 people
Windorah	12 interviews involving 14 people
Bedourie	12 interviews involving 13 people
Birdsville	8 interviews involving 11 people

The interviewees were:

Householder	14 people (Some local government staff were interviewed as householders given the context of the interview)
Business	14 people
Rural Landholder	9 people
Local government	11 people
Other e.g. School, Police	10 people

The key impacts of digital connection were:

- Improved access to services particularly health, education, government services, banking and shopping,
- More effective business operation but business culture and acumen remain a limit on the full application of fast internet connection and mobile phone coverage,
- Diversification of the economy and the development of tourism in particular,
- Improved liveability for people (with the potential to attract people),
- Improved emergency preparation and management,
- Improved organisation and operation of community organisation and events.

Internet and mobile phone connection did not change the way people socialised. Business motivation and "culture" need to adapt to more fully take advantage of digital connection.

Internet access in Windorah

Internet Connection and Use

Type of connection

In each town, except for Stonehenge, four facilities had "fibre to the premise" connection through an underground fibre optic cable – the council office, the health clinic, the school and the police station. Stonehenge only has a school with fibre to the premise connection. Residents and businesses in the rest of each town had "fibre to the node" connectivity where the fibre optic cable terminates at the telephone exchange and houses and businesses access internet via their fixed landline phone line. This final stage on the copper wire telephone line provides slower internet speeds than fibre to the premise. Outside each town, in the extensive rural areas of the shires, landholders only had access to satellite internet provided by the Skymuster satellite system. This has much higher capacity then previous satellite systems.

Each town had mobile phone connection provided by a local mobile phone tower. Within each town, mobile reception was good, but it diminished with distance outside each town in a radius which ranged from 5 to 20 km from towns.

What the Internet was Used For

There has been a noticeable expansion in the reported use of the internet from the uses identified prior to connection in 2016. The range of activities being undertaken on-line was very broad. Several respondents answered the interview question for this with one word: "*Everything."*

The uses of the internet across all respondents included:

- Information search,
- News and Weather information,
- Shopping – eBay, online products and services,
- Banking – pay bills,
- Applying for jobs,
- Education – kids, adults,
- Government services – registration of cars,

- Social networking,
- Messaging,
- Accessing health services,
- Accessing maps,
- Communication – emails, messaging, Skype, Facetime, social media,
- Auctions,
- Games,
- Videos and YouTube,
- Gambling.

The most common uses were information searches, banking and paying bills, communication (emails, messaging, and social media), on-line shopping, news and weather information, and social networking.

"My partner uses it for shopping and paying bills. My family uses the internet for games, videos, YouTube, banking, and admin activities. I use it for generally for preparation activities before and after school." School teacher

Cost

A significant number of respondents (52%) were not able to say what the cost of their internet access was. Typical responses from respondents were:

"*I have no clue."*
"No idea."
"The Council pays…"

This was sometimes because the access was provided by an organisation or by local government. Also, internet access was often bundled with mobile phone connection and several people had multiple devices included in their bundle.

Many other respondents provided a cost, but the responses were quite varied and some of the responses seem unusual (e.g. $99 for 1000 GB) (Table 6). This suggests some unfamiliarity with the cost of the internet.

Table 6. Reported costs of internet access

Reported Monthly Fee	Capacity (Gigabytes)
149	2TB
99	1000
80	100
90	100
34.99	90
190	80
180	70
120	50
157	50
85	45
49	25
76.94	12
70	10
40	8
300	unspecified

Time of Use

The reported time of access to the internet varied according to the situation. Business operators and employees, schools and local government staff were accessing online services and communications throughout office hours. Many respondents said that they used the internet for work during office hours and then in the morning and/or evening for personal and social use. Services such as health clinics and police always used their access including outside hours when needed. Rural landholders often used the internet in the mornings and evenings. Those working from a home office or accessing the internet out of work hours were accessing the internet at all times.

"For business its 9 to 5. And 7 to 10 is for social stuff." – Council officer

"It's a bit random. Here in the office we use it all the time. In addition, at home I use it in the evenings." – Business operator

"Early in the morning, I mostly check my emails, go to Facebook, look through the news and the weather and shop online in the evening." - Council worker

Reliability of Connection

The reliability and quality of internet connection is shown in Figure 16.

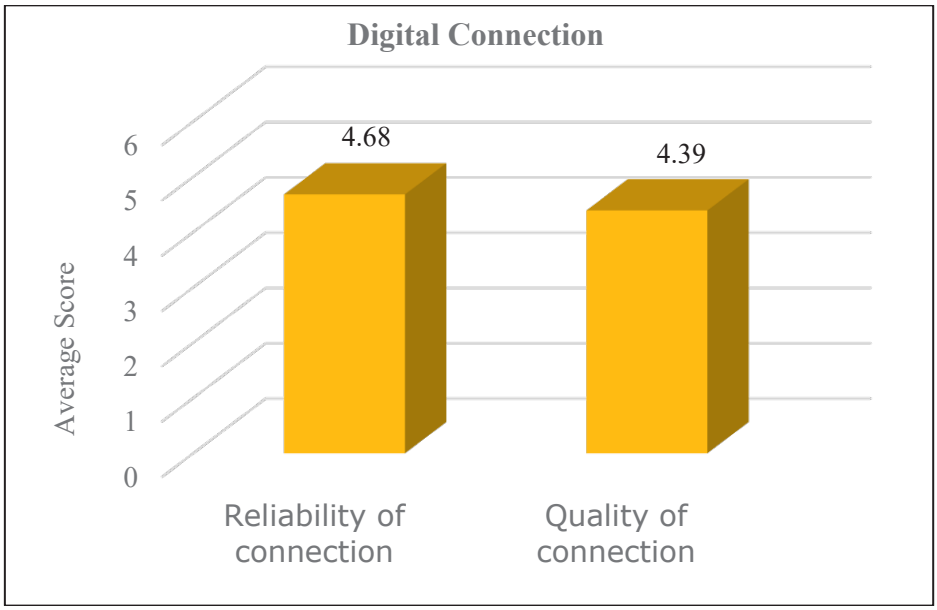


Figure 16. Average likert scale scores for the reliability and quality of internet connection

The reliability of connection involved people being able to access the internet when they wanted to and being able to maintain connection i.e. to not have interruptions to service or "dropouts". Reliability was markedly improved from a pre-connection average likert scale score of 2.0 to a post connection score of 4.7 out of 6.

Respondents generally experienced good reliability.

"*Now it works perfectly – not like a year ago when I could not even download an email*." – Business operator

It's good – I will say there is a huge improvement in terms of sustaining the activities we use the internet for. – Householder

"It's is absolutely brilliant. I love it. I have never had a drop out." – Business operator

However, about a third of respondents reported interruptions to service. Some expressed greater problems with drop outs than others, in the same locations.

"Not so reliable. Don't get me wrong, it is much better than what existed. However, there are still a number of dropouts when using it." – Health Clinic

"There are dropouts. It has happened few times and sometimes it goes off totally. But in general, you can access it whenever you want to access it." – Council worker

Almost all respondents noted that reliability was much better then prior to fast broadband connection.

"It is much better than before. At least, with the new network, we are able to do some basic downloading and uploading which were not supported by the old system." – Householder

Some people noticed that accessing the internet by mobile phone was much more reliable, and faster, than by ADSL connection.

"On my phone the internet is very good and fast but when I use the other internet it is very slow, and it can drop out." - Householder

Rural landholders who were accessing the Skymuster satellite appeared to have more unreliable connection than ADSL internet connection. The connection appeared to be affected by weather conditions and people experienced drop-outs.

"It's reliable but sometimes it drops out on cloudy days." - Rural Landholder

"Sometimes it's good. Other days, it's really down and that is usually due to bad weather conditions. But again, I will say the current network is much better." – Rural landholder

Some people observed that the Wi-Fi in their home or office could still be slow and occasionally dropped out or there were questions about the capacity of internal internet equipment such as servers and modems.

"It has been extremely reliable. I think the problem we are having are internal problems not external internet problems." – Council worker

Quality of Connection

The quality of connection includes the internet upload and download speed and the ability to maintain internet functions such as video and audio quality. Almost all respondents noticed a major improvement in internet speed with an average likert scale score of 4.4 compared to a pre-connection score of 1.7.

Speed

The speed of internet connection was generally considered to have improved to significantly enhance access to, and use of, the internet, especially during peak times when speed was previously most difficult. People were using the internet much more for both business and personal use because of the improved speed and reliability.

"(Internet speed) is perfect most of the time." Householder

"*Before [the faster connection] I would use the satellite connection to just use it when I needed to, but now I am online all the time."* - Householder

While there was overall satisfaction with the speed of the internet, several respondents noted that they still had difficulties with slow speeds and drop outs particularly when large download volume was needed such as during video streaming. There was consistent feedback from community members across the five communities about internet speeds remaining slow or them being disappointed in the expected increase in speed.

"I did try to log on to webinar [at work] and I couldn't because the connection was too slow, but I was able to do it when I got home." Householder

"*When all of my kids log on for their assignments it is extremely slow. The pressure on the system is a big challenge. We can't download interactive videos for the kids. The more of the kids that log in, the slower it gets."* – School Principal

Phones were mentioned regularly as a tool for access, sometimes as a preferred means as it was perceived that the mobile access to the internet was sometimes faster and more reliable than other access options available.

"People used to come in here (to access Wi-Fi) all the time but now that has dropped back a bit because they are using their mobile phones to go online." – Information Centre staff

Digital Capacity

Changed Use of Internet

There is a change in people's use of the internet as a result of faster speed and more reliable access. Residents were using the internet a lot more and throughout the day, rather than during periods on low demand.

"Now that it performs better, I am using it more." – Business operator

"I can now access the internet during the day when this was not possible previously." – Business operator

"Before when I was using computer and the satellite, I will just use it when I am checking something but now, I am on it all the time." - Landholder

"Given the network is now better I will use it more." – Landholder

"I use it more frequently. At first, it is frustrating to open just a website as you will have to wait over hours. Now, things are just fast." - Householder

Some people noted that more time was needed to notice a major change in internet use as a result of faster speeds.

"Not really. I still think it's too early for such a change to be seen" – Business Operator

"My internet use is still pretty much the same." – Council staff

As a result of faster speeds and more reliable access residents were using the internet for a wider range of business and personal purposes. Increased capacity allowed people to watch streamed internet television, access webinars and watch films which were not accessible previously.

"I am using it now for things I could not do before – like Netflix and live streams." – Tourism operator

"We can now stream TV unlike when TV signals drop out and we miss our episodes in a series we might be watching. But now we are able to catch up and it's now satisfying." Householder

Not all respondents noted a change in their use of the internet. Several people noted little change is what they used the internet for even with faster speeds.

"We still use it for same old things" – Business operator

"It hasn't changed our usage, it's just more efficient now." – Health Clinic

"Our use is much the same. Doing the same thing as we use to do, maybe I will say doing it more than before. We use it more during the tourist season as we do lot of ordering and purchasing." – Business operator

Change in Skills

Many respondents noted that because they were using the internet more due to faster and more reliable access, they were developing more skills and confidence. Their skills were developed almost entirely through practice and "learning by doing", rather than through formal training.

The likert scale scores for people change in digital capacity are shown in Figure 17. On average respondents scored a moderate increase in skills (2.88 out of 6) but a considerable interest in building their skills (3.47 out of 6).

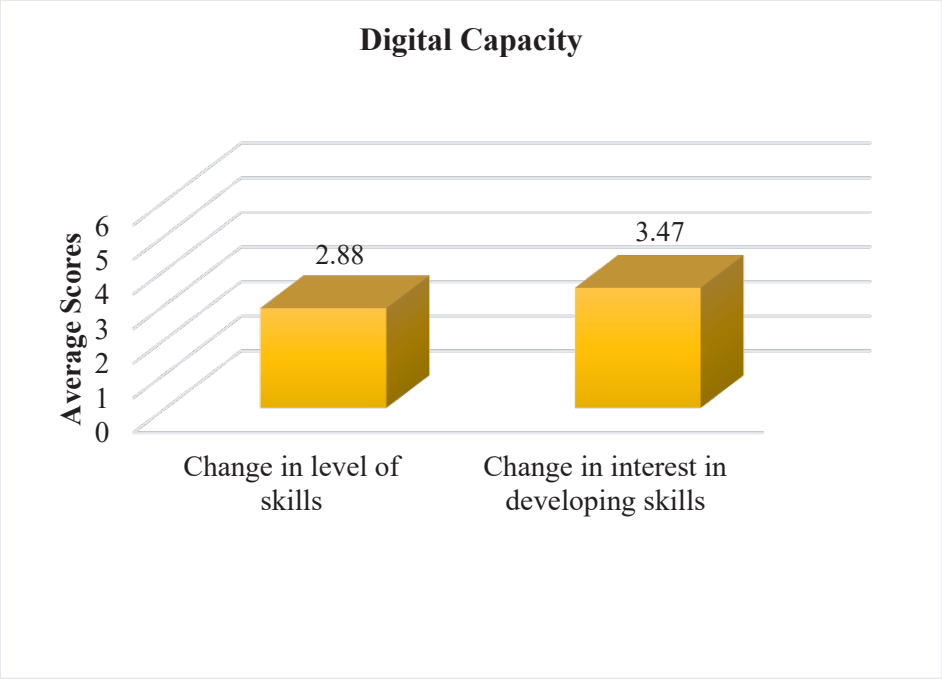


Figure 17. The change in digital capacity from digital connection

People taught themselves to use mobile phones, social media (Instagram/ Facebook) and new software/databases. Some people mentioned that their confidence had increased as their familiarity grew. Some were taking courses online or solving problems following online

directions. One younger person observed that their parents' skill online had noticeably changed for the better.

"I think they (my skills) are better now, given that the internet is much better now, I feel I can now do more with it." – Council staff

"Now it's easy to play around and learn more about it." – Health Clinic

"I am able to do lot of research now but 12 months ago it can get frustrating and we stop." – Business Operator

"Practice makes perfect, so my skills have improved because it (the internet) is fast. In the past, I didn't spend much time on the internet due to all the challenges with its speed and reliability. Now, I use it for many other things, and that makes me better every day" - Landholder

Many respondents also saw that their skills had not improved much because of improved internet access. This was largely because improved connection had occurred only a few months earlier and they had not yet made the most of improved internet access. However, many people felt that their skills would improve with continued internet use.

"Not really (improved my skills). I am comfortable with my skill. At the moment I use the internet for the basic things, and I am fine with it." – Business operator

"I would say I am a bit more confident handling stuff now. I would like to develop more skill with time." – School Principal

"It really too early to say" - Householder

Some respondents identified the need for more training and support for people to build skills and make best use of improved internet access.

"As the internet get better, we now see more of its use and that means there is the need for more need for skills training." – Council staff

"Now we can use the internet to do more things and as a result learn more things and I am really looking to develop more skills." – Health Clinic

"They have increased but there is a lot more that I need to learn." - Householder

Interest in Developing more Skills

Almost all respondents mentioned interest in developing their internet skills. This was due to both a specific interest in developing internet skills and a general interest in building skills regardless of the topic.

"If there are new things that I need to use the internet for in the future and this calls for new training then am happy to improve the skill." – Business Operator

"Now we can use the internet to do more things and as a result learn more things and I am really looking to develop more skills." – Council staff

"I am more likely to try new things now because it doesn't drop out." – Tourism Operator

"I'm always happy to learn new things." - Householder

Some people mentioned that while they had an interest in improving their capacity, it was not a high priority and time pressures limited their ability to learn new internet skills. Others saw that they were happy with their current level of skills and that they could do what they needed on the internet.

"I am currently comfortable with the things I use the internet for and not seeing myself doing a course of something. But if there is any form of local training on new skills by the government, then I will participate." – Landholder.

"I am ok for now. If future training opportunities come up, happy to participate." – Landholder.

Voice Telephony

Access to mobile phone coverage made a major difference to voice telephony across the five communities (Figure 18.). The reliability of the fixed telephone service was variable, whereas mobile phone access was rated as quite reliable (4.89 out of 6). Respondents rated access to mobile phone as having a major impact on their lives (4.39 out of 6).

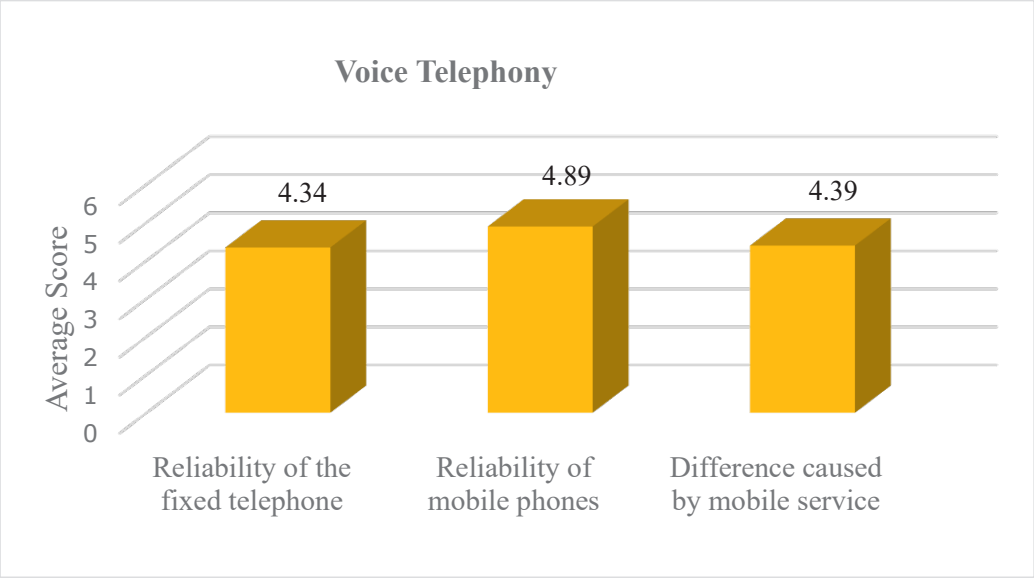


Figure 18. The reliability of fixed and mobile phone services and the difference to their situation that people perceived as a result of mobile connection.

Reliability of Fixed Phone (Landline)

The reliability of the fixed landline telephone was generally good although opinions varied. Some people saw it as reliable and others noted regular periods when the line was out of order.

"It drops out occasionally and have had few problems from time to time." – Business Operator

"It's pretty good. A couple of drop outs in a couple of months." - Householder

"The land line drops out of service sometimes. But generally, it is good." – Business Operator

"It's reasonably good. The only times it has bit of problems is times of bad weather conditions." – Police officer

In Bedourie, the landlines had been out of service the week prior to interviews. In other areas, the landline was "*pretty reliable*".

Landline Use

Landlines were used three main purposes:

- Contacting family; children at boarding school, and family and friends elsewhere.
- Business – enquiries, orders, contacting staff and customers; teleconferences.

For all calls – personal and business calls.Many people in towns, where mobile service was available, mentioned that their main form of communication was becoming a mobile phone rather than a landline. The mobile was more reliable and convenient than the fixed phone which was now used more frequently as a "backup".

"Now that we got mobile phone, we do not really need but we use it because of the $99 plan that covers it." – Council staff

"We probably only use it 10% of our calls out because we now use the mobile phone for our calls." – Business operator

"I use my (mobile) phone but we have a fixed phone here in the office." – Council staff

Reliability of Mobile Phone

Many people noted that the mobile phone service was very reliable, and they often contrasted it with the variable reliability of the fixed phone line.

"Landline drop outs affected the use of the EFPOS, and over number of days there was no use of such service. But today, with the mobile service, the EFPOS are connected to that service and this has become more stable." – Business operator

"We haven't had any problems with the phone. It's pretty good. We don't really get drop out with that." - Householder

"We haven't had any trouble with it. It's been fabulous." – School Principal

"It's quite reliable. In some areas we only get 1-2 bars but mostly 3." – Landholder

Typical comments were:

"It's been fine"

"It's been great"

"Really reliable"

The Difference that having Mobile Phone Service has Made

There has been a rapid uptake in mobile phone use which was generally considered to be very reliable. Some mentioned that they made use of it to access the internet because this is the most reliable method for tasks such as accessing banking services. Others use the mobile phone for video calling (Facetime) their children at boarding school. Several valued that they are contactable by family and friends more easily, something that was absent previously.

"I use it for everything, and the world be a lonely place without my phone because I connect with lots of my friends with it." – Council staff

"It's brilliant. I can see my grandchildren through video calls, call my children, and talk to them all the time without me flying to see them." – Council staff.

"I really like the mobile phone because now I am contactable, I can send a message to someone when I can't pick up a call. I can leave a message to someone. It has really improved the efficiency. I also use it for video calls with my family. I am able to see my kids' faces which is really nice." – Council staff

The convenience of being able to use text messaging as an efficient and fast way of communicating is increasingly appreciated. It is used for checking in, short advice, to solve problems. For example, it was especially useful for sending photos of tools, items or situations in the workplace to another and immediately informing a return solution or response.

Many people appreciated the benefit of now being contactable at all times, anywhere (in mobile service areas). People valued the timeliness of mobile phones where they be contacted easily at any time. This avoided them having to access a landline and wait for returned calls etc. People valued the ability to continue to work or conduct home life and be able to be contracted easily.

"Now I don't have to be in the office to work, I can work from home and things are much easier." – Business Operator

"Socially and personally it has made a bit difference….in terms of work, I am able to reach out to colleagues and clients on time no matter where I find myself." – Business operator

"Unlike before when we have to wait around for someone to call back on the landline, now we can take the mobile with you and they can call you at any time, and you can get on and do what you have to do." – Council staff

Being able to reach people on the move or away has also made a difference to the sense of security and safety, being able to check-in when workers or family are travelling or in isolated areas or working alone was reassuring.

"I can contact my husband when he is away – it makes a huge difference. Has brought a lot more security." – Householder

"It is a very helpful safety tool. Instant messaging has been really helpful." – Council staff

Some mentioned taking photos with the phone and posting these to social media as promotional and communication devices.

"We are always contactable. We can take photos and send them to clients or co-workers." - Householder

There was also concern about mobile phones reducing the amount of personal face to face interaction between people

"People instead of communicating prefer to text instead. People meet for a cup of coffee and they are all on their phones." – Business operator

"I'm not too sure if it's good thing or a bad thing. But I am more effective with helping people who need answers to some questions straight away." – Business operator

Social and Community Characteristics

Access to fast internet and mobile phone service had a marked effect on people's social interaction, the function of local community organisations and on the conduct of community events and activities (Figure 19.) Average likert scale scores for increased social connection ranged from 2.53 to 4.02 out of 6.

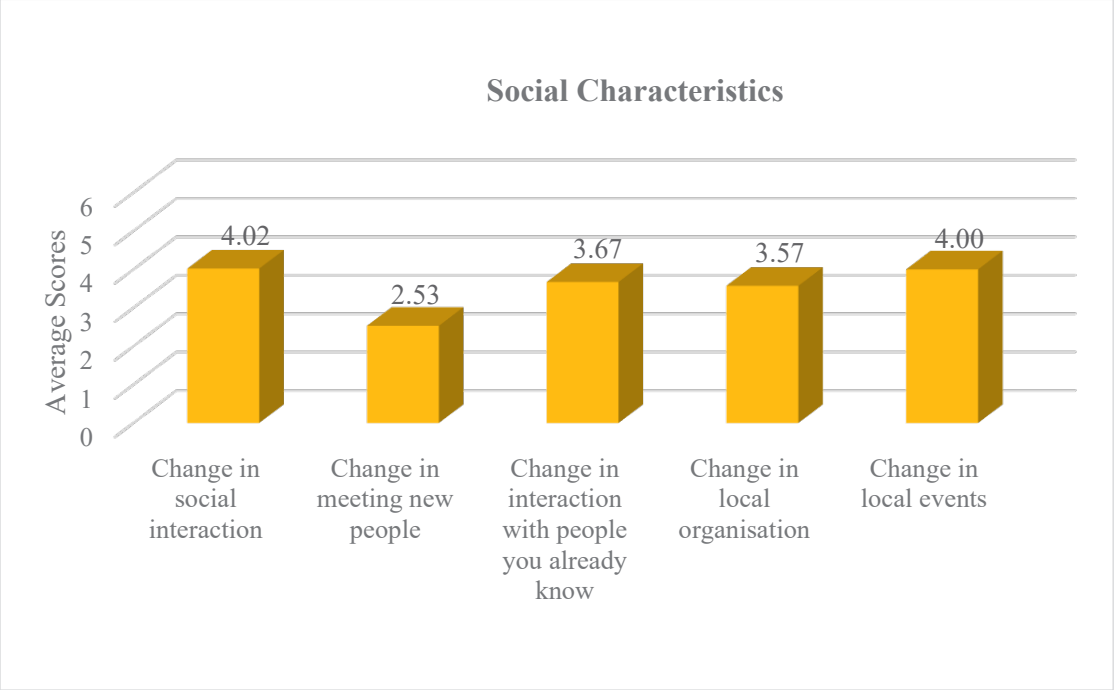


Figure 19. Change in social connections as a result of digital connection.

Changes in the Way People Socialise

Almost all interviewees noticed that digital connectivity had markedly changed people's ability to socialise on the internet whether on a computer or mobile phone. People were using social media, messaging and videolinks to keep in touch with family and friends. This was particularly important in remote communities where people were often separated from children in boarding school or family and friends elsewhere.

"It has created lot of avenues for people to socialise, people can just post a notice on Facebook without necessarily calling people about it. Lots of people are spending more time on their phones." – Business operator

"I think people text more now than ringing somebody and people use Facebook and others to connect more now." - Landholder

Locally, digital connectivity was also important allowing people to more conveniently contact each other and more easily communicate for work and for personal reasons.

"It keeps people connected. Teachers can connect with family. The kids can connect to friends in other schools. Parents can text and leave messages when class is in session and we read them after class without interruption." – School teacher

Some people expressed concerns about mobile phones interfering with face to face contact between people.

"Mostly, you see people sitting with their phones." – Council staff

"People go to the pub, but they don't socialise much anymore." - Landholder

However, other respondents felt that in the small communities of the region, people still had an ethic of personal face to face communication that was not affected by digital connectivity.

"People still come to pub and talk." – Business operator

"This community is a very small community, so people socialize personally and so there is not much influence of the internet here with how people socialise here unlike larger communities where people make use of internet to socialise a lot." – Business operator

Some people mentioned that having digital connection increased the attractiveness of communities for visitors, increasing social connection in that way.

"My children come to visit me now that we have mobile phone coverage." - Landholder

Concerns about maintaining face to face communication
(Western Star Hotel Motel, Windorah)

Changes in the Way People Socialise on the Internet

Access to mobile phone and fast internet has increased people's social activities on the internet. It has provided an important additional way for people to contact each other, participate in social media, and use messaging and web searches. Facebook was frequently mentioned as a key way in which people connected with family and friends as well as with broader social networks.

"I think people are socializing more through Facebook and other social network." – Council staff

"I believe it's a change that we have embraced. My daughter is able to contact her friends who were her mates a long time ago. People are using Facebook for everything now." – School Principal

"There is a lot more connectedness that builds relationships. People are not bothered to do face to face but simply send a text. I think the kids connect more on the internet." – School Teacher

"People are always walking about or sitting down with a coffee and their mobile phones. People are really connecting more." – Community member

"I will say more people are now more connected online like Facebook. I will say there is now more connectivity than before." - Householder

"People are able to use social media or text message and meet up friends or make business meetings. Personally, it gives me flexibility to call the councillors and do lots of things at the same time." – Councillor

Some people had concerns about people's use of mobile phones reducing their face to face contact.

"Everyone gets to be on the phone and there is lack of conversation. People do obviously more of that now that the internet is fast." – Community member

"The kids don't talk to each other. Everyone sit together but they are all on their phone." – Business operator

"I have noticed people are not talking to each other anymore. I believe with phones it brings you closer to the one in the other side of the world than the one next to you." - Landholder

Other respondents saw the use of mobile phones as a useful additional way in which people can connect with each other and with people outside the region without affecting face to face communication. It was an additional enriching opportunity, rather than replacing existing local networks.

Digital Connection Expanding People's Social Networks

Mobile phone coverage was allowing people to extend their social networks by allowing them to interact with people they wouldn't normally meet. People saw this as mostly happening on Facebook and other social media and on-line platforms.

"People are connecting especially on Facebook. Definitely led to people meeting people they would not normally meet." – Council staff

"There is a lot of social networking what wasn't really there before, and people are extending their social networks." - Landholder

"People are connecting more online and meeting people they wouldn't normally meet." – Tourism operator

"There are many people who are now using the Facebook app on their phones. In the past, many people prefer to walk to friends' houses to have a chat. But it appears that people now are much connected online." – Police Officer

Some people also saw social networks expanding thorough visitors being attracted to the communities and staying longer because of the presence of digital connectivity.

"People are connecting a lot more than before including connecting with people they would not normally meet. Also, tourists are able to stay longer than usual, and this helps local people to interact with different people." – Health Clinic

Some respondents noticed that people were re-connecting with old friends through the internet.

"There are many old friends that they would not see again due to distance that they are meeting because it is possible on social media. It is amazing, I will say." – Business operator

"People are rekindling their connections. People are connecting with people with they went to school together in their past life." - Councillor

Others cautioned against the "quality" of the interaction on the internet.

"It can be a fake connection because we are not actually talking to each other. More people are using more internet now and they can upload videos to people to see and interact." – Householder

Impact on Community Organisations

Internet and mobile phone access greatly improved the function and operation of community organisations, and the organisation and conduct of community events. Many people noted that fast internet and mobile phone coverage allowed much faster and easier communication to community organisation members and to the broader community.

"People are really using social media to communicate events a lot because it is free, and it is very effective – before we had to post information." - Council staff

"It has really made it a lot easier to contact a lot of people about a few activities – communication is easier and reliable. Before we had to use flyers." – Business operator

"Event notices are now put on social media, and it's making a big difference and lot of people are being exposed to such notices and information unlike before when fliers were sent out." – Landholder

"It helps with communication and organising with texts and email. We had to rely on meetings doing all that before and now it is more efficient." - Householder

Other people noticed greatly improved ability for community organisations to search for information, order products, make use of downloaded apps, promote functions, and to coordinate actions and initiatives.

"It has really made it easier to keep records and upload information to websites and get data on time. Social media has made it easier to promote events and if anyone has an enquiry about anything it is fast and easy to answer. People can get the right info and timely enough to take useful action. The mobile phone has made everything that much easier." – Community volunteer

"You can actually go online now and get information that you need about an organization through their Facebook page etc." – Business operator

Some people found that more "instant" messaging seemed to "speed up" communication reducing lead times on invitations and actions.

"Previously they used to use the postal system but now it's not like that anymore. I think the negative thing about it is that people don't plan far ahead any more. They just send you a message like "hey we are meeting tomorrow." But overall it's made event organization easier." - Councilor

Changes in Access to Services

Internet and mobile phone coverage greatly improved people's access to services particularly education, banking (Figure 20.). It also greatly improved community preparation for, and management of, emergencies. Health services also were more effective particularly through telehealth.

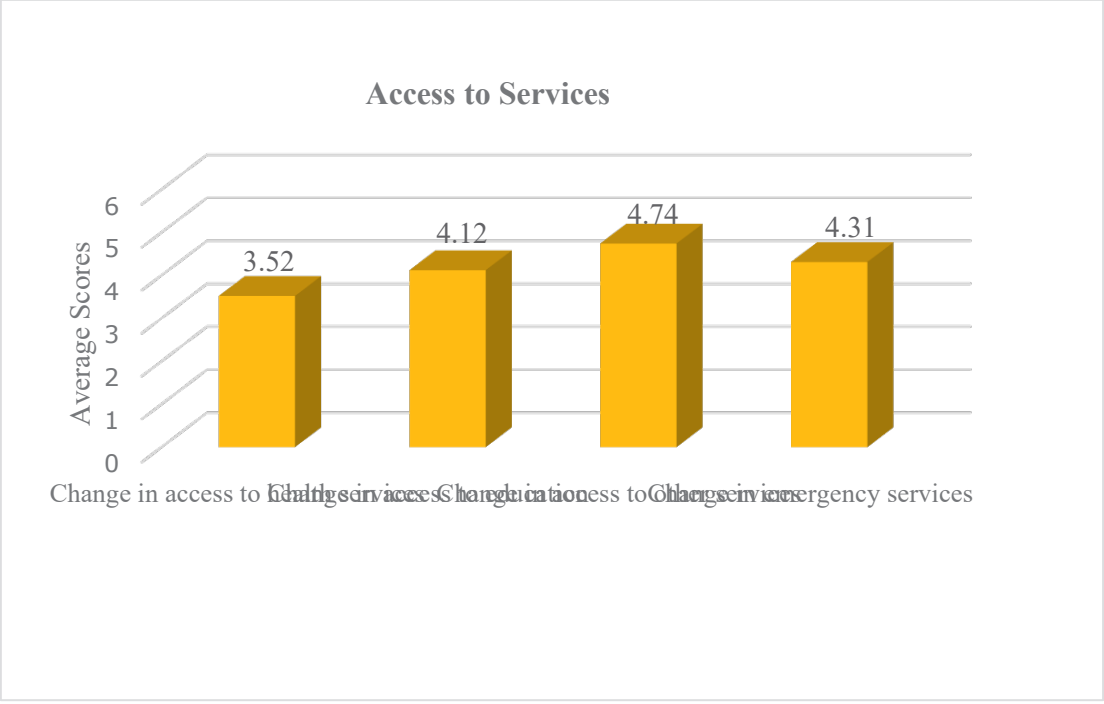


Figure 20. Changes in access to services due to digital connection

Change in Access to Health Services

Amongst the participants there was an awareness that the Clinics were able to conduct teleconferencing connection with health specialists and providers. Specialists have been able to be connected with patients. Mental health support has been more easily accessible.

Patients in remote areas were able to contact the local clinics with ease, which has avoided the need for them to travel in order to seek medical advice. People are making use of the internet to access online information about conditions and are reading more to learn about conditions.

"*We have accessed telehealth to see a specialist who is in Brisbane. I have only met him by telehealth, and it saves money for us and probably the government as well. It's good - a bit impersonal but fine."* - Householder

"We can book appointments easily through the internet. People with chronic diseases can get information and do research online. I can get access to diagnostic services and my results." – Health Clinic

One resident mentioned that relevant YouTube videos had proven very helpful and that these had been used to help educate children in relation to health awareness. The mobile phone has also assisted by allowing people access to telephone mental health and advisory support services.

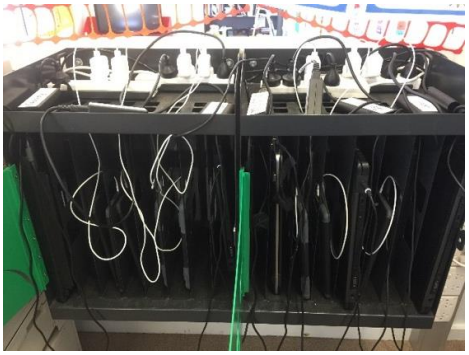
Change in Access to Education Services

There has been a very positive impact on access to education support services. Students can learn without a teacher onsite, can take online courses. Adults are finding training and undertaking courses through the internet. There was widespread interest and action in online training.

"*I could do in theory do training online but it was very expensive before broadband came along. Video takes a lot of data and previously, data limits were small and very expensive. It had to be rationed."* - Council staff.

"I have three kids who can all access lessons at the same time without it dropping out and it's fine, even though it has taken the books away from them. And I have staff doing training modules online." - Householder

"My partner has finished short courses online – it's very convenient for us." - Landholder



iPads used by students at Bedourie State School

Change in Access to Other Services

Banking Services

One of the major benefits of fast internet and mobile phone connection that was widely reported by residents was greatly improved access to convenient and fast banking options. This was seen to be very greatly improved. This included all banking operations such as online payment of bills, transfer of monies, managing loans, and paying tax.

"We have always done online banking, etax and with the old system we always had issues but now it's fast and convenient." – Council staff

"Internet banking has definitely improved, hasn't helped in depositing money but paying bills is really much easier." – Tourism operator

"It is easy to send money to the kids at school, regardless of where I find myself when they need it." - Householder

"Banking is easier now, I got the app on my phone and I get reminders and it's been really helpful." – Council staff.

Another key service that was frequently mentioned was access to online shopping. Many people mentioned the ability to shop on line and they could access a wide, diverse array of products online that could arrive by post within a few days. This was seen to improve quality of life and it was considered complementary to existing businesses because people access goods and services on line that were not available locally.

"*You might be nine hours from the Coast, but you can shop like you live there."* – Householder

"We shop online and spend a lot of money as it is incredibly easier." – Business operator

"Most people shop online now, and I think it's beneficial to businesses that cannot be set up in remote locations." – Council staff

Government Services

People's access to government services, particularly local government has been markedly improved by digital connectivity. Local governments have changed their communication practices, posting information on the internet, using SMS messaging and being contactable via text and email. This has improved community access to Councils.

"Most people now instead of ringing these organizations, they simply just send an email and it's much easier." – Landholder

"Government agencies are easy to reach now unlike before when their line was always dropping." – Landholder

"Staff are more easily contactable. Before we always had to leave messages." - Householder

Internet access also allowed people to search government agency websites and access information and services over the internet. People mentioned that local government websites provided information that was useful, relevant and easily accessible.

"You can get on their website and get access to information as the good internet helps us to get faster response from them now." - Landholder

Within Councils, digital access has greatly improved communication, allowing connectivity for data exchange, SMS messaging and submitting of documents online. Many council staff mentioned that internet-based processes were more convenient, easier and faster.

"The absolute biggest benefit I have seen is the connectivity between council staff. We can now make the use of government texting. Moreover, at first, we were exempted from submitted documents online but now we do not have to do that we are able to submit documents online." – Council staff

Several people mentioned that being able to send emails to Councils was an effective and easy communication option. Councils was well regarded for responses to email enquiries. Council staff mentioned that the number of phone calls from residents had declined as use of email increased. One local government employee mentioned that email could be used to target segments of the community with information relevant to their situation or need.

Changes in Emergency Preparedness and Management

Disaster management training has been accessed online and systems established to communicate with local people through their telephones and email. Having mobile phones has made people far more easily reachable with alerts. This is relevant to fire, flood and storm warnings, road closures or hazards and power outages.

"We have been able to undergo disaster management training. We are able to email each other when there is an emergency. People are able to use their phone to know whether there is a disaster happening somewhere." – Police Officer

"The council send emails about floods and fires to alert the people. And having a mobile is also helpful and has made a big difference." - Householder

"Communication was always by word of mouth of people who have used the road to know whether it is open or not. Now it is easy to be on your phone to have a read of the weather and road condition. Also, its improved communication hugely within the community during emergency times." – SES Volunteer

"We can now use the mobile phones to call these organizations to alert them of flood, fire etc. Disaster organisations are able to send SMS to the people to alert them so it's a safety tool." - Councilor

Several people stressed the importance of improved communication during the response to emergencies like road crashes.

"My husband attended a road crash scene and yet he was still able to call me to get things done for them while they were on the scene. This wouldn't have been possible if we were still on the old system. I will say, there is much more improved communication in handling hazards such as flooding, power outages etc." – Landholder

"There was road accident, a fatality, a few months ago. People on the scene were able to call me to get me to do things to help them, even while they were still out there. That was certainly not possible before. There is much improved communication." – Police Officer

Some people mentioned that the 000 service sometimes does not work and is not answered. However, there is a sense of assurance that they now have the mobile phone network to call for help.

"When the call system goes off, we receive messages from people, and they need to work on the system. Triple 0 fails a lot. Now we have a group text system so once a message is sent everyone gets it." - Business operator

Participants particularly appreciated being able to better access weather warnings, and to have emergency broadcast capacity to mobile phones.

Economic Changes

Figure 21 shows the average likert scale scores that people gave for changes in the economy resulting from internet and mobile phone access. The most significant changes were in improved tourism (4.02 out of 6), internet use by businesses (3.76), and changes in agriculture (3.25).

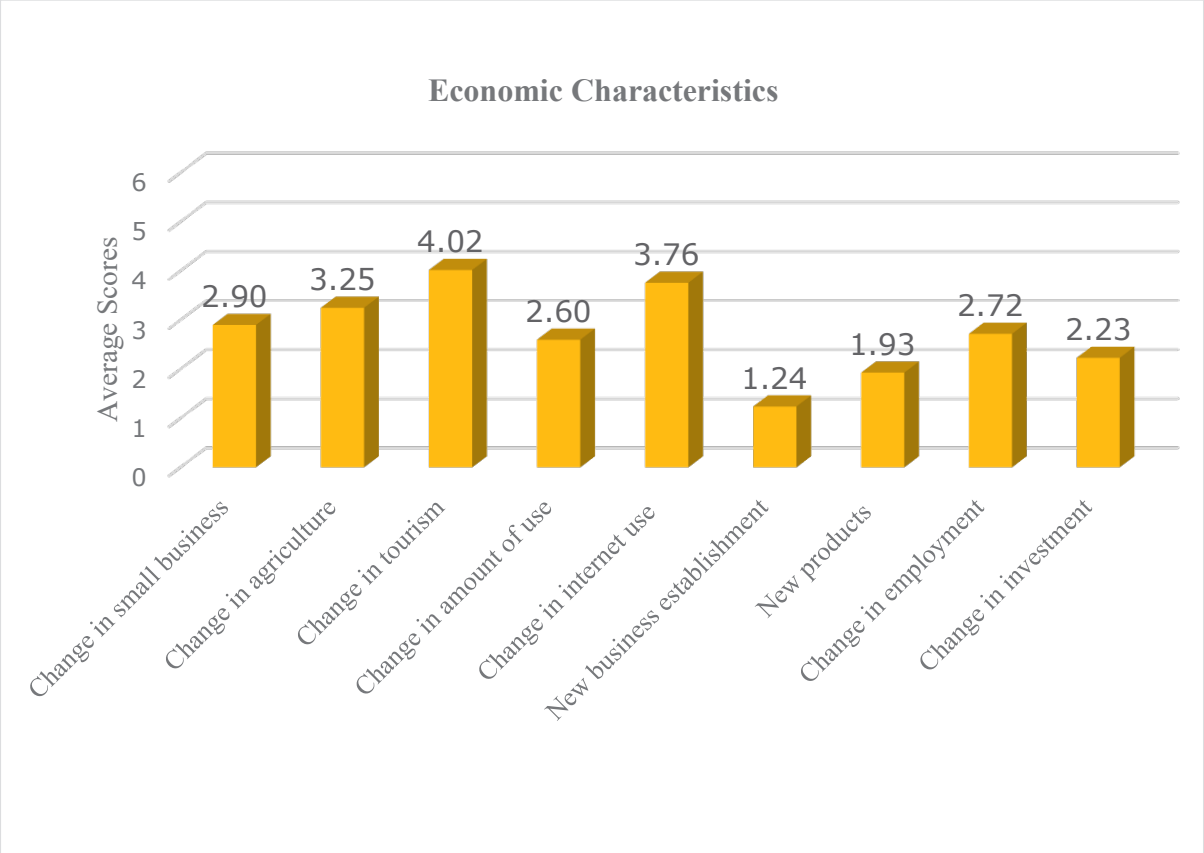


Figure 21. Changes in economic characteristics as a result of digital connection

There was not always certainty or clarity about the benefit of the internet to the economy. There was awareness that visitors were staying longer in the area and that this increased economic turnover. There was no awareness of it leading to more investment in the community. Many businesses were now making use of internet access for transactions.

In general, people felt that connectivity had not increased employment, but it was thought that internet access could make remote communities more attractive to tourists and new residents and more able to retain incoming employees.

Impact of Improved Digital Access on Businesses

People noted that local businesses were largely taking advantage of improved internet access by promoting their business on the internet and social media. Others have found EFTPOS capability (particularly wireless EFTPOS) very useful.

"I now have internet booking system. Reduced the amount of operational time. Ordering is much easier. Response time is a lot faster. Booking is a lot faster now and you can promote your business online. I have slightly increased turnover." – Tourism operator

"People are able to access your business through the internet and have more information about it." – Business operator

"The reliability of EFTPOS makes it possible for easy access to cash and easy ways to make payments and this has increased spending." – Business operator

"There is a lot of advertising through the internet now. We suspect that those on the properties can now use the good internet to check out stock and even advertise their products. We are just not too sure if that's what is happening." – Business operator

"Now we are able to do more advertisement to capture lot of customers." – Business operator

Other benefits that people noted was improved ordering, inventory management and better access to web-based book-keeping.

"It has kept the small businesses going. It's of great benefit to them. Helped them with keeping records. My customers can access me now very easily." – Business Operator

"Before the internet, we had to fill in spreadsheet for orders and stuff like that but now everything can be done online and easily." – Business operator

"There is a lot of advertising now and the internet has really helped staff. I think the internet may play a role in replacing some particular labour work in the future." – Police Officer

Many people also mentioned a major increase in online shopping. This wasn't seen to compete directly with local businesses because people shopped for items that weren't available locally.

"You can go online and get much better prices for things." – Council staff

Respondents also raised the economic and business benefits of the internet attracting more people to visit the region and stay longer. This enhanced local economic activity.

"Having internet access brings people to the area and so the turnover increases as a result." - Landholder

"People are staying longer in a place where there is free wifi and the more they stay the more they spend. People are more contactable now." – Councilor

"People who come to the pub stay longer and the longer they stay the more they spend. Even my family members who come to visit now want to stay a bit longer which that wasn't the case before." – Business operator

"You have customers staying longer at the pub and interacting more with people. This is because of the presence of the good internet. This was not like that before the services were improved." – Business operator

"Free wifi has brought a lot of people in here to use it. People never used to stay long because there was no mobile or internet service." – Business operator

However, several people felt that business attitude and culture limited business use of digital connectivity. Many people saw that many businesses were unfamiliar with digital opportunities and were unlikely to use even basic ways to enhance their business through connectivity.

"I think it doesn't matter how internet improve here. They will still operate exactly the same way they have been operating." – Council staff

"We don't have online booking. I don't think it has changed anything" – Business operator

Changes in Agriculture

Pastoral stations had access to a new Skymuster satellite service and only stations close to towns with mobile phone service were able to get mobile phone reception. Many respondents noted that it was too early to see a noticeable change in agricultural businesses or productivity due to internet connection. However, people noted some improvement in ease of communication particularly through email, and internet-based communication. Other people noted potential major improvements in the ability to maintain records, pay accounts, order supplies and in corporately owned stations keeping in touch and coordinating activities.

"The impact has been to improve safety, and they can use online communication and conferencing." – Police Officer

"Nothing has changed yet. However, I can see using the internet to manage many more activities such as record keeping, accounting, marketing and related." - Householder

"The work on the property is much easier now. They are able to use the internet to contact people." – Council staff.

"They have less paperwork. Booking and ordering done online." - Landholder

Many graziers did not have mobile phone connection on stations but had access when in the town coverage area. Many continued to use UHF radio and satellite phones for communication when out of range. There was no mention of the use of digital connectivity to implement agricultural technology such as virtual fencing, internet-based video cameras on water points etc.

Changes in Tourism

Access to the internet was widely regarded as a positive, encouraging visitors to stay a little longer, rather than moving on to areas where internet access was available to facilitate communication with family, information searching and access to banking and booking. There was a perception that people moved on, frustrated previously when there was neither mobile nor internet service available. The only negative observation expressed was that some Telcos did not support access and this was sometimes an unhappy realisation for tourists.

It was also seen as an aide to promotion, directly as a means for promoting and advertising services and indirectly, as visitors shared their own photos, experiences and observations with friends and family networks on social media.

"*Now tourists are able to still manage their business back in the city, while they are here, and it makes them more willing to stay longer than they might have intended."* – Business Operator

"Having the internet has definitely helped tourism. Really good for posting to social media, for advertising and really good for us volunteers." – Community volunteer

"*Before the mobile service, the caravan park may have 6-7 caravans staying and they would be here one day and head north where they have mobile service. But this year, with the mobile service we had 20-30 caravans staying within the community."* – Council staff

Changes in the Business use of the Internet

Most businesses were using the internet in a limited way before improved connection. With improved connectivity, businesses continued to use the internet but far more often for a much wider range of functions. Hence, connectivity did not change the number of businesses using the internet, but it markedly changed how much businesses used it.

"The number of businesses using internet hasn't changed but how much they use it has changed now." – Council staff

"The number of businesses using internet has not changed because before everyone was using it even with the limited access we had, and they are now using internet a lot more." – Business operator

"The number of businesses hasn't changed but they are using the internet more and there is an advertising to push data to the people." – Council staff

"Businesses are using the internet here now for advertising. I know that the retailers se social media a lot to sell their products and so they are really taking advantage of it." - Householder

"Now that it is working perfectly many businesses are using it and I believe are using it more. They are able to develop systems that people can access to market their products better. More of online businesses." – Business operator

Changes in New Businesses being Established

Almost all respondents noted that they were not aware of any new businesses being established in either shire. However, many recognized the potential for new internet-based businesses and for internet and mobile phone connection to make it easier for new physical businesses to be established.

"I don't know of any internet-based business set up. It probably would create the idea of people creating internet product, but I haven't seen any." – Council staff

Several interviewees mentioned new businesses beginning online, particularly a local young person who was selling fashion products online.

"Actually, there is a young lady that has come up with product as a result of the internet. The lady now selling more of clothing and jewelry online, which is made possible because of the internet." – Business operator

"I heard of couple of families now involve in some kind of online businesses due to the nature of the internet." - Householder

People were informally selling goods and services online.

"It helps with advertising. I think social media is a great tool so if you want to sell something you can post it out there and its easier." – Health worker

"We receive a lot of email about houses and stuff available for purchase. And we take pictures of things we want to sell, and transactions are made easily." - Landholder

Changes to Businesses Developing New Products or Services

Almost all respondents felt that businesses were not offering new products and services due to digital connectivity. However, some people noticed tourism businesses in particular promoting services much more online. EFTPOS (particularly via wifi) and an ATM were mentioned as new services being offered.

"The pub has an ATM now." – Council staff

"Tourism businesses are offering more online now because it is reliable." – Business operator

Changes to Employment

Most people felt that digital connectivity, of itself, had little impact on employment in the communities. However, many noted that internet and mobile phone access allowed for much more effective advertising and appointment of staff.

"It's not really creating more jobs because we are too small here. I think now different types of people are applying for positions here though." – Council staff

"Lots of jobs are being advertised through social media." – Council staff

"It makes it quicker for job applications and stuff like that. Now, all new employees are able to participate in all the online training prior to the start of work." – Business operator

Some people mentioned that they may be more demand for people with IT skills.

"I think it has improved employment processes. I personally am looking for someone who will help me run my webpage." – Business operator

Others mentioned that digital connection made the communities more desirable for employees.

"There are not that many jobs in town. But the few people here will have good reason to stay because they still have their life together. They can contact their family." - Householder

Changes to Investment

Almost all respondents noted that digital connectivity had had no impact on investment in the two shires. However, some noted that, amongst other factors, digital connectivity makes the region more desirable for businesses to operate and it also may attract infrastructure projects.

"At the end of the day it (internet and mobile phone) probably improves socialisation and all that, but there are lot stronger factors that may influence investment." – Business operator

"It has made business more reliable. But I can't say that it has made any change to investment." – Community volunteer

"Things are pretty much the same. I don't see any form of investment going on at this point." – Business operator

"I think it is too early to say" - Householder

Attraction and Retention of Population

Digital connectivity was an important factor among many others that influenced people's decision to move and settle in the region. It was very important for employees to be retained in remote communities because they could stay in touch with family and friends and access services and entertainment.

"People don't want to live where there is no internet - so it helps." - Landholder

"Many people take into consideration wide range of issues when considering moving to a place for work. No doubt the presence of the internet will be helpful." – Health worker

"In terms of attracting medical personnel, it does because it allows them to stay in touch with family when they come here to work." – Health worker

"It is more of an incentive." – Landholder

"I think it can attract people, but I feel it depends and goes beyond just the internet. People will have other priority factors such as schools and other facilities than just the internet, and that will be hard for such people to be attracted on the grounds of the internet." – Council staff

"Employees want to know if they will have internet before they take the job. Especially young ones." - Landholder

Some people noted that either the presence of the internet had little effect on attracting new residents or that other issues far outweighed digital connection in people's decision-making.

"Employees don't come because of internet. There has been no change in turnover as a result of the internet." – Business operator

"No, it hasn't affected attraction of people. Our major challenge is housing." – School Principal

Assessment of Change Due to Digital Connection

2019

Assessment of Change Due to Digital Connection 2019

Internet Connection and Use

Type of Connection

In 2019, internet connection in the study communities were:

- Fibre to the Node for private residences and businesses,
- Fibre to the Premises for key government services: Clinics, Schools, Council and Police Stations,
- Satellite through Sky Muster (two satellites) for people outside towns,
- Fixed wireless connection using data transmitted over radio signals to connect a premise to the broadband network through an antenna,
- Hot-spot tethering from a mobile (4G data).

Frequently individuals were not aware of the type of connection they had. There was occasional ambiguity as reference was made to "wifi", which was likely reflecting a poor understanding of how data reaches their phone. Unless it was satellite, or they knew they used their mobile data through hotspot tethering, it was hard to clarify if the connection was fixed Wi-Fi or fibre to the node or something else (e.g. satellite was found connected to business premises in town). Younger people are overcoming frustratingly slow speeds to their home modems using mobile data. Mobile phones were used as tethered hotspots for laptops and for a 3D printer as the mobile data speeds are accessible and considerably faster.

Residents often did not understand the technical aspects of enhancing or facilitating fast internet access and when it is substandard, many are inclined to accept what they have rather than complain to the telecommunications provider. Experience with internet connection is relatively new and relative to their previous experience: they consider the connection they have is a vast improvement on no connection at all. Residents often regarded slow or inadequate connection as an unchangeable factor of where they live. This is not necessarily correct.

In one community, it was noted by several residents that the mobile phone 'service bars' had recently decreased from being at four early on, to now being at two in the same locations. Other reports were given of varying strengths of mobile service over time and some queried whether this may be a result of illegal boosters, maintenance issues in the mobile tower/infrastructure or just more people using the service.

Use of the Internet

Reliable and easy access to the internet has opened a world of services, entertainment and communication options that are widely enjoyed and appreciated (Table 7).

Table 7. The Use of the Internet by Respondents

Use of the Internet	% Participants
Information search	96
Educational services (distance or online courses)	45
Government services (e.g. tax, car rego, licences, benefits etc)	63
Employment services (promoting vacancies, processing applicants)	31
Social networking (Facebook, Snapchat, Instagram)	65
Messaging (Messenger, Texts, WhatsApp)	53
Health services (online consultation, chronic illness training (e.g. diabetes), pharmacy (ordering), diagnostics (x-rays), info searches for health, fitness and nutrition info	26
Shopping	75
News	50
Maps	50
Email	98
VOIP (e.g. Skype, WiFi Calling, Facetime, Messenger, WhatsApp)	24
Pay bills	80
Banking	67
Auctions	14
Music	50
Games	35
Videos & television	56
Gambling	10

Many residents complained of very slow data speeds in their homes and businesses. Speculation regarding causes include the possibility that the local telecom infrastructure is not optimally arranged to deliver the higher speeds into premises, that domestic technical set-ups (e.g. older modems) are unsuited to the upgraded internet speed or that data limits are exceeded. This requires technical investigation to clarify causes of choking.

Younger residents particularly tended to rely on their mobiles more than any fixed line service for a much wider range of use because mobile data speed was very much faster and more reliable. Residents with access to larger amounts of data and speed, stream music, television and films through online service providers. Younger people were also more inclined to have social media use beyond Facebook, with mentions of YouTube, Snapchat and Instagram. Those who were more comfortable with technology and online life were also finding and using apps for a range of lifestyle and business purposes including fitness, games, travel/maps, shopping, first aid, communications and auctions.

One of the most valued new services available through internet and mobile access was online banking. Previously this service was impeded by the 2-step login process, reliant on codes

received to a mobile phone. Without mobile phone service online banking was generally not available. Financial transfers were previously so slow that there was often uncertainty as to whether a transaction had been processed or not before timing out.

Shopping online has made a range of services and products available which previously were not known to be available or were not easily accessible. Some mentioned that they find 'bargains' for machinery, tyres and equipment and other consumable items. Others shop for clothing, groceries and lifestyle items not available locally. Businesses order with online portals and apps.

Some landholders mentioned Google Earth as a useful tool, but the data consumption made it inaccessible. Internet was used to check weather forecasts and location of flood waters. Most landholders mentioned that they now take photographs of problems to share with others for direction or to seek advice. For example, photos were taken of items or situations such as broken equipment, machinery parts or human injuries to quickly inform others. These photos were transferred via email or text, depending on data service available and the capacity of the individual (e.g. knowing how to attach pics). It was also found useful for tracking the delivery of packages, especially parts.

Some schools mark the roll using an online portal and use it to access learning programs and for curriculum planning. Others were using mobile hotspot modems to access digital technology in class, one school offering an entrepreneurial program selling products created through a 3D printer. Some schools had access to 3D goggles to enhance learning activities. These services were reliant on high speed data access available through a separately purchased independent modem accessing mobile data to overcome the inadequacy of available network data.

Businesses mentioned the convenience of electronic invoicing, taking payments and ordering online using apps or websites and the convenience of accounting now that bookwork could be easily shared with professional advisers. Images of products could be uploaded for sale and promoted through social media. Deliveries could be tracked to customers. Accessing EFTPOS meant that businesses were easily able to take assured payment and were relieved of the burden of managing large amounts of cash, especially during special events (if internet was accessible – outages were a major inconvenience and risk). Others mentioned the convenience of managing travel with online bookings and prepayments.

Some respondents use internet minimally and without comfort or familiarity, with assistance from a family member. One of these had taught himself to touch type yet was not at ease using the internet – most of his work and life focus was outside and away from connectivity. In every community the researchers found at least one business that was not online and not using a mobile phone or publicly available email address accessible by clients/customers.

"Now I can buy dance classes for my four-year-old from instructors in Longreach."- Bedourie Resident

"*My (online) business wouldn't be viable if I had to use satellite data – the cost is too much. I couldn't run the business without broadband internet and the mobile phone."* – Community business owner.

Cost

Responses to the question of price of data indicated a general absence of awareness of what data was costing and frequently no immediate recollection of how much data they were purchasing. The dollar amounts given were very variable and showed no pattern that might reflect a particular Telco arrangement. Where costs could be or were quoted as monthly bills, they were found to also include leasing costs for handsets, bundling of multiple family member phones, data to the home and data to the phone. Corporate or business costs were not known by employees. Also noted were some responses making claims of 'unlimited' data which may have been confused with *unlimited* calls and texts, although unlimited data packages are also available. Combined with the evident general lack of awareness of bundled costs nor how much data was included in their packages, the responses to the question of cost are not considered meaningful or reliable.

It was found that one significant business located in town, was still on a satellite account even though fibre to the node services were locally available. This was a surprise to researchers as it meant a constraint on entertainment and other related services that could improve the experience and services provided to customers, services which were being provided in other communities using other data access options available. There is not necessarily strong knowledge and appreciation of the range of data services available, what data use quantities might be and what might best match data needs. 'Bonus data' in satellite packages was not well regarded in this sample.

Time of Use

The time of use ranged depending on the personal circumstances of individuals. If they worked within community then use was high during business hours and at home it was unsurprisingly, used early mornings and in the evenings. Some were very comfortable with accessing the internet regularly and for a wide range of personal and professional purposes, while others used it with specific intention at certain times only (e.g. check email, pay bills).

Those with satellite internet made mention of the off-peak data that was available to them after 11pm to early morning. While this was recognised as an available data resource, it was consistently criticised as being inconvenient to access.

Quality of Connection

Current internet connection was assessed using criteria of:

- Reliability - being able to access the internet when wanted and maintaining connection without dropouts.

- Quality of connection – speed of download and upload and the quality of use such as being able to videolink without interruption.

Figure 22 shows interviewee's assessment of the reliability and quality of digital connection in 2019.

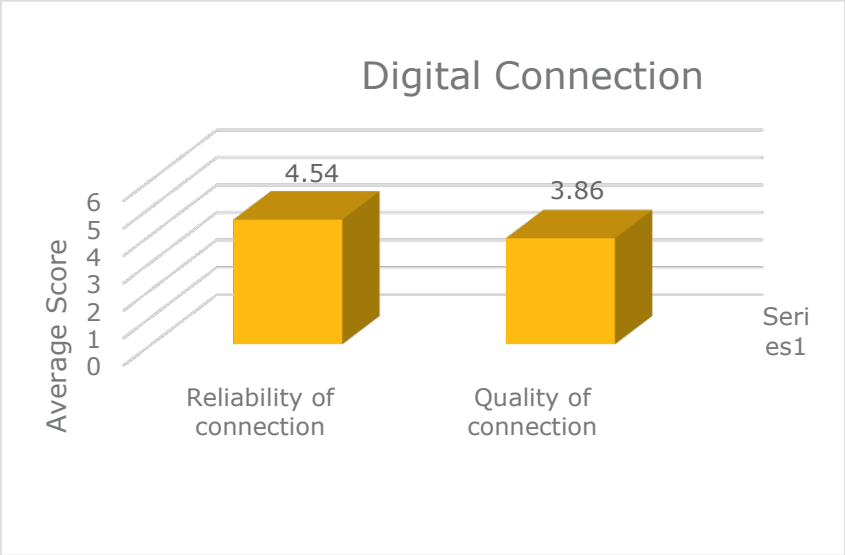


Figure 22. Average likert scale scores for digital connection

Reliability of Connection

There was mixed satisfaction with the speed and accessibility. The quality of connection was reportedly, either excellent or terrible. Some were happy and reported no problems. Other respondents reported that the internet was "down a lot". It was hard to upload. In general people were able to connect when they needed to use the service. There were reported dropouts with access through home connections, but mobile access was generally considered completely reliable where there was service available. It was notable that there is a degree of tolerance for drop-outs in these communities, that would not be found everywhere.

Jundah experienced a great deal of frustration with access to the internet with regular mention of drop-outs. The reasons for this are unknown. It may reflect issues with telco provider capacity and set-up, the modem and equipment used within the premises or with data caps being exceeded. In Jundah and Windorah, some people expressed greater problems with drop-outs than others. It was reported that there can be a long delay between turning on the internet and being able to use it and it was reported by several that this aspect has remained the same before and after the broadband connection. In Stonehenge mobile data was found to be far more accessible and reliable. Bedourie residents reported they were able to stream television through their mobile phones with no pixilation and with occasional drop outs.

"Terminals are not so bad in terms of connecting. It drops out a little bit, occasionally." Birdsville

"*No problem… drops out briefly maybe 2 or 3 times a month. Sometimes the EFTPOS won't connect but I try it again and it is good. Privately, I have internet on my mobile. It's better."* Bedourie

"When I use the internet on my computer, I use the mobile data, but my husband goes through the satellite and it drops out regularly.

"I use the mobile router to connect my laptop." Stonehenge

"It's pretty reliable - in the last year, maybe lost it 4 times. Seems to affect the wider town at those times." Windorah

Speed of Connection

Some reported that the internet speed was brilliant while others found it consistently unsatisfactory. Some mentioned that they found work-arounds using mobiles as tethered hotspots for connected devices. Those who referred to having home data packages had reportedly good speed and excellent reliability.

The reasons for this inconsistent experience were not clear. It was also apparent that what was described by some participants as "good" connection and reliability (relative to their previous experience of no or unable-to-use internet) included regular drop-outs and irregular speeds measured at less than 5mbps for download. The people of these communities had a noticeable stoicism in tolerating slow data speeds and drop-outs that would probably not be acceptable elsewhere. Some would work with or work around these constraints or give up on accessing a service (e.g. streaming video) accepting them as a factor of their location, rather than making enquiry with the service provider or their employer Help Desk to seek improvement.

"Some days the websites just will not open – slow." Community service, Windorah

"Speed is really good. It only takes five seconds or so to load a page." Resident, Windorah

"We can't offer wifi to the guests - it is a problem." Business, Birdsville

"*I turn it on, go and do something and when I come back it has usually connected."* Resident, Jundah

"Well we lost it last Tuesday and it was out more than a week." Resident, Jundah

"*I am used to it – but it is slow."* Resident – Jundah

Not everyone contacts their telco about these technical problems, accepting the service faults and interruptions as part of life, but in fact, for those who mentioned contacting Telstra, they did apparently often notice a resultant improvement. In Birdsville and Stonehenge it was reported by respondents that complaint to Telstra regarding connection and speed, resulted in noticeable improvements.

When it is working it is fast but sometimes it is terrible. It drops out but not every day. It is very inconvenient when it does. I phone Telstra often and they try to help us "change the channel". Recently it drops out completely once or twice a fortnight." Business, Windorah

"We finally got the Telstra modem box for access at home and it took a while because Telstra said that being here, it would not allow us to have it (ADSL connection). But my mum talked to them for hours over the phone and finally they realised we had the blue cable here – so then they sent us the right modem. We have now got fast internet at home. – Resident, Birdsville

"In May 2018 we couldn't run a YouTube clip or get an email downloaded. Got onto Telstra and it was checked then suddenly the speed improved. We could run videos." Principal - Community School.

The speed of mobile phone connection is shown in Table 8.

Table 8. The speed of mobile data in in the main street of each community.

Location	Ping (ms)	Download (mbps)	Upload (mbps)
Windorah	48	116.2	42.2
Jundah	68	68	14.1
Stonehenge	68	68.9	32.4
Betoota	n/a	n/a	n/a
Bedourie	72	87	30
Birdsville	59	71.7	29.3

Several residents have found that the data access via mobile phone is faster and more reliable. Where the connections to homes have reliability and speed constraints, some work around this by using mobile data modems or hotspots. In all communities some residents make use of modem routers that access mobile data with more satisfactory reliability and speed.

"It says it is connected but it is so slow that it is more practical to switch to the mobile phone which is faster." Resident - Birdsville

"It's fast enough for what I do, but the mobile phone is much faster." – Resident – Stonehenge

"We hotspot our phones to run our laptops. It is better than using the ADSL." Resident - Birdsville

"My partner does forex trading and so timing is critical, and he has no problems." Resident – Jundah (mobile data)

"We access internet from the hotspot on our phone." Resident - Stonehenge

Residents who could access film and television were delighted by this access. It was highly valued. Where this access was more variable and less assured, frustration levels were higher.

"Good - unbelievable streaming - we can run 3 different televisions from online. Facetime is great." Resident - Windorah

"My partner thinks there is a problem with the speed and the websites can be a bit slow to load. But we watch (streamed) TV all the time." Resident - Bedourie

"We link it to television, and it drops the connection regularly. This drop out occurs weekly. Have to turn it off and start it all up again." Resident - Bedourie.

Telstra Air Services were not available in any community, though public phone booths were present. Telstra Air allows visitors to access their own data through public hotspots and this could be a valued service for tourists and visitors to these communities.

Government Service Connections

Government services in these communities had fibre connected directly to the premises, however they experienced exceptionally slow speeds. While the service has mostly been reported to have improved (in several locations this was not reportedly the case) this is relative to having no service. There remain significant difficulties in accessing the benefits of available fast and large data that should be available with a fibre to the premises connection.

The download speeds in government service facilities in various communities were as follows:

- Clinic - 3.7mbps
- Clinic – 4.12mbps
- Clinic - 3.8 mbps
- Clinic – 3.9 mbps
- School – 1.9mbps
- School – 1.7mbps (wifi) and 0.9mbps when the cable was connected directly into a computer
- Council Office – 1.9mbps
- Council Office – 18 mpbs (special Council connection/supplier)

Some ways that this slow speed impacts included:

- Hesitation to accept hosting an online remote health conference,
- Freezing and sound difficulties in teleconferencing between patients and specialists,
- Long time to connect to the internet, slow to load pages, slow and inconvenient to complete online forms,
- One child only at a time able to use learning support apps,
- Finding work arounds for when the sound or visual quality is inadequate – chat boxes; sharing headsets; limiting who is logged on at once,
- Being unable to use the laptop for staff online meetings and having to use the mobile to join due to that device having better (personal) access to data to sustain the online connection.

Two Clinics have X-ray equipment kept and maintained onsite but not utilised. In one example, a young patient was flown to Mt Isa for X-rays, then had the problem of how to get home 500km, once given the all clear. The reasons for not using the local diagnostic equipment were cited in previous assessments as being lack of trained and accredited local operators. In 2019, the reasons were unclear to local staff although it may be again due to lack of licensed operators. The role of possible digital connectivity constraints was unclear.

The researchers made enquiry about the connection to the government premises. In the case of the Clinics, they were advised that Queensland Health constrain ‘class of service’ across six queues which may impact the speed an end user is experiencing. ‘Class of service’ refers to the priority assigned to data traffic. This means that some health applications (e.g. teleconferencing) might be given priority at the expense of other services. Email might be last. Browsing the internet, could be a priority four but if a teleconference begins, it is

automatically given a higher priority and could slow the internet browsing experience for the rest of the office. This protocol is used to "lock down" the required bandwidth at a site to constrain data usage to a level the Department deems acceptable.

The researchers were advised that this is an internal network/link issue, rather than a connection issue. This circumstance may be an issue for the schools, police stations experiencing substandard access, as well as for the clinics. The technical connection may function perfectly, but internally, the speed is inadequate. The experienced slow speeds and reduced data access to government facilities is reported as an in-house economic decision and not a technical constraint.

"We had trouble on Friday. We had all 7 kids logging on at once for a class and it could not cope and was dropping out." – School Principal – Community School

"We do French online which the kids could not access previously at all - it would drop out all the time. Now at least you can get them logged in and when their mic goes dodgy, we can use the chat box or a neighbouring kid's mic." Community School.

"The speed suffers significantly when you have more than one student logging onto programs, such as reading support programs. We have a Rolls Royce infrastructure here and we aren't able to make use of it." (A School)

"We know it is slow because we have a data cap at 2MB. We have looked into getting 4MB and it would cost us $1250/year extra. The P&C are looking at raising this money." (A Primary School)

"Usually we can process driver licences, but this has not been possible lately. We have had problems where we cannot connect with the TMR connection. We've had people drive in to town a hundred kilometres to do a test and then the internet is not functioning, and we cannot run it and they have to just go home again."- Community police station.

"I turn it on, I go and do checks and sometimes it has loaded." (A Clinic)

"Most of the time it functions but it has not improved at all since we got the new line." (A Clinic)

Satellite Connections

Satellite connections are the option available for remote properties who do not have a local mobile phone tower service. The Sky Muster satellite service delivers the NBN broadband access network in remote locations through two satellites. It requires a satellite dish installed and an NBN modem where the satellite cable connects to the premises.

Property managers in remote locations had very limited access to the internet prior to Sky Muster. They developed reported strategies for access such as loading accounting information (e.g. book-keeping to their accountants; assignments) in the middle of the night (3am) when data upload was faster or in another case, taking all computers to a residence in a town with internet access and spending a day upgrading software on every device. Education was difficult with one property owner saying that previously her child could not use the video when working with online distance education classes.

Sky Muster satellite users reported that their access is now improved and that it only takes 2-5 seconds to load a page when previously it would not load at all. Videos are still more difficult – video often cannot be successfully run but audio is now available allowing the Wifi Calling app to be used. There is capacity to join online meetings without visuals turned on. Data is still quite limited and considered expensive but essential. Data on remote properties has to be shared between family members and staff putting it under greater pressure. There is off-peak data available after 11pm that was not particularly appreciated.

Only one participant reported waiting until the early hours in order to make use of off-peak improved speed and data allowance to upload accounting information for their accountant. It was regularly reported that on properties 'everyone knows the day the data starts again' because frequently the data allowance limit has been reached prior.

Other property personnel mentioned that with the SkyMuster internet access they have been able to run an investment rental property directly using online communications. This was not considered feasible previously. Notwithstanding ongoing issues with the quality of satellite connection and data availability, there is excitement and appreciation from staff and managers for the opportunities and benefits that internet access brings to the social and business aspects of remote property life.

"*I was excited when I found online videos for learning how to use the drone to work stock and manage pasture. But I think it used 65G to download the videos and we only had 20G so that was a very expensive exercise."* Property Manager – (satellite)

"I use internet a lot since it has been better and now, we have a bigger data allowance and we pay extra to have the faster (sonic) internet but it is still very slow. We cannot watch any videos not even 15 seconds - it just will not load." Property Manager – (satellite)

"The connection drops out regularly." Property Manager – (satellite)

"We cannot stream music or video. We can't give patrons access to WiFi" – Business, (satellite).

"If we run out of internet, we have to get up at 2am to use 90G that sits there unused unless we get up." Property manager

"We have multiple satellite dishes on the property, and each has a data allowance. When one is used up, we shift to the next and then the next."

Digital Capacity

Changed Use

Overall, respondents found that access to the internet was better resulting in greatly expanded online experience, notwithstanding occasional issues with some slow loading and drop outs. It was reported that improved internet and mobile service facilitated access to a much wider range of uses that had not previously been available at all and that their data use was as a result, much higher. They could access data from their homes and workplaces conveniently and reliably.

People were less concerned about excessive data use. Several mentioned that they were now using social media, Facetime, WiFi Calling much more to stay connected with others, especially younger family. This meant much higher quality engagement was being enjoyed with children at boarding school, friends and family located elsewhere and other community members who were in town or working in in remote areas, at camps or on properties. Quite a number observed that their internet usage spikes in school holidays when their children come home from boarding school.

Online access was quite transformative as a communication tool for individuals and the community organisations. Businesses with staff that had skills and knowledge often were expanding their marketing and community promotions, were using EFTPOS for transactions, were using online portals and apps. Some had bought new equipment – smart phones and iPads. Overall, people felt that they could not do without internet access, having now experienced the benefits.

Other lifestyle changes included:

- Banking - 2-step security pin to mobile now possible allowing convenience, certainty,
- Shopping - it could now be assured that a transaction had been completed rather than dropping out mid-way or taking too long to load,
- Streaming television and video,
- EFTPOS – less issues with cash management,
- Education services –video/online visual meeting is accessible; more children can be logged on from home at one time,
- Social media use has expanded significantly because it is accessible and effective,
- Online portals can be accessed for ordering, record keeping, government services,
- YouTube videos for problem solving and repairs of equipment; self-teaching,
- GPS pegging; Google maps, Google Earth accessible as mapping tools,
- New apps available – fitness and weight management, meditation and reflection, mapping, market places/auctions, galleries for selling photos, first aid,
- Enhanced business applications – accounting, ordering, loading pics of products to websites, FB/Instagram marketing and promotions.

"I am using internet more than ever. My life revolves around it." Resident – Birdsville

"If we had then, the internet connection we have now, our lives would be different. I spent three years in town with the kids because we had no internet to sustain what we needed to get their education. This split our family; there was a cost. The first day we left the station to live in town, my kids and I cried all the way in - it was not an easy decision to make." Property Manager – Birdsville

"*I am doing the same things, but it is easier now, and not a headache."* Resident – Bedourie

"I had to go to the Library and was trying to send large files for my business. It just did not work! It affected my income until they got the fast internet connected eventually." Resident – Windorah

"When we first started forex trading, we did this over the telephone to execute transactions on time but now we can do it online." Resident – Jundah

"Previously I was on dial-up, so I only used it when it was a necessity and I had to get up at 3am to pay bills." Resident - Jundah

Skills

Respondents in the majority felt that they had enough self-taught skills to manage what they needed to get done online through experimentation. It became apparent in conversation that some people who were cautious or uncertain in using the internet, didn't know of improved or easier or alternative ways to achieve outcomes and were unaware of inexpensive or free tools and programs that could be advantageous to their needs. While they had achieved a level of competence through self-teaching, many "didn't know what they didn't know" of online services, online portals, apps and the ease of free and accessible information. They didn't know how to construct business services online or to make use of online services and supports. And they were not necessarily savvy to cyber-risks.

Several mentioned that they did not feel at home with social media, a minority did not trust online financial transaction. A significant portion of respondents, a majority, could not say with confidence how much data they had available/purchased.

In two communities, there were businesses with no online presence, and it was reported to the researchers that these businesses were thought to not have an email address. The proprietors did not have any social media, or they had a Facebook page that was dormant and unresponsive. Several were not aware of, or afraid to use social media, in case of making 'big mistakes'. They were not aware of the ease with which they might improve or serve their business or their customers. For some this reflects a degree of digital illiteracy and technological intimidation. There was fear of getting it wrong, of breaking things badly. For others resistance to the technology was explained as a personal characteristic, of being "old school" and this may have masked uncertainty, fear of change or shame, or just not having access to learning support. One or two announced refusal to adopt as a point of personal pride.

In other situations, Facebook pages had been established for businesses by young temporary workers or family members, and once those individuals moved on, the maintenance of a social media presence lapsed, suggesting that there was not skill, confidence or interest in maintaining the Page.

The consequence is that further opportunities to make use of services, apps and programs online are not taken up, because there is poor knowledge of their existence, or there is a lack of confidence or even, for some, fear to experiment or explore online.

For satellite users, excessive use of data (previous bill shock and current data stalling) fosters some caution.

"*I don't do social media or that Facebook. What if I put something up and it goes to the whole world and is a big problem?"* Resident - Windorah

"I haven't got time to learn how to do that – I am old school. I do things the old school way." Resident – Jundah

Skills Development

Most people expressed interest in learning new skills, especially if they can develop skills that enhance life, are relevant to their interests or activities, or make their business more effective without cost.

"*We've found YouTube is just fantastic to learn how to do something. I used it to fix a pump that I would have otherwise had to pull out, take into town, wait for them, and then pay for it. With YouTube I fixed it myself, right there."* Property Manager

When it comes to learning more about how to use the internet itself, the main issue for those who are very willing and able to self-teach, is knowing what is available and how it can be used.

Businesses were not all making the most of the opportunities available with fast internet. They increased use of accounting packages in partnership with their accountants, but this was not universal. There was increased use of online ordering, price comparison, banking and transaction services – but this was not universal. A minority of businesses were highly active on social media, engaging with local and wider audiences about upcoming events, specials, unique offers for locals, photos of the town and area and responding to questions and queries from those considering visits. Much of this was driven by younger family members and staff. In some cases, the ongoing connection with tourists meant that there was ongoing dialogue and engagement about upcoming developments, plans and proposed events as information was shared on Facebook forums.

"They have a Facebook page that one of their temporary workers created. But once that person left, it hasn't been touched again." -Jundah

"They (the business) have an email address and possibly a mobile phone but they won't make them known to the public – it's just for their private use. If you want to book, you call them on their landline." -Windorah

For other people, there was awareness of not having enough capacity to use online services. Other did not understood nor appreciated digital connection as something that could add value or ease the time spent on business management tasks.

"The photos they have on Facebook are average – there are a lot of pictures of red sand hills, too many. What about posting more of what you can do, can experience, of what's happening around the place, the services people can use?" -Windorah

"I realise there are probably a lot more online things that I would not know how to do now and I would like to learn them but those tools must be relevant to what I do." – Stonehenge

Likert scale scores for digital capacity are shown in Figure 23.

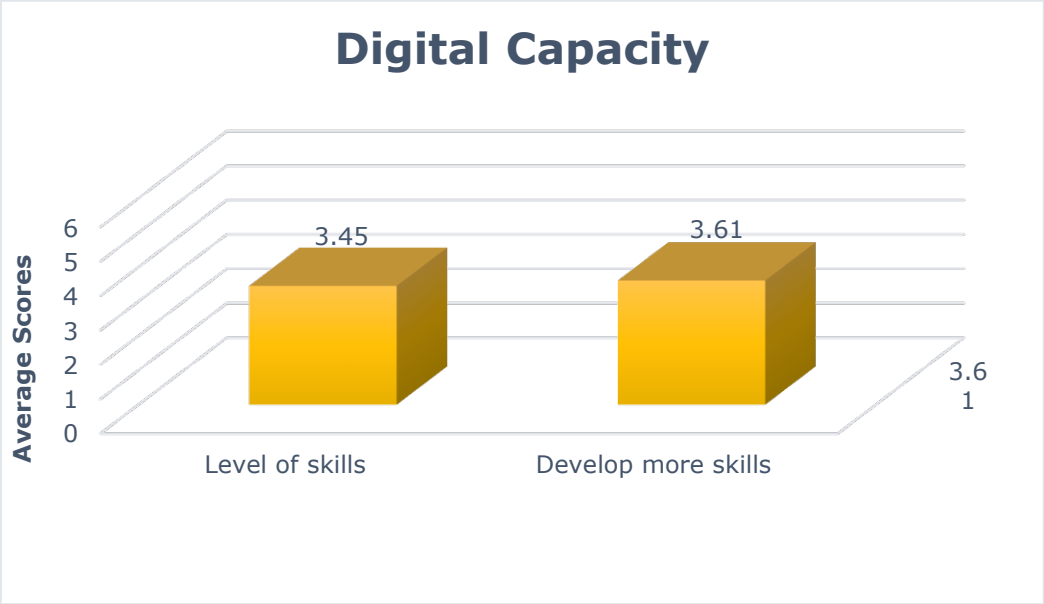


Figure 23. Average likert scale scores for digital capacity

Voice Telephony

Fixed Landline

Landlines were generally reliable with some occasional complaint with loss of service. Increasingly they were a backup communication unless the mobile service is unavailable or patchy because of being outside or on the edge of mobile service range. The infrastructure remains valued by those who have a connection for business and private calls. Where there is no mobile service, the landlines remain a primary and essential tool for communication and necessary for times when the internet service is unavailable for one reason or another.

Mobile Phone Use

Where there is service the mobile phone has become an essential instrument. It offers multiple options for communicating. Some rely on the speed and reliability mobile phone internet access and don't access the internet any other way. Smartphones were being used for far more than voice communication. It was a tool used for research, maps, apps, news, weather, shopping, entertainment, social engagement, communication, commerce and banking.

Many noted the convenience of time saved as they were always now contactable, anywhere. Property managers did not have to come in to make calls during office hours. Time is saved when they do not need to wait by the telephone for return calls on a landline and they can continue to work or travel without interruption, being accessible in a shed or paddock, in some cases. Not many property managers and staff had this access to mobiles but where they did, the impacts were stand out positive in efficiency, safety, convenience.

It also allowed for a sense of improved safety and security e.g. checking in when travelling; having access to a means to call for help if trouble occurred while working alone.

The sense of being connected to information, to entertainment, to money, to friends and loved ones is cited as a significant and important benefit of having both mobile and internet services.

"We can do absolutely everything with the phone. It is more than a phone." Property Manager – Betoota

"Before mobile phone you had to phone people by landline when they might be at home or go look for them, whereas now - you just text them." Resident - Birdsville

"My husband has poorer contact with our kids (away at school) because he refuses to get a smart phone. He talks with them on the landline, but he doesn't know what he doesn't know and he's missing out on different and better communication with them." Resident – Birdsville

"There is the ability to just text instead of speaking to people which is very convenient and preferred. No effort, how-are-you, what-about-the-weather: just what you need to say." Resident – Bedourie

The average likert scale scores for voice telephony are shown in Figure 24.

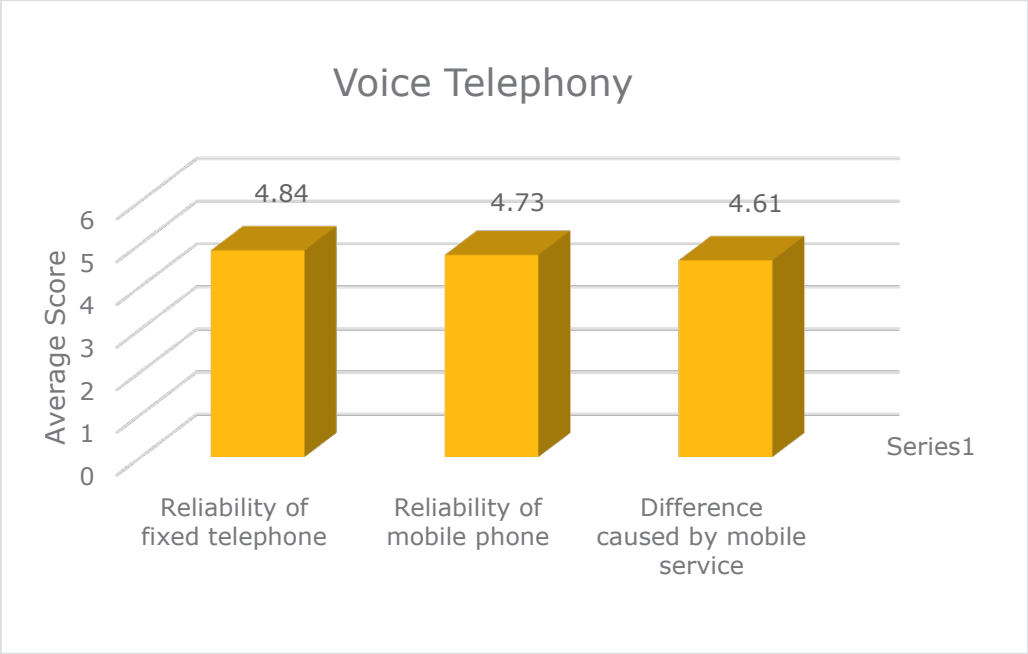


Figure 24. Average likert scale scores for voice telephony

Social Characteristics

How Local People Socialise

Respondents often observed how people had quickly adopted the habit of having the mobile with them at all times, including in social spaces. There was a mixed response as to whether social networks have changed or expanded with access to online tools and this division reflected those who engage strongly online and those who avoid it. Those who do not engage much on social media felt nothing had changed or that it had changed detrimentally with a

focus on screens in public spaces rather than in person conversation. One older respondent mentioned the sad loss of the regular 'galah' sessions over the UHF radio, that once occurred regularly three times per day. She was not a social media user.

Others said that while mobile phones were certainly evident, they had become an integrated part of the social exchange and had expanded and encouraged social connection rather than replacing it. People took and shared photos together, updated, checked in, engaged with others not physically present. It became clear that online there is a significant increase in frequency and quality of interaction that represents major change. There may no longer be 'galah' sessions shared through over the air, but it could be argued that Facebook and Messenger groups have effectively replaced those community communication sessions, are more personal and offer more privacy (closed groups) and immediacy (available at all times).

A strong majority of individuals now have a Facebook account and they monitor and engage with community pages, friends and family and use Messenger services. Facebook and for younger people, Instagram and Snapchat have become familiar platforms for communicating and connecting. If you are not online, you risk being out of the loop. One young newcomer to a community reported that once invited to join local Facebook groups, their social networking and sense of involvement occurred quickly.

The likert scale score for the extent of change in social connection are shown in Figure 25.

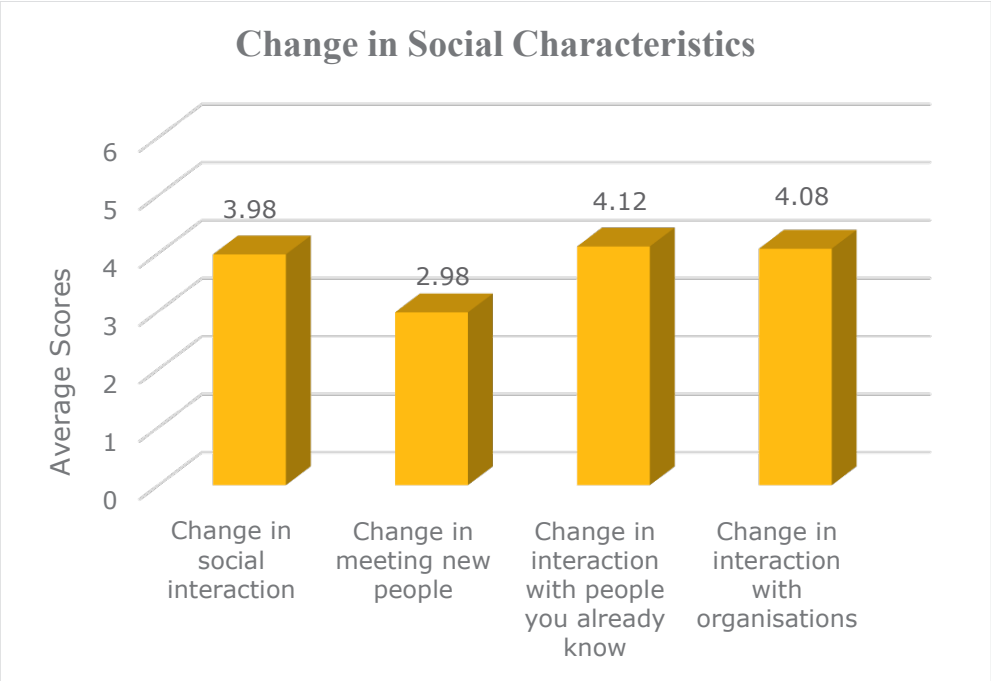


Figure 25. Average likert scale scores for social connection

Quality of Social Interaction

The communications options available through mobile service and internet have created valued improvement in personal and community information sharing and engagement.

It was often mentioned that the expanded options for communicating with family have added frequency, quality and depth to those exchanges and reduce isolation, keeping people in touch more frequently and more personally with each other's life experiences, the small and the momentous.

"We use Facetime to get my brother on video call for Mum and she strokes the screen to touch his face or his hair." - Resident

"Facetime is brilliant as we can have the family together somewhere on the Coast and then they can talk to us here and we can show them a goanna or budgies or the kangaroos out here using the iPad, live. We can show them our life, and all be together virtually. All of this is really important." Resident

"I am not into the social media thing unless it is with my grandchildren on line, Facetime them or video Messenger. I can really see them growing up and without that I would be out of the loop a bit." - Resident

"Previously we might be in contact once per year but now it can be several times a month. We might have only seen them at Christmas time before and we now see them all through the year." – Property Manager

Messenger is used extensively for group chats amongst friends, for community group messaging and planning. It has created group exchanges based on friendship, common interest or objectives (e.g. planning). One Messenger group reportedly was set up to conduct an interactive running commentary about a reality television series, as members watched and assessed plot and character developments together. This was mentioned as an enjoyable team engagement, creating a sense of inclusion and connection: a two-screen chat group. People use Facebook to coordinate catchups in town, joint attendance at events and group activities.

"When there is funeral notice now it goes on the Community Event page. People who were touched can say something nice about the person who's gone. Even strangers would tell of their one contact with them. There wasn't a way for this to happen before." Resident, Windorah

"We have a group of us that get together for training. We get together, get the video going up there and do the (fitness) class together." Resident, Stonehenge

People Interacting with New People

Social media platforms are online vehicles providing a way to speed up, extend and enhance social connection for those who are willing to use these tools.

"If someone moved to town and wanted to know where things happened the FB page would help to become familiar with who was who in the community." Resident

"It has helped social networking a lot and I didn't think it would." Resident

"I had a lady find us on Facebook and ring me here at work, from Brisbane and ask if she could donate some toys. And when she came out here, she waited here to specifically meet me, to put all these toys in the Centre." -Visitor Info Centre

Another example was of young people working in an isolated situation on stations, finding other young workers on surrounding properties online through social media. It was reported that by the time they met in person, they already had established a foundation for friendship by finding common interests and experiences shared through Facebook.

"They meet someone briefly at a rodeo and they connect through social media and then the next time they meet them, it is like someone they have known for 12 months." Property Manager

"Ringers tend to reach out without knowing each other and then eventually meet up in town. They connect and introduce themselves online." Property Manager

Others are fearful of social media as a vehicle for loss of privacy, gossip and negative consequence. Residents who said that they did not access Facebook, also mentioned that they had less information about what was happening in the community that there seemed to be less community conversation. It is possible that those who are not accessing social media, are self-excluded from local planning, information sharing and social engagement that is happening intensively online in community. This loss is felt and would explain why they feel that the social impacts of internet and mobile access has been detrimental.

"We aren't writing letters as much. We used to have a lot of functions and TV out here and drink driving laws ended social interactions also. We no longer have pictures every Saturday." Resident

"Hasn't expanded my social network. On the internet, if I don't know a name, I don't talk with them." Resident

"I stay away from social media. Social media opens "bad doors" - too much avenue for gossip. I rarely post anything." - Resident

Arranging Local Events

Connectivity has had an important positive impact on the ease with which local and community events can be coordinated, managed, recorded and reviewed. Mobile phones, email, social media groups and messaging have made it very much easier to share information and make and advise of decisions, to such an extent that formal meetings are occurring less. This saves an enormous amount of time and travel, increases the speed of decisions, improves the accuracy of communication and is inclusive.

Community events

One participant reported that they were having so few 'face-to-face' meetings that their organisation was 'at risk of losing their incorporated status'. An enquiry was made by the researchers about use of video link meetings, but this was not happening due to a lack of familiarity with this communication tool and with how easy and effective it can be, replacing in-situ meetings and enough to meet the corporation requirements. It was reported that the

records of organising were available and where conversations occurred in group chats, were immediately and easily accessible to all members. Emails meant that the history of contact and agreement with suppliers was clear.

Online access has facilitated easier awareness and application for financial support.
The groups organising events have easier awareness of and access to grant funding and can make applications on line without inconvenience or lost time in having to mail in earlier to ensure meeting a deadline.

"We can more easily do research for the money that is available. We can more easily get it in on time." Community Organisation Member

Tourism Events

Community leaders use online communication to advise communities of arrangements to accommodate the influx of visitors in their thousands to communities usually of only a few hundred residents. This has replaced community meetings to some extent. Strategies and plans are on Facebook pages. Debriefings happen via email and Facebook. Facebook also used to remind residents to replace their stocks of fuel or gas, prior to major demand periods to reduce local inconvenience. It has made finding insurance, ordering and coordinating much easier. Reviews were available, including feedback from various stakeholders, making it easier to replicate and improve the event the following year. General organisation is very much eased and advanced.

"With internet and mobile - getting a local shed built was easy - we emailed quotes, mobile phone to solve details and problems. We have copies so we have a paper trail. We get messages about problems that we can deal with straight away and it makes everything faster. Reduces delays in the turn-around." Resident

"We don't have seem to have as many in-person meetings now because we can flick it around messenger or email. We have a FB group and messenger groups. A lot of people are out of town and this is quicker, better." Community Organisation Member

"We have a P&C Chat. All the parents in the School are on this and if I need them to know things, I put it there and they get it." School Principal

"Rodeo Committee we would have a lot more effort to find a working bee date and it is easy to find a date." - Community Organisation Member

However, the greatest benefit was the improvement and ease of communicating upcoming events, primarily through social media. Promotion of events has become extremely efficient, cheap and easy. Previously such publicity required printed posters, letters, word of mouth and flyers to spread awareness of upcoming events. Now it is posted on Facebook, or details emailed with attached point-of-sale materials printed by the receiver. The sharing, comments, and page likes allow fast, accurate and colourful promotion and questions can be immediately and accurately answered, once. There has been a noted increase in numbers attending community events, which is attributed to this more effective promotion.

"Events are shared via Facebook - bingo nights, markets, movie nights, and all info is sent out via those online networks. These social events are much easier to organise and more successful in terms of attendance." - Resident

"We had some young ones that were tech-savvy and they live streamed the Yabbie Races on Facebook. They live-streamed someone having their head shaved to raise money for cancer research." Resident

If you are not online, you risk being more socially isolated and less informed. Those not familiar with or willing to engage online are finding the shift more difficult, yearning for the past. While others embrace the technological options fully and become reliant on it this makes it highly disruptive when it is not available for any reason.

"Some of the old people don't manage as well. They don't have smart phones with data, or they don't get emails, or they won't use Facebook." - Community Organisation Leader

"Most of the Fire brigade blokes are 60+ and they're not much online…" - Community Organisation Member

Interaction with Government Organisations and Institutions

It was reported that having access to mobile service and accessible internet has had a significant impact on the contact with organisations and institutions. More people are using websites to self-inform answers to information needs. Others are using portals to submit time sheets and reports, to check school rolls and complete forms or applications. They use the interactive options for chat and reported that response times with email were much quicker. This is often regarded as much more convenient and user-friendly than using the phone. It has allowed people to research at times convenient to them, rather than coming in to use the phone while at work or during business hours. They can now research in the evenings or early mornings as enquiries can be sent at any hour without inconvenience to either party and there is a written record.

"It is much easier - you can email and get a faster answer. You can find things on the webpage. Better than when we were limited to office hours and being on the phone trying to find someone." Property Manger

Access to Services

Access to Health Services

The availability of internet and mobile phone has changed the types of services available to residents and those needing assistance as visitors. Triple zero is now available as a mobile service and reaches the Clinics.

Telehealth

Telehealth services were mostly available in local Clinics where local staff were willing and able to make use of these facilities and some communities appear to be more active in providing this option for residents. When this service was not available, individuals had to drive to other centres (e.g. Toowoomba or Mt Isa).

Telehealth has also been used to provide those with chronic illness, such as diabetes, training and information on how to manage their lifestyle and condition for best results. Telehealth, where available, is saving a great deal of money, time and inconvenience in very long travel

(2 days each way) and associated accommodation and other costs. There was demand for extended services that are not yet available, particularly mental health support.

"There's video conferencing - you can explain something to the doctor and if they can see what you are talking about it is much easier." Resident – Windorah

"My doctor is in Cairns using the video app Pixip. I use this to speak with my doctor and he sends scripts to Chemist Warehouse and they send it to my address, off my account with them." – Resident, Jundah

"We have had times where the RFDS cannot get here, no pilot or something, so they conduct their appointments via video link. Very helpful and powerful." – Resident, Bedourie

"I have used video link to speak with a surgeon in post-op follow-up. Avoided a 2400km drive. The outcome was no different to being in person." Resident, Jundah

It is necessary that staff in community Clinics are familiar and confident to make use of the video link and diagnostic services available because when these services are not used, it creates significant cost and inconvenience for patients and their families.

"We had a fill in nurse at the Clinic who didn't know what was available or how to use the telehealth service - didn't know it was there and if she had known we could have avoided a drive to Toowoomba." – Community Resident

"We had a young fellow hurt his wrist and they couldn't use their x-ray machine at the Clinic, so they had to fly him to Mt Isa for a scan. It was fine. Then we had to go and get him." – Community Resident

Accessing Specialty Services

Health Clinics also used online communications to advise the community of visiting specialists such as podiatrists, paediatricians. They can put together diabetes health plans online. This has been very welcomed and appreciated by residents.

"We can have consultations from home with the speech therapist and I can access my child's paediatrician through the telehealth service at the Clinic." - Resident, Birdsville

"Since the Clinic can easily advertise that specialists are coming in, demand went up. It's harder to get an appointment now!" – Resident, Bedourie

Medical Information Search

Several respondents admitted that they use online information search to enquire about symptoms they were experiencing before seeing a medical practitioner. They also used this resource to inform themselves about professional diagnoses known for themselves and others. They were able to access information regarding lifestyle and self-care. They use it to inform themselves about prescribed medications. They use it to access fitness, nutrition and health support programs.

Ordering Pharmacy Products Online

Pharmacy products were ordered either directly, or through the Clinic and paid for online, delivered by post or by the RFDS. They are also able to use mobile phones to speak with the RFDS, and if necessary, get codes and access to the local community Medical Chest (e.g. for antibiotics).

Record Keeping & Sharing

Clinic staff advised that their record keeping has been much more efficient and easier since they have had an improved internet service.

"They have an e-Health program online and you can set up an account and choose who can see your health record. If something happens to me the RFDS can see my history. All doctors can see it if I give them permission to access my file." Resident – Birdsville

"As we have the access now, we can scan and send forms to doctors - it was previously a nightmare." – Medical staff, Community Clinic

Maintaining Good Health

Others are using online services to invest in wellbeing, accessing apps to support fitness, nutrition, calorie counting and fitness and reminders for preventative check-ups.

"I have a fitness monitoring watch that uploads to an app and it all syncs and a personal trainer can see my result and give me feedback. I do strength and running. I am preparing to do a half-marathon." Resident, Windorah

"Recently I had a text message to remind me about the Breast Screen clinic; they text you reminders for scans. So that's new."- Resident, Stonehenge

Access to Education Services

Distance, and difficulties associated with that distance unappreciated by institutions, have previously made it extremely difficult to access personal development and training opportunities. School services were delivered with the communication methods available and those students were disadvantaged with limited access to experiences and technology that is a standard component of much working life. Internet function and connectivity has radically opened access to online learning and education services, formal and informal.

Professional Development

Previously professional development required long driving or the expense of flights. YouTube videos were mentioned as sources of self-taught solutions to address a range of problems, from technical glitches on phones and computers to in-situ equipment repairs for pumps and other machinery or learning how to use drones effectively. Others are finding they can attend online courses or meetings that provide training and information to increase personal capacity. Information search is used routinely for solving immediate information needs. Others need to have mentoring or support to overcome anxiety, frustration and concern that they don't know how to get online, how to be at ease with basic skills and awareness of how online services work. As people become more familiar with using the internet, their confidence expands.

"I did some mandatory training online. I did try four or five times and had to find someone to help me and I was eventually able to work it all out, sorting out passwords and whatever. And then it was really good." - Resident, Jundah

"Now we can look up the details of chemicals or horticultural issues and problem solving is easy, convenient." Manager, Bedourie

"Training at the Clinic is happening online. I can dial in to meetings, conferences, community meetings and it is all visual conferencing. You can call in and get all the info you need, without travel and inconvenience and cost." – Medical personnel, Clinic

"My partner and I have completed a course in biosecurity, for quality assurance registration, online." – Resident, Windorah
Organisational training is now available online for White Cards, for specialty skills like asbestos training. It is far more accessible because of better internet.

"Training for our staff is really hard - they might offer training in Emerald and then ask why no one attended - it is a 17hr trip return! And then they complain when we don't attend."
Government Employee, Windorah

"You just could not study here before - too long to load. Not accessible. Atrocious. You would make five attempts to submit an assignment and you were never sure if it went or not."
- Resident, Bedourie

Tertiary Education

Several respondents are undertaking tertiary study through institutions and the increased convenience of effective internet has greatly changed the practicalities of receiving lectures, readings and related materials and uploading assignments. Previously this was regarded as almost impossible with internet access a source of anxiety and frustration. A few young respondents were studying in this way and indicated that without high speed internet they could not remain in the community. Mobile data is the fastest and most reliable access to the internet.

"The apprentices are doing their training and many employees are doing Certificates and all online." - Manager, Bedourie

"Now, I can study, do online courses. Previously I ran out of data. On the day we ran out of data once, I had to go to every house in town to beg someone to allow me to upload my assignment using their data. Now that isn't a problem anymore." - Resident, Windorah

"TAFE is accessible to me now. Previously I had to wait half a day to load a page."
Resident, Bedourie

"I am studying externally but I cannot do it with the house internet. I use my mobile phone as a tethered hotspot to access the speed required for the 3hrs of video lecture." Resident – Jundah

They have also been able to more conveniently build studies in around their life, downloading lectures and listening while on long drives. Students report that they have been able to connect with other students to support and assist each other.

"I study on line and some students formed a Facebook group and we supported each other and only met at graduation." Resident, Stonehenge

Schools

Universally there is dissatisfaction with access to the internet for schools unless they have acquired separate modems to make use of mobile data. The speed is so slow that it is impossible for any school in the subject communities, to have multiple students (i.e. more than 2) logged on without problems with sound, pixilation, drop-outs and access. It is a source of extreme frustration and has not been able to be resolved by complaint to agency Help Desks.

"In school, the internet is still a bit slow - it used to be so slow it was hopeless. It is faster than it was but it's not as fast as it is in my home. In class, we can't all be on the internet at the same time - there is not enough access for all the students to use it." Principal, Community School

Schools can offer a range of learning that was not otherwise effectively available, including languages other than English and speciality technology and science classes. They have also been able to provide children in remote communities with unique experiences.

"*We have connected Stonehenge, Jundah and Windorah on Zoom with Qld Opera and the kids told them what they liked, funny stories in their life - they were just talking with people from the music world. Sara Storer wrote a song for the Barcoo. They learned the song and performed it. This was valuable to the kids, exposing them to a different experience."* Principal, Community School

E-Kindy is now offered as an at home kindergarten program for little children that is accessible in these communities. It is run by a teacher with specialty training in education for the very young and is 15 hours over 40 weeks.

"*We have E-kindy up and running at the School and there is a teacher aide to run that class."* – Principal, Community School.

Distance Education

Distance Education services can offer a different level of service using online classrooms. Internet has enhanced options with teachers being able to see their students and students being able to see other students in their class. They can offer an expanded range of classes including science, languages and robotics.

"Return of school work and feedback on assignments is pretty fast. They can see their teacher now and they can see the student. They can see if they are paying attention." Parent, Bedourie

"Kids can now access high end tech, access coding, and Japanese or other languages. They can build contacts with other kids that they engage with through the online classes - expands their social network." Parent, Birdsville

"Yeah, it's good until there's five thousand people in town and they all want internet. Then you just can't get onto internet so that was 2 weeks, no school." Resident, Birdsville

Other parents have decided that as they have internet access, they can keep their children local for high school instead of the expense and separation of sending them away to boarding school.

Access to Emergency Services

The mobile phone has reportedly improved residents' sense that help is more accessible, where that connection is available. Councils are using Facebook pages to share relevant information to the wider community. Respondents mentioned that with recent flooding, there was regular timely updates from Council on road conditions through their Facebook page, on the location and flow of floodwaters through Google Earth, Bureau of Meteorology and Facebook updates from local property owners. This information helped to prepare for isolation by ordering in food and medical supplies in advance and helped to avoid visitors being cut off by advising motorists and tourists in advance of expected road closures.

"We were trying to use the flood boat to transport mail - or ferrying people across so that staff be allowed to use this. It was not a recommended practice, but we were able to negotiate a solution. Getting responses was possible and negotiating solutions via internet and mobile phone was possible and it all could be done in the field - not having to return to the office." Manager, Bedourie

In communities, the Emergency Services group communicates via Messenger. If they are activated it is by text message and if there are exercises, maintenance or training requirements then that will be posted to a Group on Messenger. If a motorist has ignored directions and travelled on a closed road the vehicle registration and description is shared and the communities down the road can monitor that they arrive safely. If there is a search or a need to contact travellers, they can watch out for the vehicle. SMS (text) community alerts were not available in any community.

Access to Other Services

Respondents were asked about other services that are available to them now that connectivity is more available.

Banking

Access to banking was most frequently mentioned as a very great benefit arising from mobile phone and internet access, particularly convenience, accessibility and certainty. For those communities with large events, hosting thousands of visitors for short periods, having access to EFTPOS and prepayment over the internet has removed the burden of having to manage large quantities of cash. On the other hand, reliance on EFTPOS means that when the internet is down, it is a very big problem for business owners.

"The Post Office where we do our banking, will not take coins and they will not take more than $5000/day as a deposit. When the races are on, we do more than that and we can't bank. We are paid in cash very frequently, especially the older generation - 30%. We provide change to (other businesses) because of we have coin operated services and the Post Office will not take coins and we cannot store them." Business manager, Birdsville

Shopping

Other residents mentioned the benefits of online shopping to access items not available locally and to make purchases that were at a better price than available locally. Previously it was not enjoyable as there was a degree of uncertainty as to whether transactions had been completed before timing out. Delivery was a greater issue than the transaction, often taking a considerable time and being a larger expense than it might be for those in the city or larger towns. Nevertheless, shopping was generally described as a positive experience and one that added to the quality of life, providing options in an otherwise relatively sparse choice.

"You can go online and get inputs cheaper. Tyres for my ute cost $250 at Longreach but in Emerald $125. I did the research online." Property Manager, Jundah

Others mentioned the convenience of accessing Centrelink sand other government services through online portals. This removed the need for long periods waiting on landlines or the need to travel for in person appointments.

Online Programs

Other benefits mentioned included access to cloud data storage, online programmes for accounting and the capacity to send attachments on emails, none of which was available before the internet improved.

The likert scale scores for the extent of change in access to services as a result of digital connection are shown in Figure 26.

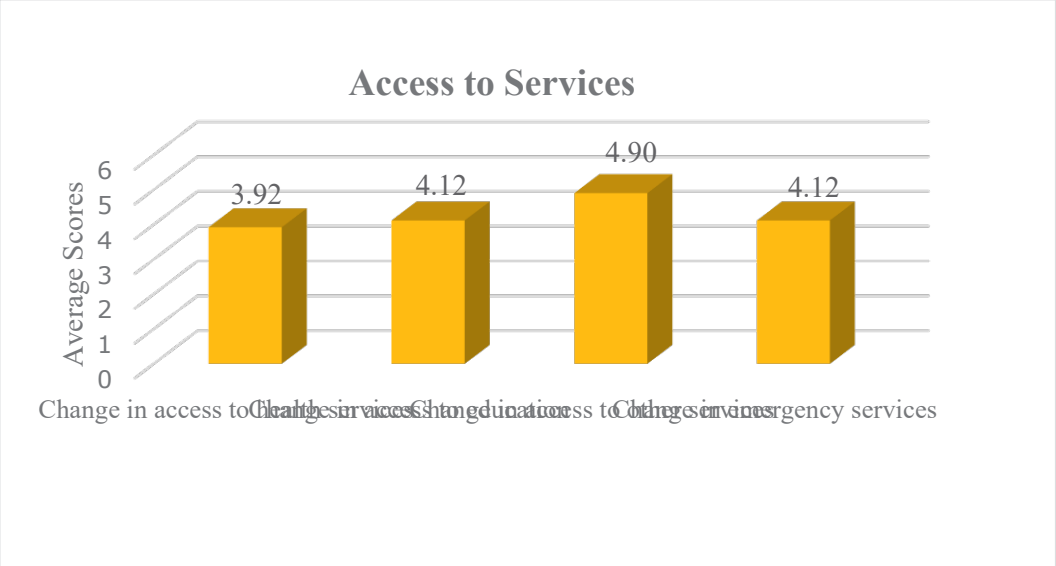


Figure 26. Average likert scale scores for changes in access to services

Economic Impacts of Connectivity

Small Business and Retail

Internet and mobile phone connectivity have provided a significant range of benefits to those businesses that have been willing to embrace it. There are some businesses which resist internet presence and use; in each community there are businesses that do not have a mobile phone or email address (that is shared publicly) and often it was a very important community or hospitality business with potential to offer an important attraction or service to residents and visitors. They still take enquiries, bookings, orders by landline enquiry; promotion is by word of mouth and physical presence in the community. Their existence is supported by limited local competition. The proprietors were older, suspicious of the internet, unconcerned with change or threat to their practices and had been in location for many years.

"There is no reason to have internet at this place (hospitality business). There is no reason to offer internet to tourists - they don't need it. They don't expect it here and they don't need it." - Community Business

"*They are 'old school' down there and don't use the internet at all. A backpacker set up their Facebook page to promote what they had to offer, but once that person left, it never was touched again." – Hospitality Business*

"No, they don't have a mobile phone or email address that they let anyone know of. They have a Facebook page but don't post to it. If you want to book accommodation there, you call on the landline." - Accommodation Business

Under the guidance of young temporary workers some businesses created a Facebook page that was active for the period that the individual was employed. This was reported for several businesses within these communities. Once that individual left the locale, or the job, the Facebook posts lapsed. Young ones were often mentioned as coach/encourager and a source of advice for older proprietors or employees who realised the importance and value of an online presence and needed some support to develop understanding, skill and confidence. Some seniors fully embraced this opportunity. Others fully rejected it.

The downside of reliance on internet, is that it is a serious problem when it is not available.

"People put in their fuel and then with no EFTPOS, they could not pay, and they had no cash and could not wait around here till it came back on because they had miles to drive so we had to just give them our banking details and hope that they did the right thing." Business Owner, Birdsville

"When we had no access to internet, we put in our order by fax and someone in the supplier's office had to manually enter all that from our order spreadsheet into their online order forms." Business owner, Bedourie

A further disadvantage is that one business owner confided that they had been caught by an online scam and had been forced to pay overseas fraudsters to have access to their computer unlocked. It had seemed the cheapest and most convenient solution. This was an unpleasant lesson in cyber-security. Another disadvantage mentioned is that there is expanded online shopping opportunities for residents. While some of this is certainly for products not available locally, it was regularly mentioned that groceries are often being purchased online

through Banana Blue Adelaide or collected by those travelling and returning to Mt Isa Woolworths, Click and Collect.

"The shop is not stocking some lines because people are supermarket shopping online instead of locally because it is less expensive." - Resident in Community

There is a long list of advantages raised with the researchers by business proprietors and they included:

- EFTPOS – but a serious inconvenience when the internet crashes,
- Prepayment for services e.g. accommodation, drinks tickets,
- Online booking systems,
- Communication with client/customer community – email/social media,
- Divert landline to mobile – never miss a call,
- Calendars – knowing when events are on so we can be ready for big numbers,
- Promote specials, products that have come in, services are available; iconic sporting event; community celebration; footy tipping,
- Send company accounting to professionals,
- Online ordering using apps and websites,
- Streaming music, sports events in restaurants and pubs,
- Flexibility to offer/promote unexpected opportunities e.g. bus of visitors arrives; local business closes,
- Advertising and recruitment of staff; retaining staff,
- Ordering parts to repair equipment, organising service, maintenance,
- Training staff,
- Contactable when away from site for queries from staff or customers,
- Price comparisons,
- Equipment search,
- Email photographs of product brands or types required,
- Accessing and placing catalogues online.

Agriculture and Pastoral Stations

Connectivity remains limited and data accessed via satellite is very expensive. Most do not have mobile phone connectivity beyond VOIP services at the homestead, or online. Data accessibility is limited for workers, children home from boarding school (reportedly a time of peak data pressure) and business managers. Managers are not necessarily familiar or at home with using internet services as it has not been available. Women and younger people were often active in coaching or supporting use of online opportunities. Where there was connectivity because the property was close to town, the internet use for our small sample was markedly higher, with great use made of training, problem solving, price searching, and online marketing services. But it was also mentioned that on most properties, nothing has changed as they effectively have no or limited connectivity.

Economic activity mentioned as being facilitated by internet connectivity included:

- Wands and scales auto-data collection and uploaded at night as reports,
- WiFi on watering points, speed limiters on vehicles, GPS,
- Cameras for security,

- Resources for children at school,
- Social connection for workers – email, text, social media, mobile at the homestead only,
- Banking and paying bills, staff,
- Accounting book keeping programs, online,
- Shopping – groceries, parts, plant and equipment, clothing,
- Convenient mobile communication – don't have to wait by the landline,
- Access to services online at home – counselling, speech therapy, OT home and distance schooling,
- Tracking flood waters,
- Advertising online for employees,
- Auctioning stock,
- Advertising unique product – Instagram,
- Virtual fencing – for cattle, not cost effective for sheep,
- Use of drones to check lambing sheep, move livestock.

"We do a lot of advertising on Instagram to attract employees - we take photos of the lifestyle, what we do out here, the scenery - attracts backpackers." Property Manager, Jundah

"It has made it more attractive for recruiting because the staff can stay connected to friends and shop and bank and it makes them feel less isolated." – Property Manager, Bedourie

"We have about 7-8 workers who have to share 40G/month. Snapchat uses a lot of data which they like, and they can't watch videos on Facebook out there. They all know the data renews on 3rd day of the month and they can't access anything when it runs out." Property Manager, Birdsville

"You can be in your paddock and buy sheep or cattle. Saves you losing a day travelling to a saleyard, reduces the stress on cattle - one trip. You can keep a reserve and after that, timing is important." Property Manager, Stonehenge

"I can't imagine being without it. To sell livestock now is fast and convenient. We are using a drone. You take a photo of them at peace laying under the tree and looking calm...improves the marketing." Property Manager, Stonehenge

"We use walkover scales which send the data straight to the platform in the scales and it is auto analysed." Property Manager, Jundah

Tourism

Many respondents felt that social media promotion and engagement had significantly enhanced tourist and visitor numbers, and awareness of activities and services available locally. Some businesses were growing online communities who had visited and remained in contact, commenting, liking and sharing online experiences. This had increased awareness and built anticipation for upcoming events. Many tourists shared their photos on social media. They joined Community pages and retained contact, sharing their ongoing journeying, commenting on events and posts from the Community and engaging as extended members and ambassadors for the Community.

Facebook pages are effective providing information and exchange with tourists and visitors through the area, answering questions, sharing photos and information on road conditions, services and supplies available. A few businesses are experimenting with developing an extended community through social media – community footy tipping competitions, pizza nights, specials – are promoted. Other businesses post pictures of the landscape but may not appreciate the importance of focus on the interests and needs of a wider audience. Two new tourism businesses were founded entirely online in one community. Yabbie Racing at Windorah was livestreamed as an initiative of young employees.

Mention was made that the potential of the internet was still not being maximised either in social media management or in the development of local tourist information apps.

Social media was a two-edged sword for some – if a false rumour was on social media it could be very damaging. In one community, one event that was public became the subject of considerable uninformed negative speculation and trolling online, which was hard to manage. False information can quickly impact travel plans.

The Visitor Information Centres had noticed up to a 10% drop in walk-ins when internet was available in the community (and not just on their premises). The same number of brochures were collected but the walk-in numbers dropped, and this was significant because this measure was tied to funding.

"People just want to let their family know that they are ok. Those who have business or commitments at home they need to attend to have the freedom to travel because with internet they can call in and do the wages or meet other commitments. They can travel and keep in touch." - Resident, Windorah

"They need to be informed that only Telstra, works out here. It causes a lot of frustration." Resident, Birdsville

"The message was out that there on FB that there was no fuel at Windorah. And while there was no fuel at the Shop but there definitely was fuel from the Servo. We were constantly refuting the misinformation – there is fuel in Windorah. You can get fuel at the Servo. Otherwise, people might not come here at all." Business, Windorah

"There are a lot of pictures of sand hills and not enough on what you can do or see or experience around here. Not enough on the services." Resident - Windorah

Tourists become virtual ambassadors as they share their stories and images of the area. Experimentation with Facebook Live (Yabbie races, Windorah) has been very well received. In Birdsville the increasing numbers of tourists attending their destination events is attributed to the increased promotion and info sharing through social media, that has generated excitement and encouragement to attend.

"I think that the tourists in town use Facebook to find out what is going on around town. They all share thing tips, experiences, things to see and do, on the Grey Nomad Facebook pages." - Resident, Jundah

New Businesses

Many respondents indicated that the enhanced connectivity had not brought new businesses to the community, but this was found to be not entirely correct. The new businesses were not visible to locals, not brick and mortar establishments, being established online and with clientele that were often beyond the local community. The researchers found in the course of this research a range of new internet economic activities and there may well be others outside our sample.

Economic activities established online included:

- Foreign exchange trading,
- Financial services business offering services to government agencies,
- Handmade accessories for sale through a Facebook page,
- Online retailing of specialty clothing and accessories,
- Sound engineer, providing services online (had to leave town to continue this prior to and without internet access),
- Two new tourism businesses that have no shopfronts (offering tourist experiences),
- Photography services and product – promoted/sold online,
- Bore pumps and water gear – sold online,
- Artist – using Facebook to promote her exhibition in a regional gallery.

In one community one of the online business contributed considerably to the business of the local Post Office.

"I am probably sending 20-50 parcels per week. Making my website was challenging and took a long time. It would have helped to have some coaching online, or a list of resources available. To talk to suppliers overseas means talking to them at two in the morning. I have relationships with my customers - they are return customers." Online Business Owner

New Products and Services

New businesses all brought products or services to the market although that market was not necessarily local. There were also a range of services and products now available to the local community that were not previously available.

- One of these was dance classes for children, offered from Barcaldine through video conferencing,
- One pub was now able to offer Keno because of internet connection,
- Tours of local area offered online,
- Tourism experience promoted and offered online,
- Buy, swap, sell site established for a community,
- New café and free camping ground.

Investment

Residents felt that greater tourist numbers, their own activities online in shopping and other generated flow of finances was increased. Investments in the local community were also not necessarily visible to the residents of the community, not publicly known or recognised. Some felt that the improved internet connectivity was allowing effective promotion of

destination events that were drawing increasing numbers of visitors to the communities and this in turn was building a case for better roads, better services and local facilities– i.e. government investment.

It was regularly remarked that with internet, tourists were staying longer, and therefore spending more within the community. It was strongly felt that EFTPOS facilities and ATM's were also a part of this enhanced spending.

It was also observed that the local expectation that 'nothing will change' was an impediment to considering investment possibilities, because some locals were comfortable with their practices and with some events being un-inclusive of tourists and visitors. New ideas, offerings and innovations were sometimes brought about by those new to the community, including young people.

One direct investment mentioned was the recent auction of land, sold to investors bidding remotely from outside community, online or over mobile phone. This was seen to be as a result of local event promotion and communication of the sale.

Availability of Employment

New business ventures discovered were largely employing those who established them. They created income for the employer rather than a larger range of jobs.

Advertising Positions Available

Advertising positions and recruitment to fill them is largely done online.

"We do not have unemployment - everyone who wants a job, has a job. It is more attractive for government roles and for people passing through. We have capacity for more services and amenity to offer people coming here for work or to come back to live." Resident, Windorah

"Nannies are employed by a local person, employed over the internet and they would not come here without access to the internet. They don't stay long-term, but they are employed here and live here for a period of time." Resident, Bedourie

Attracting People to Communities

Participants said that there were significant issues in attracting people to live in their communities. Housing, employment, entertainment limitations were mentioned.

The researchers found four young couples, who stayed in their remote community because they had fast internet through their mobile phones. Usually one partner had work or a reason to be locally based and the other partner was studying, creating business, finding work and using the mobile phone and online connectivity to maintain social relationships and connections within the community and beyond the community. Singles did not stay as they were reportedly looking for a life partner, but couples stayed longer than they had expected because life was able to be lived with a quality they valued, because of internet connection. This represented a discovered population increase of eight adults under 30, that was directly facilitated by digital connectivity.

For these young people it was considered crucial to have internet and 4G mobile phone coverage. While this was not enough alone to attract people, if it was not available it was a good reason to move on, or to reduce the time spent in community. It reduced quality of life while there were in community and was considered a major problem if it was not available. Connectivity allowed them access to their pre-existing social groups, to shopping and banking, to health services and to education. This significantly diminished the previous disadvantages experienced by being in remote communities. There were issues in some locations with availability of quality housing, but all had found work and were intending to stay for at least a few more years.

"I just assumed it would be here. It would be a shock if it wasn't. I would be applying for other places." Resident, Stonehenge

"Internet and mobile phone are very important in attracting new families to the community." Resident, Windorah

"I think people find that internet and mobile phone makes it more attractive - you are not isolated, but we also need other things to bring people here." Resident, Jundah

"We have had teachers in the past who cannot cope without a mobile phone. When they found there was no internet or mobile phone service it was The-End-Of-The-World." Resident, Bedourie

The likert scale scores for the extent of change in the local economy as a result of digital connection are shown in Figure 27.

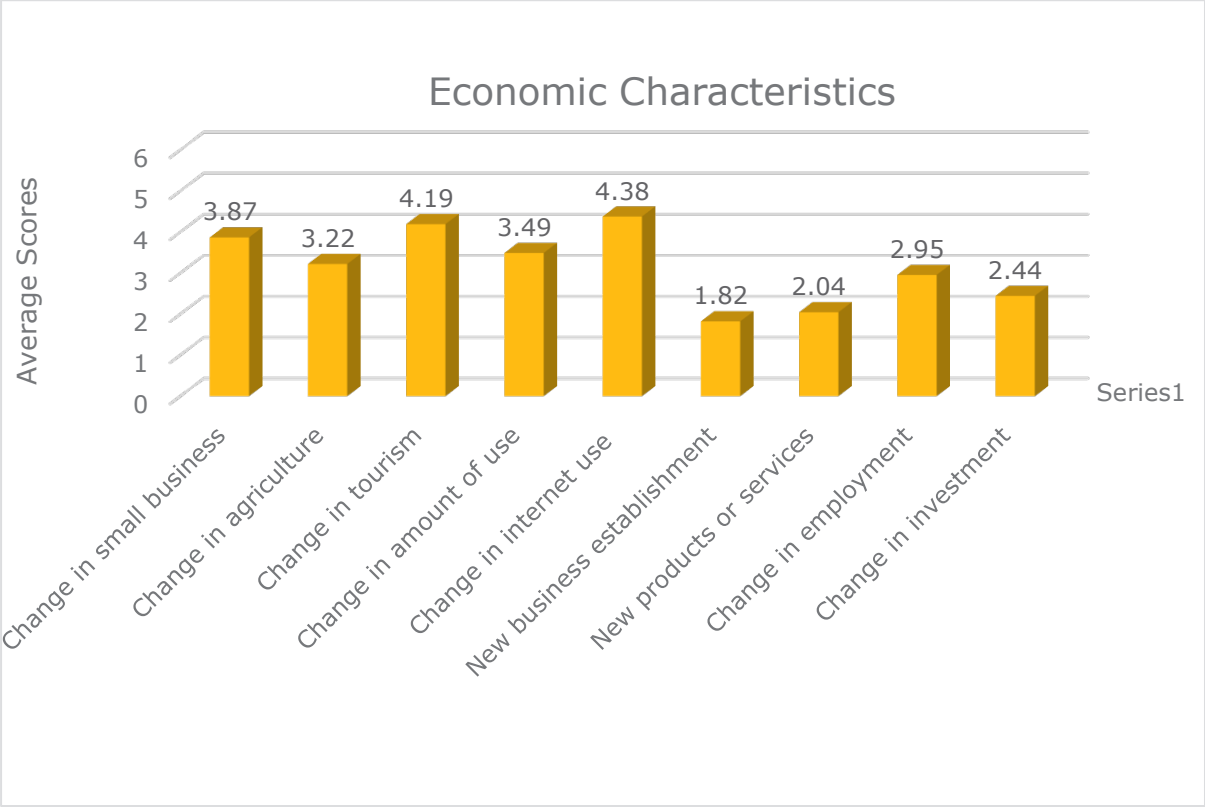


Figure 27. Average likert scale scores for changes in economic characteristics

Discussion

Digital connectivity, while quite variable in connection quality, has improved and had a consistent and extensively positive impact on a wide range of social and economic aspects of the Barcoo and Diamantina Shires including the remote communities of Birdsville, Bedourie, Windorah, Jundah and Stonehenge.

Mobile phone service and fixed wireless data access in these remote communities is excellent. Many people reported significantly improved internet access and speeds compared to 2016, prior to fibre optic cable and Skymuster satellite connection.

The mobile phone service and mobile accessed data are highly reliable and where accessible is delivering speeds in excess of 60mbps. Many residents are accessing mobiles as hotspots or fixed wireless as a work-around inadequate cable data to access streaming services associated with education and entertainment.

Satellite services from SkyMuster are delivering very much improved connectivity though the data quantity and speed is limited (12mbps). Satellite provides data at 39-47c/GB and data caps are being reached very quickly because it is servicing numbers of staff and family members onsite. The off-peak satellite data allowances are inconvenient to access – 1am-7am.

The telco service provider is not easily accessible to resolve or assist with problems and contacting them requires persistence with wait times, staff not knowledgeable about the local infrastructure and communication frustrations. When residents did contact the telco with complaint, services seemed to improve.

Costs for data could not be correctly determined as the amounts quoted by respondents were sometimes a guess, often for bundles, for several family phones with shared data, included mobile handset, or were paid by someone else. It was commonly unknown how much data was available to individuals nor evident understanding of data delivery options available.

Online Communication Makes Life Easy and Enjoyable

During the conduct of interviews, the research team came across five couples of young people, who had come to town with an expectation of a temporary stay, and yet they have stayed longer than anticipated or planned. This may or may not be a permanent shift, but they have already contributed to their communities in extended social and economic ways. While employment and availability of quality housing remain critical issues, all emphatically stated, that they would not be living in that location if they had no internet or mobile phone connection.

Mobile phone connectivity particularly, has had the greatest impact on positive quality of life. Mobiles are far more than telephones: they offer many personal and professional communication options, contact details, capacity for information search, entertainment options, money access and management, shopping, and many other tasks, activities and interactions completed via apps and a camera. Having accessible services through a 4G mobile phone service greatly mitigates the economic and social isolation of people living in remote communities. It was found that connectivity is reducing the disadvantage and inconvenience of isolation and improving quality of life through access to services, products and people.

Some community members provided examples of engaging more broadly to create wider community support through social media engagement. One community's school used social media to ask the tourist community page for their supermarket tokens (as part of a supermarket support-schools campaign) to buy sporting equipment for the local primary school. This received an overwhelming response with tokens being posted to the School for months, from all over Australia, accessing thousands of dollars in equipment. Others mentioned the unutilised potential for local app development, to provide tourism product, self-guided walks and drives, to combine fitness or arts or history into a reframed exploration of local communities. Not everyone is aware of these opportunities.

Social Media Is the New Galah Session

One older resident mourned the loss of the regular 'galah' session, which used to occur three times a day, as people living on remote properties would check in over radio frequencies, with social contact and news to be passed on. This no longer occurs or certainly not in the way it functioned in the past. Social media and group chats have replaced the social radio 'galah' sessions. In remote areas where there is online connection, access to social media has seen social connections and engagement flourish.

Social media is facilitating introductions and connections to new and known persons, allowing small exchanges of personal news and information, so that when people meet in person, it feels as though there is a stronger base of relating. When they travel into town or to community events, they have a pre-existing connection. They already know people and don't have to wait on serendipity or courage to introduce oneself, nor on chance to find those with some common interests. People are also using the internet to create social events – to manage the logistics of gatherings and coordinated catch-ups. For example, it was reported that young ringers are finding colleagues on other local properties, through Facebook, making it easier to meet up in person with those who have some common interests; newcomers can find their way into social networks quickly; an 18th birthday party was planned and promoted online.

Digital connectivity has been a large advantage for community groups, being more easily and efficiently able to access information, apply for grants, research and pay for materials, insurance, services and to promote the details of upcoming events. Social media has had a large impact on community organisations with Messenger and Facebook groups allowing convenience, record keeping, transparency and immediacy. It permits free shareable content, to promote events. Some have experimented – for example, using live Facebook feeds, with considerable success. It was observed by several participants that numbers at local events are perceived to be increasing and this is attributed to wider and more timely electronic promotion, allowing people to coordinate their attendance with others, to plan to attend. Community organising is made efficient and easy.

There are a few negatives. One downside is that those who are not on social media are receiving less social and community information. Complaints were heard from individuals not online, that Council "did not share information on road closures or progress of flood waters" – however there was more information and more timely information provided than ever previously possible, if you were online.

Some expressed suspicion of social media and spoke of it as a negative social impact and sometimes declared that they had no social media accounts. They felt there was a noticeable

shift to screen-attention in public spaces. One of these individuals (not a senior) also mentioned that they did own a mobile phone but never carried it with them unless they anticipated it would be convenient to initiate a call when away from home. There was not an apparent appreciation that a mobile phone has use or function beyond being a portable handset. Asked how someone would contact them in an emergency, they cited coming to the workplace or using a landline at the workplace. Conservatism in resisting technology could potentially be overcome by demonstrating the personal advantage and convenience of technology, although for others such resistance is portrayed as strength of character.

Social media is far more convenient and less expensive than previous communication tools. Councils, community groups and event organisers using social media to promote and communicate information to their members have found it efficient and highly effective. Face-to-face formal meetings are not occurring as frequently as a result of access to online communication vehicles. Except for Facetime (mentioned mainly for speaking with children at boarding school) online webinars are not noticeably being taken up, largely due to a lack of knowledge and technical confidence in accessing video link apps such as EzTalks, Zoom, Skype and similar, and concern about access to enough data.

Commerce is Made Easy

One of the significant improvements to quality of life, linked to accessible internet is the result of capacity to now undertake info searching, banking, and shopping. Shopping online is mentioned for bargains, for products not available locally, for pharmacy and for groceries. Groceries were purchased through Banana Blue (Adelaide) and through online ordering in Mt Isa, when someone was travelling to that city and willing to collect. The most valued services online are arguably, shopping and banking.

For businesses with the acumen and business culture to seek cost savings, customer convenience and beneficial offerings of product or service, the internet has delivered. It has improved the ability of businesses to manage their business practices, to order, manage inventory, invoice, promote and recruit. It has allowed certainty with electronic transactions. This has also been a significant advantageous advancement for many businesses. Customers could access electronic banking through local ATM's and EFTPOS it has meant that more is thought to be spent (this is a local perception and this research did not seek evidence of this) and that duration of stay longer.

When asked about new businesses, most said that no new economic activity is visible: however, it was mentioned that there (notwithstanding a slow tourist start this year due to road closures caused by flooding) there were more visitors to special events and that those visitors were thought to be staying longer. This research also found several economic endeavours occurring online to draw fulltime income for an individual and several micro-economic activities selling items occasionally. One of the substantive online businesses notably generated business for the local Post Office.

New products and services included:

- Dance classes for children, offered from Barcaldine through video conferencing,
- A pub was now able to offer Keno because of internet connection,
- Tours of local area promoted and offered online – EFTPOS or pre-paid,
- A tourism experience promoted and offered online,
- Buy, swap, sell site established for the community,

- New café and free camping ground promoted online.

Recruitment has moved online into social media forums and Gumtree. Interviews are conducted remotely, to some extent inductions (what to expect, is this really for you) and paperwork completion are facilitated by online access. More can be offered to those who expect to have online services available.

Agricultural Connectivity Brings Immediate Advantage

Agricultural technology that was accessible, particularly with mobile phone data, showed immediate productivity benefits. A powerful story was told of how this can occur: the pump in a river on a property stopped working and the property owner could not determine the cause. Realising he had some mobile phone service, he info searched the pump/problem and found a YouTube video which described the cause and then showed how to fix it in a video lesson. The landholder was able to repair the pump within a short time, in-situ. He said that without the mobile phone data access, he would have had to remove the pump, transport it to the repair service several hours drive away, wait for it to be repaired (days at least), pay for it to be repaired, return it to the property and reinstall it in location. Obviously, the immediacy of accessing relevant information was a significant saving in time and money.

In the world of primary industries, technology adoption has been and remains somewhat hampered by inadequate connectivity. While satellite has changed life and delivered highly valued benefits it remains constrained compared to the opportunities available with speeds above 12mbps and with access to large data. Pastoral companies were reportedly investing in improving their digital connectivity by location of mobile towers and radio/mobile phones that can carry text messages on their own properties. Mention was also made of illegal boosters used by some neighbouring properties reduce the service to the community. This requires negotiation with the telecommunications providers.

Tourism is Flourishing

Tourism promotion is based on the capacity to conduct online information search, to share experiences, information, reviews and advice with other adventurers. The primary tourism benefit evident from access to online communication and services provision has enhanced promotion, information and leveraged word of mouth promotions through tourists and visitors own sharing of their experiences and advice.

Businesses locally appreciated that online connectivity facilitated prepayment of accommodation, food and drinks and tour tickets using prepayment and EFTOS capacities. Large volumes of cash do not now have to be managed, particularly when there are big events drawing extra thousands into town.

Other businesses used Facebook to advise that services and product were available to incoming tourists and visitors, in the face of uncertainty (road closures), to mitigate against false information or misunderstandings. For example, when one business ran out of essential product, another business was able to promote that they had ample availability. This situation occurred in more than one community, sustaining traffic to a community when it may otherwise have suffered loss.

One disadvantage has been that funding of Visitor Information Centres is linked to walk-in traffic and with the accessibility of both internet access (no need for a WiFi hotspot) and the information search availability that comes with that – this is no longer an effective measure.

Skills Deficits Could Be Remedied for Greater Benefit

There is room for greater use of digital connectivity to build business activity and it is held back by lack of confidence and awareness of social media, websites, apps, portals and a range of other technological options. Self-taught skills are getting people online, but they are sometimes not then making the most of the potential available and are not aware of the ease of improving results, reach and reward with some strategic knowledge.

The skills needed to build these opportunities or to create an online business are and while this information can be self-taught, this is highly time consuming and requires persistence, confidence and curiosity to make mistakes and rework early efforts. It is not for everyone. It could be advantageous to provide some local skills and online development training to cover some of the following:

- to make people aware of what services and templates and support are accessible online,
- to provide an overview of apps for business, for life quality and special interest,
- to provide awareness and experience in using online webinar programs to remove anxieties and demonstrate ease and effectiveness,
- to build skills and awareness in how to make the most of social media as a community building promotional tool,
- to build awareness and capacity to access and make use of digital and technological advancements for agriculture,
- to provide training in cyber security and how to recognise and avoid scams, phishing and spam.

There are several Government funding pools available to support such training:

- There are grants for businesses that are established by a non-government body to assist small businesses build their capacity to be more digitally engaged,
- There are grants available for businesses from the Queensland government to purchase and adopt digital technology or service that will enhance the digital capabilities of their business, and help them to be more competitive and employ more staff,
- The Federal government has a mentoring and digital champions initiative to help small businesses expand their enterprise using the potential of technology to extend and expand their business.

Most people in the research sample said that they were interested in learning more of what was possible in the online world.

Reduced Internet Speeds in Public Services

In 2019, many respondents noticed reduced internet speeds from 2017. This was particularly the case for state government services such as schools, clinics and police stations. The police, school and health services in all communities were constrained and, in some cases,

impeded from delivery, by the inability to reliably access online services, even though they were technically facilitated by fibre to the premises infrastructure.

Police stations could not on occasion run driver tests if they could not log on to a portal, schools could not log multiple children on at any one time to access extended classes on robotics, other languages nor use technology requiring access to data at speed (3-D printers, goggles). Health Clinics were tolerating substandard video links that took data from all other online access for their duration.

State government services appear to not be accessing the capacity of the connectivity infrastructure investment in any of the subject communities with speeds of under 5mbps being recorded. Local government seemed to not experience these slower speeds. The reasons for these reduced speeds are unclear and possibilities include:

- Limited Government agency funding of data allowances,
- Telco service provider infrastructure arrangements/maintenance,
- Incorrect or suboptimal local equipment (e.g. old router modems),
- Data caps being exceeded,
- Cloudy or wet weather (satellite).

Despite this, there are important tangible benefits being delivered in the field of health to residents in these remote communities. The capacity to use telehealth is saving time and avoiding the costs of long-distance travel for follow up appointments, specialist consultations, speech and chronic illness support services. While there are questions as to why community purchased diagnostic instruments lie unused in (at least) two communities, there are also multiple examples of major benefits being delivered to those who would otherwise suffer disadvantage and arguably increased risk, without the expansion of health access allowed by connectivity.

Emergency services personnel have found that it is easier to inform communities of upcoming situations, to prepare contingencies and to keep information current– but SMS messaging is not available.

Conclusion

The digital connectivity project has demonstrated substantial social, economic and civic benefits through enhanced digital connectivity. The cable infrastructure has led to markedly improved internet connection and 4G mobile service has been particularly beneficial. However, in 2019, it appeared that state government services were not able to make the most of the technical enhancements, possibly because of constraints on access to data.

Some business enterprises are mostly adopting the technology and others are not. There is room to improve and build capacity by more in-depth knowledge of how to extend the reach and effectiveness of social media, to understand the potential savings and convenience through portals and apps, to know where to look for online learning and skills development. There is potential to develop and extend the skills and awareness needed to create online business activities. This is evident in efficiencies for tourism, agriculture and several new enterprises have been now possible online.

Digital connectivity removed one of the barriers to people being attracted and retained in these remote communities. The expected disadvantages of living remotely have been

mitigated by connectivity allowing them to enjoy the advantages of small community living. People can stay in touch, be entertained, educate themselves, shop and bank and make a living with online access. They would not stay without online access and this has resulted in several young couples making their home in these small remote communities. Community organising is enhanced, social connections are building, and quality personal communication is possible because of a range of personal and adaptable communication options, facilitated by online access.

The capacity to access online services through digital connectivity infrastructure has created a substantive and meaningful positive change to the quality of community economy, wellbeing and social life in these remote communities and has created and enhanced opportunities to welcome new people and opportunities. It is now considered essential.

Appendix 1. Research Framework Used to Assess Social and Economic Characteristics

Criteria	Indicator
Objective 1: Reliability and performance of voice telephony and digital connection	
Digital Connection	
Speed of digital connection	Upload speed
	Download speed
	The proportion of times when users experience what they see as high, adequate and poor speed
The extent of access	The area of each shire where the internet can be accessed
	The number of people who can access digital connection
The reliability of connection	The frequency of dropouts
	The proportion of times when access can be gained when people attempt to access digital connection
Quality of connection	The quality of connection e.g. poor audio/video in live connections.
Once Connected: The use of digital connection (segmented by user e.g. homeowner, business, service provider etc.)	The use of digital connection by users e.g. business, social, entertainment etc.
	The activities that are conducted on-line - Facebook, access to services, accessing information, ehealth etc.
Cost	Cost of digital connection
The extent of use	When digital connection is used - time of day
	The duration of digital connection - time of each session
Support	The ease of accessing technical support
	The usefulness/quality of technical support
Voice Telephony	
The reliability of voice connection	The frequency of dropouts
	The proportion of times when access can be gained when people attempt to access voice connection
Quality of voice connection	The proportion of times when users experience what they see as high, adequate and poor-quality voice connection
Use of voice connection	The purpose of voice connection - social, business etc.
The extent of use	When voice connection is used - time of day
	The duration of voice connection - time of each session

Objective 2: The development of digital capacity	
Level of digital competence	Users assessment of digital competence
Confidence to use digital	Users assessment of confidence with digital connection
Intention to use digital connection	Users intention to use digital - the extent of use
	Users intention to use digital - the purpose of use
	Why users intend to use digital in certain ways
How people gain capacity	Users responses about their intention to gain capacity
	Users responses about how they have gained capacity
Reasons for attitudes towards digital use	User responses about the attitudes they have towards digital connection
Objective 3: Changes in social/community characteristics as a result of digital connection	
Social Connection	
The use of digital connection for social interaction	The way in which digital connection is used for social interaction - the purpose of social use, who are communicating etc.
Interaction between people via digital connection	The level of communication and interaction between people via digital connection - how frequent, the nature of the interaction
Bridging social capital - Developing new contacts and relationships	The extent to which people may be developing new contacts through digital connection
Bonding social capital - Strengthening existing relationships	The extent to which people are interacting with existing contacts
	The perceptions of users about the strengthening of relationships (social capital) via digital connection
Linking social capital - interaction with institutions	The extent of interactions with institutions such as local government, state government, corporations etc. via digital connection
	User views of change in communication and relationships with institutions as a result of digital communication
Access to Services	
Ability to access services	The extent to which people are accessing services via digital connection e.g. proportion of people accessing services
	The experience that people have in accessing services via digital connection - quality of service, satisfaction with experience, outcomes of access.
The services that are accessed via digital connection	The nature of services being accessed - health, education etc.
Access to health services	The use of digital connection for accessing health services - nature of the service, information or service required, usefulness of service, outcomes achieved

Access to education services	The use of digital connection for accessing health services - nature of the service, information or service required, usefulness of service, outcomes achieved
Access to other services e.g. finance etc.	The use of digital connection for accessing health services - nature of the service, information or service required, usefulness of service, outcomes achieved
Objective 4: Changes in economic characteristics as a result of digital connection	
Activity of existing business	The extent of use of digital connection but existing businesses - nature of use, level of use.
	Attitudes towards the use of digital connection by business
	The development of internet presence by existing businesses
	The change in activity of existing businesses as a result of digital connection - sales, products, markets
Tourism	The use of digital connection in tourism
Agriculture	The use of digital connection in agriculture
Small business/retail	The use of digital connection in small business and retail
Local government	The use of digital connection by local government
	The economic contribution to the community from local government as a result of digital connection
New products and services	The development of new products and/or services via digital connection
New businesses	The extent to which new businesses have been established as a result of digital connection
	Intentions to establish new businesses as a result of digital connection
Development of new markets	The extent to which businesses have accessed new markets for products and services as a result of digital connection
Employment	Changes in employment that digital connection has contributed to
Investment	Examples of investment that may have been attracted as a result of digital connection
Implications for future socio-economic development	
Perceptions of future development	Views from community people about the implications of digital connection
	Views from community people about potential future use of digital connection

Appendix 2. Interview Questions

Baseline Assessment

Interviewee ID…….
Date: ……. Location: ……..

Interviewee identifies as:

☐ Householder ☐ Business – If so, what sector……
☐ Rural Landholder ☐ Local government ☐ Other ……

Connection

1. What internet and mobile phone access do you have?

☐ Internet. Accessed by…. ☐ Fixed phone line (ADSL) ☐ No internet
☐ Mobile (via Telstra)
☐ Satellite
☐ Mobile phone ☐ No mobile phone

If the respondent has any connection the following questions apply. If respondent does not have connection skip to question 9.

Reliability and performance

2. What is the **reliability** of connection re dropouts, ability to access?

3. What is the **quality** of connection i.e. speed, video/audio quality?

4. What is the **cost** of your connection?

Connection	**Data** (mbs per second)	**Cost** ($ per month
Internet		
Satellite		
Mobile phone		

Use

5. **How do you use** the internet e.g. business, social, entertainment etc.?

❒ Information search ❒ Social networking ❒ News ❒ Pay bills ❒ Videos
❒ Education services ❒ Instant messaging ❒ Maps ❒ Auctions ❒ Gambling
❒ Government services ❒ Health services ❒ E-mail ❒ Music ❒ Banking
❒ Employment services ❒ Shopping ❒ Skype ❒ Games ❒

6. **When do you use** internet connection?

❒ Morning ❒ Afternoon ❒ Early evening ❒ Late evening

Digital Capacity

7. What level of **skills** do you have in using the Internet?

8. Do you intend to **develop more skills** in using the Internet? If yes, then how do you intend to develop skills?

Voice Telephony

9. How **reliable is your fixed** telephone service?

10. **What do you use your fixed** telephone service for?

11. If you have a **mobile phone service, how reliable** is it?

12. What do you **use your mobile phone** service for?

Social/Community Characteristics

Social Connection

13. How do you generally **socialise** e.g. meet with friends, go to social events etc.

14. Do you **connect with people on the internet**? How do you interact on the internet – Facebook etc.?

15. How **frequently would you interact** with people other than people you live with?

16. To what extent do you **meet people you haven't met before**? How do you meet them?

17. To what extent do you **interact with people that you know already** (apart from people that you live with)? How do you interact with them?

18. To what extent do you **interact with organisations** such as local government, state government, large businesses etc. How do you interact with them?

Access to Services

19. What **services do you need or want to access** e.g. health, education, banking etc.?

20. How do you and your family access **health** services?

21. How do you and your family access **education** services?

22. How do you and your family access **other services** such as banking etc.?

23. How **easy** is it for you to access services?

Economic Characteristics

24. What is the level of activity of existing businesses in your shire i.e. activity in terms of turnover, number of customers etc.?

Small business/retail:

Agriculture:

Tourism:

25. Have many businesses do you think use the internet in your community?

26. For those businesses that use the internet, how much do you think they use it?

27. What do you think will be the impact of improved digital access on businesses?

28. To what extent are new businesses being established in your community?

29. To what extent do you think businesses are developing new products and/or services?

30. What is the availability of employment in your shire?

31. To what extent is investment being attracted to your community/shire?

If you operate a business, please answer these questions.

32. What is the level of activity of your business i.e. activity in terms of turnover, number of customers etc.?

33. To what extent do you use the internet in your business?

34. What do you think will be the impact of improved digital access on your business?

35. Are you expanding your business or planning to expand?

36. To what extent are you developing new products and/or services in your business?

37. What is the availability of employment in your business?

38. To what extent is new investment being made in your business?

39. Is there anything else that you would like to add?

Appendix 3. Likert Scale Scoresheet

Are you a:

☐ Householder ☐ Business – If so, what sector……
☐ Rural Landholder ☐ Local government ☐ Other ……

Connection

If you have any connection please answer the following questions. If you don't have any connection please skip to question 9.

Reliability and performance

1. What is the **reliability** of connection re dropouts, ability to access?

Not reliable at all Very reliable
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

2. What is the **quality** of connection i.e. speed, video/audio quality?

Very poor quality Very good quality
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Digital Capacity

3. What level of **skills** do you have in using the Internet?

No skills at all Very high level of skills
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

4. Do you intend to **develop more skills** in using the Internet? If yes, then how do you intend to develop skills?

Don't intend to develop skills Strongly intend to develop skills
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Voice Telephony

5. How **reliable is your fixed** telephone service?

Not reliable at all Very reliable
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

6. If you have a **mobile phone service, how reliable** is it?

Not reliable at all Very reliable
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Social/Community Characteristics

7. How **frequently would you interact** with people other than people you live with?

No interaction at all Very frequently
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

8. To what extent do you **meet people you haven't met before**? How do you meet them?

No new contacts at all New contacts frequently
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

9. To what extent do you **interact with people that you know already** (apart from people that you live with)? How do you interact with them?

No interaction with people I already know Frequent interaction
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

10. To what extent do you **interact with organisations** such as local government, state government, large businesses etc. How do you interact with them?

No interaction with organisations Frequent interaction
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Access to Services

11. How **easy** is it for you to access health services?

Very difficult to access Very easy to access
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

12. How easy is it for you to access education services?

Very difficult to access Very easy to access
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

13. How easy is it for you to access other services such as banking etc.?

Very difficult to access Very easy to access
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

14. How easy is it to prepare for community safety issues and emergencies?

Very difficult to prepare for Very easy to prepare
0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

15. How easy is it to manage community safety issues and emergencies?

Very difficult to manage — Very easy to manage

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Economic Characteristics

16. What is the level of activity of existing businesses in your shire i.e. turnover, customers?

Small business/retail:

Not Active — Very active

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Agriculture:

Not Active — Very active

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

Tourism:

Not Active — Very active

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

17. Have many businesses do you think use the internet in your community?

No businesses use the internet — Many businesses use the internet

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

18. For those businesses that use the internet, how much do you think they use it?

Very infrequent — Very frequent

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

19. To what extent are new businesses being established in your community?

No new businesses — Many new businesses

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

20. To what extent do you think businesses are developing new products and/or services?

No businesses are developing new products — Many businesses are developing new products

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

21. What is the availability of employment in your shire?

No employment is available — A lot of jobs are available

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

22. To what extent is investment being attracted to your community/shire?

No investment is being attracted — A lot of investment is being attracted

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

If you operate a business, please also answer these questions.

23. What is the level of activity of your business i.e. turnover, number of customers etc.?

Not Active — Very active

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

24. To what extent do you use the internet in your business?

Not at all — Use the internet a lot

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

25. Are you expanding your business or planning to expand?

No expansion — Expanding a lot

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

26. To what extent are you developing new products and/or services in your business?

No new products — Many new products

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

27. What is the availability of employment in your business?

Decreasing — No change — Increasing

-3❒ -2❒ -1❒ 0❒ 1❒ 2❒ 3❒

28. To what extent is new investment being made in your business?

No investment — A lot of investment

0❒ 1❒ 2❒ 3❒ 4❒ 5❒ 6❒

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