Assessing Digital Divide and its Determinants
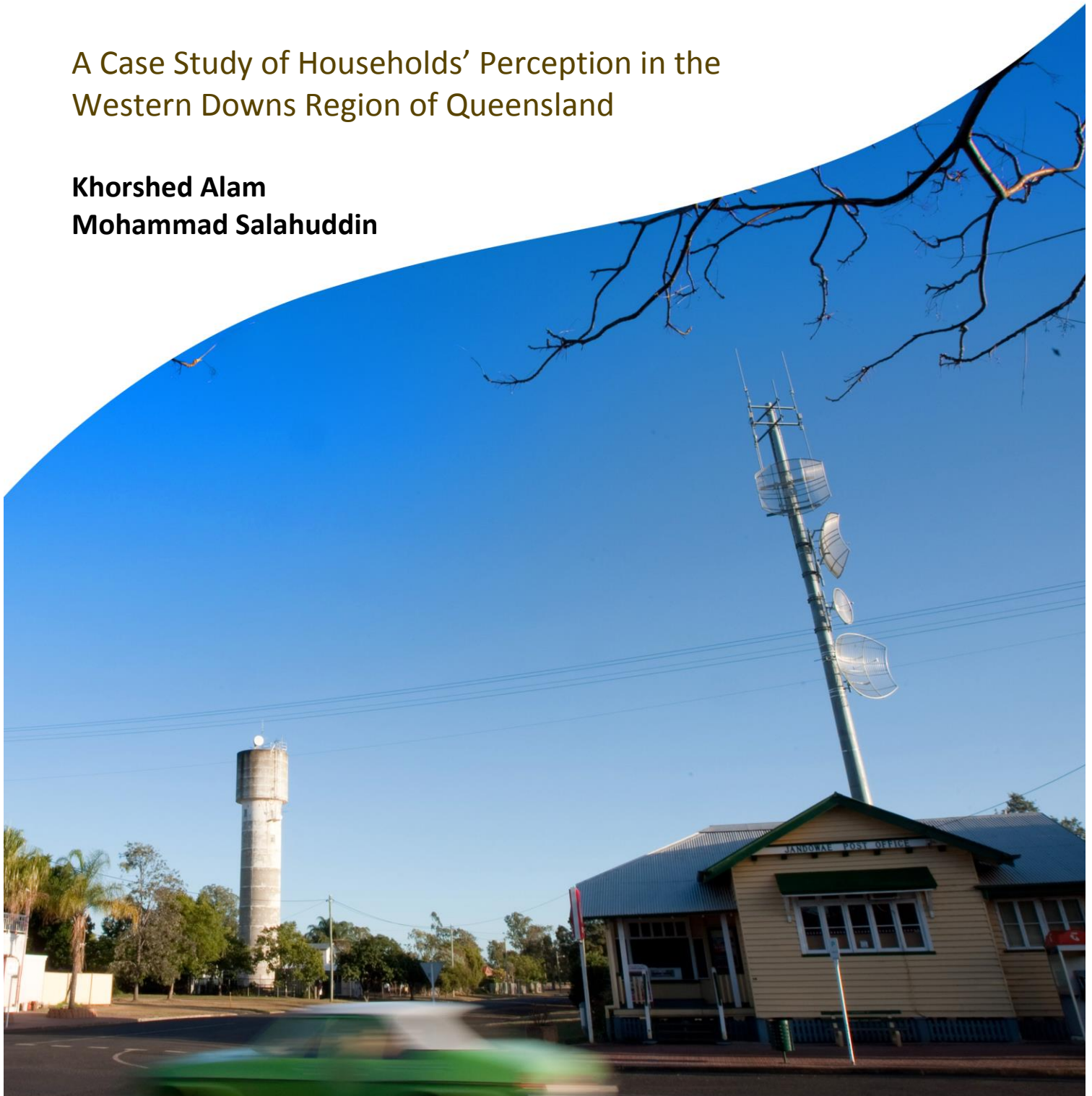
A Case Study of Households' Perception in the Western Downs Region of Queensland

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A Report Prepared for the Western Downs Regional Council

CONTENTS

Figures

Tables

EXECUTIVE SUMMARY

Purpose

The Internet has been transforming the Australian economy and society for almost two decades. But Internet penetration has grown at a spectacular speed in Australia in quite recent times. Its macro and micro impacts in the Australian context are well recognized. Despite the enormous influence of the Internet in shaping the Australian economy and society, limited research has been conducted to gain an understanding of Internet usage behaviour in Australian households and to assess how the Internet is impacting on them.

A few studies have voiced concern not only for the inequality in access to the Internet in different parts of Australia, but also for the different types of divides which exist with respect to, for example, age, education attainment, income and ability to use the Internet. Although the Western Downs region in Queensland is one of the most promising regions in Australia in terms of its economic strength, there has been no assessment of the role of the Internet in this region. The current study addresses this gap and examines Internet usage behaviour in Western Downs region households. The study also assesses the potential for broadband Internet to generate social capital at the regional level and, furthermore, it discusses the barriers to and opportunities for digital inclusion in the region.

Methodology

The study survey questionnaire was based on a literature review, expert opinions and several pilot tests. The reliability of the survey measures were tested by Chronbach's alpha.

Participants were selected through a simple random sampling design. Sample selection was based on the geographic distribution of the households, which was representative of the Western Downs region. A total of 2000 household addresses were randomly selected, from which 410 completed surveys were obtained.

Key findings of the survey relating to Internet usage

- 88% of the survey participants are Internet users, with access through broadband or dial-up services or access from elsewhere.
- 98% of the Internet users are broadband users.
- The Internet users comprise 47.21% males and 52.79% females.

Demographic factors that contribute towards the access divide

- 80% of the survey participants in the 45–54 year age group use broadband at home.
- 90% of the survey participants in the 35–44 year age group use broadband at home.
- 20% of the total broadband users are from the 35–44 and 45–54 year age groups.
- 61% of the survey participants in the 65 year and older age group use broadband at home.
- 10% of the broadband users are from the 65 year and older age group.

Gender divide

- Among the broadband users, 45.45% are males while 54.55% are females.
- 80% of the total female participants in the survey are broadband users.
- 80% of the total male participants in the survey are broadband users.

Correlation

- There is significant positive correlation between income and Internet access.
- There is significant positive correlation between education status and Internet access.
- There is significant negative correlation between age and Internet access.

Skills and use of the Internet

- A skill index has been developed by the summated scale method.
- Internet skill and use are statistically significantly associated. The relationship is positive, i.e., people with higher Internet skills use the Internet more than people with low skills or lack of skills.

Diversity of the use of Internet

Broadband is used for multi-dimensional purposes. This reflects varying degrees of perception and understanding among households about the use of the Internet at home:

- 80% of the Internet users use e-mail.
- 56% of the Internet users use social networking sites.
- 28% of the Internet users read newspapers.
- 24% of the Internet users play games.
- 12% of the Internet users participate in gambling.
- 48% of the Internet users download items.
- 40% of the Internet users upload files.
- 30% of the Internet users watch music, videos, movies etc.
- 25% of the Internet users use online video communications such as Skype.
- 41% of the Internet users shop online.
- 40% of the Internet users use broadband for education and e-learning.
- 70% of the Internet users use broadband for banking.
- 50% of the Internet users perform job-related activities.
- 24% of the Internet users use broadband for job searches.
- 67% of the Internet users pay bills online.
- 38% of the Internet users access government services.

Key reasons for not having Internet at home

- 27% of the survey participants are not interested in the Internet.
- 23% of the survey participants can use the Internet elsewhere.
- 15% of the survey participants do not use the Internet because of its slow connectivity and lack of access.
- 12% of the survey participants do not use the Internet because it is too costly for them.
- 5% of the survey participants said they do not know how to use the Internet.

Determinants of Internet usage behaviour

Based on the literature review, an extended Technology Acceptance Model, which includes the following determinants, is proposed: perceived ease of use, perceived usefulness, accessibility, affordability, self-efficacy, attitude, Internet literacy and Internet usage.

- 64% of the Internet users said it was easy to connect to the Internet from their home.
- 72% of the Internet users said that learning to use the Internet is easy.
- 73% of the Internet users agreed that the Internet helps them to complete their tasks quickly.
- 76% of the Internet users considered that the Internet helps them in learning and developing new skills and knowledge.
- 55% of the Internet users think that the cost of their Internet connection is reasonable.
- 70% of the Internet users believe that the Internet is user friendly.
- 75% of the Internet users feel that they are able to use the Internet confidently.
- 80% of the Internet users have a positive attitude towards the Internet.
- 60% of the Internet users believe that the Internet has a positive effect on their work performance.
- 73% of the Internet users use the Internet regularly (at least once a day).
- 72% of the Internet users believe that they use the Internet effectively.
- Over 70% of the Internet users use the Internet for multi-dimensional purposes such as e-mail, downloading, uploading, shopping, banking, paying bills, social networking and video conferencing.

The evidence in this study strongly supports the view that all of the theoretically proposed determinants of Internet usage influence the use of the Internet.

Internet usage and social capital

An extensive literature review clearly establishes the opinion that Internet use generates social capital. The social capital constructs are: neighbourhood effect, community cohesion, bridging social capital, bonding social capital and trust.

- 47% of the Internet users said that the Internet helps them with better and more coordinated engagement with their neighbours.
- 62% of the Internet users believe that the Internet helps them to be better connected with their community, including social and sporting groups.
- 55% of the Internet users commented in favour of the Internet's role in strengthening their trust in family and friends.

- 60% of the Internet users regularly use social networking sites for interaction with friends, family and others.

- 70% of the Internet users consider that the Internet has made them politically more conscious and participatory.

This evidence from the survey demonstrates support for the hypothesis that the Internet has the potential to generate social capital in the region.

Non-users of the Internet

- 12.5% of the survey participants were not users of the Internet.
- The non-users group comprises 51% female and 49% male persons.
- The highest percentage of non-users (32%) is in the 65 year and older age group.
- The highest percentage of the non-users (30%) completed high school education only while the rest belonged to other categories such as less than primary education, primary education, trade certificate, Bachelor degree and postgraduate education.

Policy implications and further research

This study informs policymakers about the key barriers to the use of the Internet in households in the Western Downs region, highlighting certain socio-demographic groups which are lagging in adopting the Internet. The findings in this study can be used by policymakers to guide investments and strategies to encourage these groups to use the Internet in order to increase their human and social capital. This study also indicates that reducing financial and social barriers to access to the Internet is not likely to address access inequalities unless efforts are also directed towards providing the skills and support necessary for using the Internet. In light of this research, policymakers may consider easier and more affordable community access to the Internet combined with support tailored to users to encourage the uptake of the Internet by the already disadvantaged.

It is evident from the survey that digital divides with respect to age, income and education exist in the region. Also, another form of divide – skill divide – is evident from the survey. Empirical literature argues that the digital divide hampers economic development. Therefore, it is important that digital economic strategies designed and formulated for making the Western Downs a resilient region incorporate appropriate strategies to overcome these digital divides.

The economy of the region is set to change with a looming resources boom, so a priority for policy makers should be to consider initiatives for promoting education, providing information and communication technology training for the elderly and other

disadvantaged people, and developing digital skills for people in the region generally. Such initiatives could help to make the region's economy more robust and resilient. Further in-depth research is expected to bring new issues on the surface that will be more effective to address the barriers towards digital inclusion in the region.

CHAPTER ONE

Introduction

1.1 Background

The Internet is now transforming the economy of Australia (Bowles, 2012; Deloitte Access Economics, 2011). Australia has been pursuing the Internet and addressing digital divide policies since the early 1990s (Notley and Foth, 1998). An overwhelming majority of Australians are now Internet users (Ewing and Julian, 2012). In 2013 the percentage of Internet users was estimated at 83%, up from 79% in 2011 and 73% in 2007. The vast majority of household Internet connections are now via broadband (98%), while the proportion of Australians accessing the Internet through a mobile device more than doubled between 2009 and 2011 from 15% to 37% (ABS, 2014; Ewing and Julian, 2012).

As information and communication technology (ICT), especially Internet use, increased enormously with the passage of time, the rapid growth resulted in a kind of social inequality in the form of a gap between those who have access to and ability to use the Internet and those who do not. This phenomenon is popularly known as the 'digital divide'. Because of the impact on the economic and social aspects of ICT, this uneven diffusion of the Internet has attracted the attention of many scholars and government agencies (Zhang, 2013). In Australia, despite the rapid growth in Internet use, it is evident that a digital divide in the use of the Internet exists as a result of variations in geographic locations, for example, there is an urban–rural inequity, and that it has not declined (Alam and Imran, 2015; Broadbent and Papadopoulos, 2013; Ewing and Julian, 2012; Bowles, 2012). Recent evidence indicates that the factors contributing most to the digital divide in Australia are income, age, tertiary education and indigenous heritage. Currently, this digital divide risks widening further in some rural and regional communities (Alam and Imran, 2015; Bowles, 2012).

The widespread adoption of high-speed broadband Internet has been linked to economic growth and social well-being (Dwivedi et al., 2009; Reede, 2011). The ready availability of broadband for business and households is well understood as a factor in any modern nation's efforts to stimulate growth (Bowles and Wilson, 2010). Australia is currently implementing the largest ever telecommunications infrastructure project – the National Broadband Network (NBN) – to build high-speed broadband network across Australia, including rural and remote areas in a bid to address the digital divide (DBCDE, 2011). The success of the NBN in alleviating the digital divide is of paramount importance as broadband is considered to be the backbone of the regional ICT development.

Although the Internet has the potential to generate social capital through network externality (Notley and Foth, 2008), no recent study has examined the role of Internet usage in generating social capital in the Australian regional context. Social capital consists of resources that are accessed through social interactions generated through the social network. By facilitating the social network among both heterogeneous and homogeneous groups of society, the Internet enhances social interaction, social involvement and social participation resulting in increased productivity and efficiency in human capital and a more productive society which leads to the building of social capital. Charleson (2012) argues that enhancing empowerment and social capital through the Internet for those already burdened with other disadvantages and marginalization could be a potential means of narrowing the digital divide in Australia.

Recent data confirms that the rural and remote areas in Australia are disadvantaged in terms of various socio-economic indicators in comparison to its urban counterparts (ABS, 2013). It is argued that social inclusion through social interaction at the community level could play a vital role in narrowing the digital divide at the regional level (Alam and Imran, 2015; Broadbent and Papadopoulos, 2013). The Internet has the potential to generate social capital in Australia through the inclusion of people in rural and regional areas who are disadvantaged digitally. Improvement of the digital inclusion of households and businesses in remote and rural areas is a major policy concern in Australia (DBCDE, 2011).

Regional studies in Australia on these issues are largely inadequate. Most of the studies on Internet use and the digital divide have focused on small cities and towns (e.g., Rennie et al., 2013; Broadbent and Papadopoulos, 2013; Charleson, 2012; Atkinson et al., 2008); few are on the divide between metropolitan and non-metropolitan areas (Simpson, 2005). So, there is a significant gap of knowledge about Internet use, the digital divide and social capital in a regional or local government area context. Therefore, the attempt to address the issue in the Western Downs region of Queensland is justified.

1.2 Statement of the problem

The combination of widespread network coverage, sufficient data transfer capacity, affordable devices and connectivity options in Australia has encouraged a growth in services and ways in which people use the Internet. Policy makers in different government regimes have been focused on policies related to the Internet and ICT. The expansion of the broadband network has been a key policy priority. However, despite advances in connectivity, certain segments of the population are much more likely to use the Internet

than others. Demographic characteristics such as lower income and educational levels are also correlated with lower levels of Internet access (OECD Economic Outlook, 2013).

To promote Internet usage further and to reduce the digital divide, policy makers in Australia now consider the Internet as the core of the country's communications infrastructure in much the same way as electricity, water and transport networks. It is also argued that the social capital generated through Internet-based social networking can be a potential means of narrowing the digital divide, especially in rural and regional areas, and so it has been recommended as an integral part of the digital divide policy in Australia (Charleson, 2012; Notley and Foth, 2008).

Therefore, the key issues identified in Australia with regards to the diffusion of the Internet and the digital divide are:

- The role of the Internet in boosting economic growth is increasingly prominent.
- To improve digital inclusion of households and businesses in remote and rural areas is a major policy concern.
- Digital divide due to income, age, education and ethnical diversity persists and is currently in the danger of increasing.
- Social capital generated through Internet-based network externality has the potential to reduce digital divide.

1.3 Project objectives

The two key objectives of the project are:

- Examining the households' use of broadband; and
- Understanding the digital divide and its determinants.

The specific research questions to be addressed through this study are: (i) what is the current status of broadband Internet use by the households, (ii) is there any evidence of digital divide in the region? and (iii) what are the barriers to digital inclusion?

1.4 Conclusion

Internet use in Australia is increasing rapidly and is believed to have a significant impact on its economy. However, this positive effect is not without an opportunity cost. The expansion is causing various forms of digital divide in regional Australia.

The Western Downs region, an economically highly prospective region of Queensland, has experienced a mining boom recently. It is not desirable to allow the digital divide to constrain its economic potential. This study examined the perception of the households' Internet use and to identify the contributing factors for the digital divide. The outcome of this and any other similar studies can be expected to contribute to reducing digital divide in regional Australia. This investigation is timely given that Australia is in a race to be a global leader in building a knowledge-based digital society.

CHAPTER TWO

Literature Review and Methodology

2.1 Internet use and global digital divide[1]

The digital divide was first defined as a gap between those who have access to the Internet and those who do not (the 'first level digital divide'). As the Internet became more accessible, researchers have reconceptualised this concept by focusing on the inequities of the use of the Internet (the 'second level digital divide'). Hargittai (2002) pointed to the importance of skill as a second level digital divide.

Palfrey and Gasser (2008) argue that the main issue is not just access to ICT, but also digital literacy. Recent studies (Borislov and Serven, 2013; Pedrozo, 2013) support this argument. Borislov and Serven (2013) caution that the disparity between those who are experienced users of the Internet and those who lack the skills to use it or are new users has created another divide which they termed the 'second digital divide'. Pedrozo (2013) argues that a lack of computer literacy, and cultural and economic factors affect disadvantaged youth in a more radical way and may restrict even more their chances to participate in the increasingly demanding and globalised labour markets. A 'third level digital divide' was linked with the knowledge gap by some researchers (Van Dijk and Hacker, 2003; Wei and Zhang 2006). This implies that a divide also exists as a result of inequality in the use of the Internet due to a disparity in the education level of different classes of people and societies. Another divide – the 'net generation divide'– was mentioned by some researchers (Toledo, 2007). This is the divide between the 'digital natives' (young people who have grown up with ICT, particularly the Internet) and the 'digital immigrants' (older people showing less technological affinity and literacy than younger people).

However, in the second decade of the 21st century the digital divide now refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access ICT and their use of the Internet for a wide variety of activities (OECD, 2013). Rasanen (2006) argues that the digital divide is an indication of serious and more critical divides – social, economic, educational and developmental. It adds a fundamental component to existing sources of inequality in a complex interaction as seen in poor countries where deprivation, illiteracy and basic needs such as food, health care, housing and wellbeing are unattended. These factors create barriers and account for differences in Internet access and use in developing countries and within disadvantaged groups in developed countries such as Australia (Alam and Imran,

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[1] This section of the literature review is largely drawn from Salahuddin and Alam (2013).

2015; Neumayer et al., 2010; Newman et al., 2010) where forms of digital divide due to socio-demographic factors as well as digital literacy or digital skill persists.

A significant number of recent studies have dealt with quantifying the digital divide by means of composite indicators or indices. These indices proved to be a very useful tool for understanding the multi-dimensionality of the concept of digital divide across countries (Vicente and Lopez, 2011). In this context, several authors have successfully incorporated the various dimensions of digital divide into an index by means of factor analysis. Using this technique the International Telecommunications Union (ITU) launched several indices such as the Digital Opportunity Index and the ICT Development Index to measure digital divide (for a detailed explanation of ITU indices, see World Economic Forum Report, 2012).

Other related works address the composite approach which seems to be the most frequent index. For example, Hanafizadeh et al. (2009) propose a cross-country index on ICT infrastructure and access and Barja and Gigler (2007) apply the notion of a digital poverty line in the Latin American context in particular. There are some works that use simpler indexes (Polat, 2012). However, Bruno et al. (2011) criticize several indexes for digital divide measurement and propose alternatives using a multivariate approach.

At the macro level the main causes of the digital divide include the wealth of a country, lack of infrastructure and relatively high cost of computers and connections, the relationship between politics and the Internet, digital literacy and the education system in the school (Binde, 2005). At the micro level, the influential factors include socio-cultural and economic variables such as location, race, gender, age, income levels, educational background, social support (mainly from school and parents), and variation of Internet use.

Empirical research shows that the most powerful factor causing disparity in ICT adoption is economic wealth between countries, regions and individuals (Vicente and Lopez, 2011; Waber and Kauffman, 2011). Chinn and Farlie (2010) find that per capita income is the single largest factor explaining digital divide. But gender was a cause of digital divide (Papastergiou and Solomonodou, 2005). They show that females are less frequent users of computers than males. Billon et al. (2009a) find that the proportion of the regional population with tertiary qualifications is positively correlated with the Internet and e-commerce adoption.

Population size and its socio-demographic features also explain the digital divide across territories. Many studies discuss the influence of education on access to ICT (Bowles, 2013; Atkinson, 2008, McLaren and Zappala, 2002, Curtin, 2001). Age is another factor that significantly impacts on access to and use of the Internet (Bowles, 2013; Lloyd and Hellwig, 2000). It is believed that gender divide is gradually closing in Australia (Bowles, 2012). Also,

children may generate a stronger demand for technology especially for educational purposes (Chinn and Fairlie, 2007). It is therefore expected that having more people with tertiary education is positively correlated with the Internet diffusion and e-commerce adoption (Vincente and Lopez, 2011). Schleife (2010) finds a negative relationship between the proportion of foreign population and the rate of Internet users.

A few studies consider the determinants of digital divide within countries. For example, for 44 countries over the period from 1990 to 1997, Dasgupta et al. (2005) find that digital divide exists in terms of Internet subscriptions per mainline telephone not in terms of Internet intensity, and income differentials and urbanization also contributed towards digital divide. Using data for 118 countries from 1997 to 2001, Guillen and Suarez (2005) find that the global digital divide as measured by cross-national differences in Internet use is the consequence of countries' economic, regulatory and socio-political characteristics as well as their evolution over time. Chinn and Fairlie (2007) examine 161 countries over the period of 1999–2001 and show that the global digital divide is mainly accounted for by income differentials.

Internet usage also generates a network effect. The term 'network effect' comprises social influence exerted by the user network that surrounds current non-users. Agarwal et al. (2005) state that the existence of such social networks can further increase the Internet adoption probability. Whatacre and Mills (2007) confirm that network externality plays a role in explaining ICTs' urban–rural divide. Schleife (2010) corroborates the existence of such network effects. The network effect is identified as an important factor to accelerate diffusion in another study (Andres et al. 2010). Also, the speed of access to the broadband is a powerful factor affecting Internet maturity level.

It is evident from the literature that a global digital divide exists. Despite proactive measures, it is not going to be eliminated soon unless targeted measures are undertaken at all levels of government.

2.2 Internet use and digital divide in Australia

Recognising the important role of the Internet in shaping Australia's economy, a significant amount of literature has devoted attention to digital divide in the Australian context. Recent studies on Internet use and digital divide in Australia indicated that despite a significant increase in the level of use, a digital divide resulting from factors such as a lack of tertiary education, age, affordability and being an indigenous person persists.

Renni et al. (2013) find that some indigenous communities in remote Australia (known as outstations) are unlikely to have access to the Internet at home. They identified affordability as one of the key barriers to Internet use. Other barriers they mentioned were a lack of English literacy, security of hardware and the issue of limited or poor power supply. The study also recommends education, online services and entertainment space for promoting the uptake of the Internet. Charleson (2012) argues that enhancing empowerment and social capital through the Internet for those already burdened with disadvantage and marginalization could be a potential means of narrowing the digital divide in Australia. Social inclusion through interaction at the community level could also play a vital role in redressing the digital divide in regional Australia (Alam and Imran, 2015; Broadbent and Papadopoulos, 2013). Bowles (2011) identifies income, education, age and ethnical diversity as the key reasons for the digital divide in Australia. Lee (2011) highlights inequity in the ability and skill to use the Internet in Australia and focuses on the Australian government's programs and policies aimed at redressing the digital divide. The study also focuses on government facilitated educational and informational policies designed to reduce the digital divide. It recommends further educational measures to enhance peoples' ability to take advantage of technology and to reap the maximum benefits from the roll out of the NBN.

Atkinson et al. (2008) while exploring digital divide in the Australian regional city of Albury found digital divide is related to income and different city locations. The study also identifies age, education and income levels as key factors contributing to digital divide in the city. Notley and Foth (2008) discuss the concept of a 'network society thesis' as introduced by Castells (2000) and subsequently popularised by Barney (2004), and explain how it has extended the information/knowledge society principle by providing a way to understand and value new forms of Internet participation. They argue that within the network society thesis, social capital and social inclusion can be understood as two frameworks that may be used by policy makers to define the social benefits of Internet participation and focus on funding and initiatives which would aim to ensure that these benefits are strengthened and dispersed more equally.

Data from the ABS (2007) indicate that households in Australia which are less likely to be connected to a computer and/or the Internet have particular characteristics, including low household income, the number of children under 15 years and being located in non-metropolitan or remote areas. Willis and Tranter (2006) analyse Internet use employing national survey data of Australia over the period 1998–2003 and identify persisting barriers to Internet use in Australia. They argue that despite some increase in accessibility to ICT, further technological diffusion should have widened this accessibility. Household income, age, education and occupational class remained key factors for the digital divide in Australia. Byrne and Staehr (2006) use ABS data from a Multipurpose Household Survey to indicate that the gender gap is on the decline in Australia.

Feldman (2004) find that poor English language and literacy skills affect Internet use. He argues that those with an English language background are more likely to find using the Internet easier than those without, because Internet features and software are mostly available in English. Riley (2004) finds that females in Australia use the Internet less often than males. This finding was supported by ABS (2007) which confirmed that 53% of Australian males use the Internet compared to 47% of females. Gibson (2003) warns that despite the increase in computer use and Internet access, digital divide was not decreasing in Australia then. The factors he identified as contributing to the digital divide were income, education, age, location, disability, opinion, gender and culture. Curtin (2001) suggests that the level of education is a key factor in predicting Internet access in Australia. Keller (1995) indicates that education and income are the most likely determinants of society's access to the Internet. Alam and Imran (2014) find a digital divide in refugee migrant communities in regional communities in Australia that is specifically related to income, mobility and isolation.

2.3 Theoretical framework for Internet use behaviour

Behavioural theories on technology typically focus on the analysis of individual behaviour. The Technology Acceptance Model (TAM) developed by Davis (1989) is one of the most cited theoretical frameworks to predict the acceptance and use of new ICT. The theoretical foundation of TAM is the theory of reasoned action developed by Fishbein and Ajzen (1975) and the theory of planned behaviour proposed by Ajzen (1985). These theories emphasise peoples' assumed rational behaviour, behavioural attitudes, subjective norms, intentions to use and actual use.

TAM is regarded as the most robust and influential model for explaining ICT adoption and/or usage behaviour (Venkatesh and Morris, 2000a; Venkatesh et al., 2003). The TAM was later extended by introducing factors from related models, incorporating alternative

belief factors and examining antecedent and moderating factors so that the existing usefulness and ease of use constructs were expanded to create the Unified Theory of Acceptance and Use of Technology Theory (Venkatesh et al., 2003). According to these theories, an individual's intention to adopt and usages are influenced by four theoretical constructs: effort expectancy, performance expectancy, social influence and facilitating conditions. Based on the extensive literature review, this survey uses an extended TAM with the following constructs: perceived usefulness, perceived ease of use, accessibility, affordability, Internet literacy, behavioural attitude and Internet use. These constructs had satisfactory reliability scores (higher than 0.7).

2.4 Methodological issues: Survey development

The aim of this research was to solicit residents' views on their adoption of the Internet. The phenomena were studied in detail in the Western Downs region in Queensland. Extensive amounts of theoretical and empirical literature were consulted to develop an extended TAM. A questionnaire based on the constructs was designed. During the preparation of the questionnaire, experts' opinions were obtained and the questionnaire was adjusted, corrected and modified. Quantitative data were obtained from two consecutive pilot tests. Significant changes were made after the first pilot test and the improved questionnaire was used in the second pilot test which was distributed to a cross-section of households having different socio-demographic characteristics. The questionnaire then received further comment from experts. The reliability of the survey measures were then tested. This process eventually led us to develop and prepare the final questionnaire. Different forms of potential bias were handled in an appropriate manner.

The questionnaire and survey procedures are approved by the University of Southern Queensland's Human Research Ethics Committee.

2.5 Study area

The Western Downs Local Government Area, the Western Downs Regional Council, covers a total of 38 004.7 km^2. The area comprises the statistical local areas of Chinchilla, Dalby, Miles-Wandoan and Tara. There were 32 872 people residing in the Western Downs region in 2012. The key centres in terms of population and economic activity are Dalby, Chinchilla, Miles, Tara, Jandowae and Wandoan (Map 1). The region's economy is based on strong mineral resources (mainly thermal coal, coal seam gas and liquefied natural gas) and agricultural sectors, with primary production of beef, cotton, grains and wheat. The region is considered an emerging energy and resource based one in Australia. The region is promising

with its booming mining sector and agriculture and forestry. Despite significant economic potential, the region lacks business diversity (Alam and Shahiduzzaman, 2015). The NBN can play a significant role in accelerating the region's business and economic activities and will reduce its backwardness in ICT access.

Map 1: The Western Downs region.

2.6 Target population

The target population includes all households living permanently in the Western Downs region. Fly-in fly-out, drive-in drive-out or migrant workers temporarily living in the region are excluded from the sampling frame. Residents were contacted by phone initially (using the electronic White and Yellow Pages). Participants were selected after a household consented to participate in the survey. If a household declined to participate, it was

replaced by the household next to it. A brochure and a consent form were sent to all selected households.

The sample size and the inclusion of all household residents, with the exception of those who refused to participate in the survey, established the study population. Responding to the survey was voluntary. Data were collected directly from respondents. Only the household member randomly selected could answer the questions. Interviewers asked for and recorded the best time to call back in order to complete the interview and follow-up calls were made at different times throughout the collection period.

2.7 Sampling and recruitment

Sample selection, based on the geographic distribution of the household, was representative of the households in the region. In deciding the number of samples to be drawn from the four statistical local areas the sample was chosen based on the population of each area so that it is representative of the population. Anybody over 18 years of age was invited to complete the survey questionnaire. There were 410 completed survey questionnaires: 432 questionnaires were returned from which 22 were omitted due to the large number of missing values. The non-missing variables of the questionnaire were examined and no peculiar characteristics were found to justify the decision for list-wise deletion, which is the best option under such a situation (Allison, 2002). The process of data collection started early in April 2014 and ran through to the end of June 2014. The data were analysed both qualitatively and quantitatively using the SPSS.

2.8 Conclusion

The extensive literature review shows that while Internet use is increasing significantly a digital divide persists in Australia. Most of the empirical research in Australia supports this claim. An in-depth investigation using current data to examine ways to further promote Internet use while addressing the issue of digital divide is significant for regional Australia.

Based on the review of the literature, this study applied an extended TAM to assess the households' attitudes towards the Internet and the contributing factors for digital divide in the Western Downs region. The satisfactory reliability scores endorses the theoretical framework adopted in the survey.

A complete effort was made to ensure that all of the survey procedures were appropriately and sequentially performed. These procedures involved designing a draft questionnaire, pilot testing, consultation with experts, correcting and modifying the draft questionnaire,

distributing a revised questionnaire to validate the representative sampling technique, and distributing and obtaining the final questionnaire forms.

CHAPTER THREE

The Digital Divide and its Determinants

This chapter first of all provides a socio-demographic profile of the participants, i.e., the distribution of all survey participants in terms of their gender, age, education and occupation. Then there are statistics on the digital divide due to differences in the socio-economic profile among the households. It shows the extent to which digital divide exists in the Western Downs region in terms of the socio-demographic variables. Various cross tables show the disparity in Internet access with respect to the socio-demographic variables. Finally, correlation analysis demonstrates a clear picture of the digital divide in the Western Downs region with respect to these variables.

3.1 Demographics of the sample

Of the 410 participants who completed the survey, 170 were from Dalby, 120 from Chinchilla and 60 each from Tara and Miles-Wandoan. The gender distribution of the participants was 54% female and 46% male (Fig. 3.1). The participants ranged in age from 18 years up to more than 65 years. The sample was dominated by participants belonging to the 35–44 and 45–54 age groups (19.51% and 21.7%, respectively; Fig. 3.2). The majority of the participants had completed high school education and/or a trade certificate diploma (around 67%) while the percentage of postgraduate degree holders is low (Fig. 3.3). The biggest occupational group was the professional category (14.6%) while the number of retirees was significant (11%) (Table 3.1). The income of almost 48% of the participants was over $60 000, but almost 20% of the participants did not provide income information (Fig. 3.4). The highest percentage of people who did not have an Internet connection was the 65 years and above age group. Participants who did not use the Internet at all totalled 8%.
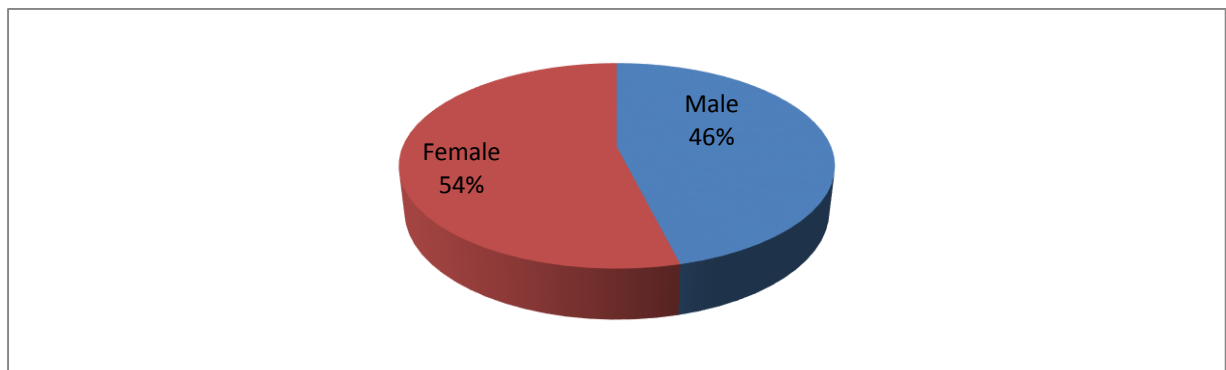
Figure 3.1: Gender distribution of participants.
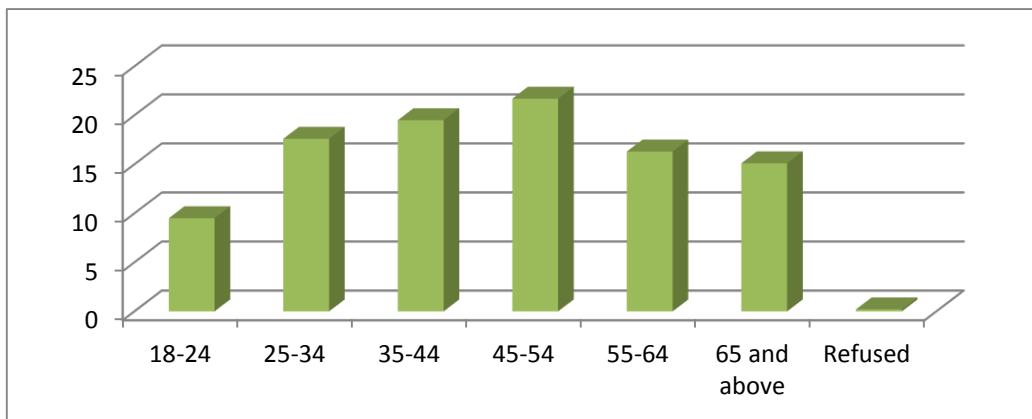
Figure 3.2: Age distribution of the participants.
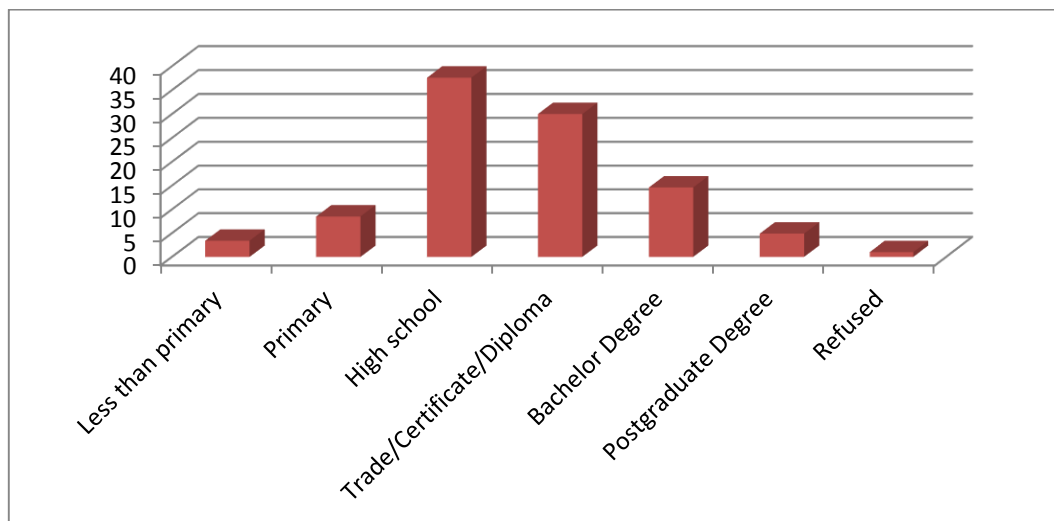
Figure 3.3: Level of education of the participants.

Table 3.1: Survey participants by occupation.

Occupation	Frequency	%
Technician or tradesperson	53	12.9
Manager	39	9.5
Professional	60	14.6
Clerical or administrative worker	36	8.8
Machinery operator or driver	28	6.8
Home duties	29	7.1
Retired	45	11.0
Unemployed	10	2.4
Grazier or farmer	22	5.4
Other	86	21.5
Total	410	100.0

Average household income (before tax)
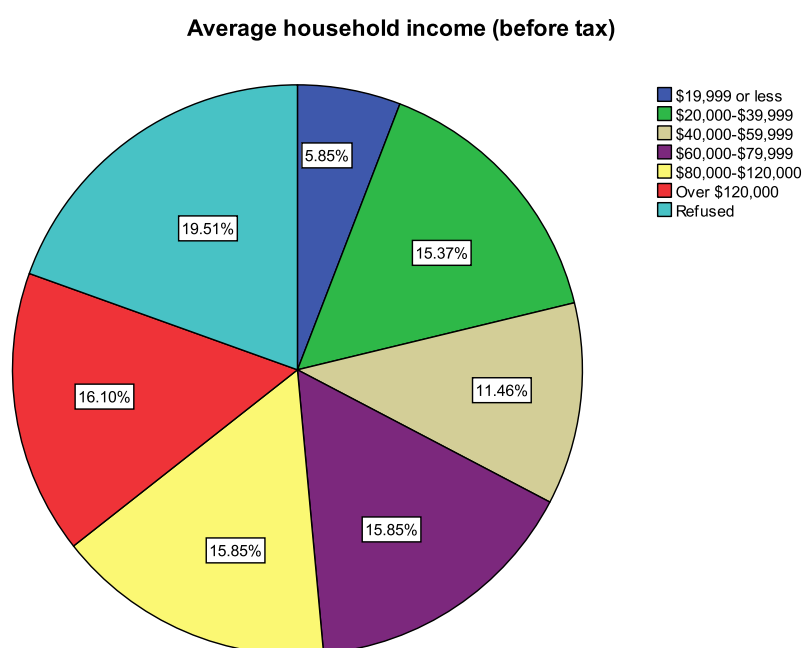
Figure 3.4: Distribution of average household income (before tax).

3.2 Internet access in households by individuals

An increasing number of people are using the Internet for their daily needs and it has become an integral part of their daily lives. There are four key types of Internet access available in the study area – broadband through Telstra's copper network (e.g., ADSL, ADSL2+), fibre, wireless (including 3G and 4G) and satellite. Few of the households were connected through dial-up and other technology, including the Telstra and Optus HFC networks.

Over 87% of the participants have Internet access at home. About 83% of the participants with Internet access had a broadband connection and a little over 2% had a dial-up connection. The majority of the broadband connections were through wireless (40.3%) and ADSL/ADSL2+ (32%).

3.3 Disparity in Internet access in terms of demographic variables

Digital divide due to gender is almost absent in the Western Downs region. More females have been found to use the Internet, and broadband access, than males (Fig. 3.5). This is consistent with earlier studies that were optimistic about the lack of a gender divide in Australia.
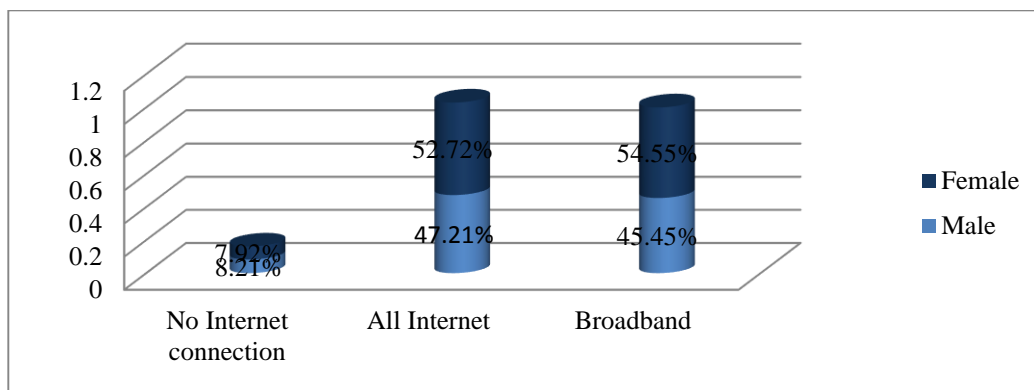
Figure 3.5: Gender distribution of Internet users.

Most of the Internet users in the survey were aged between 35 and 54 years (Fig. 3.6).
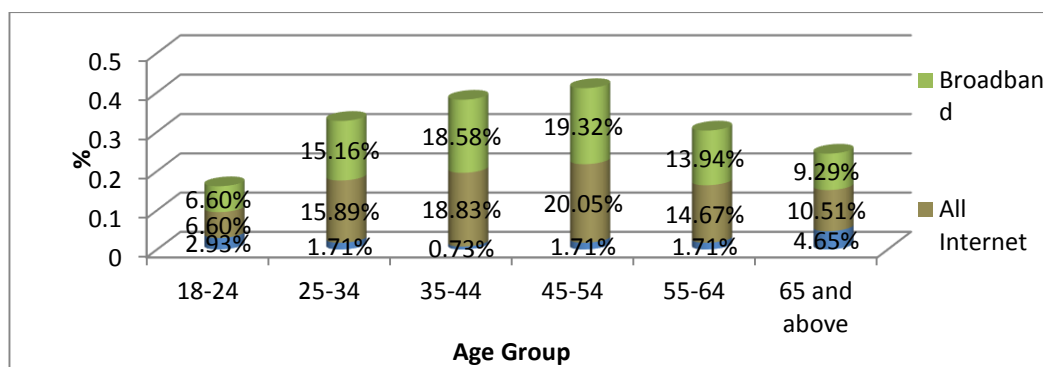
Figure 3.6: Distribution of Internet use by age group.
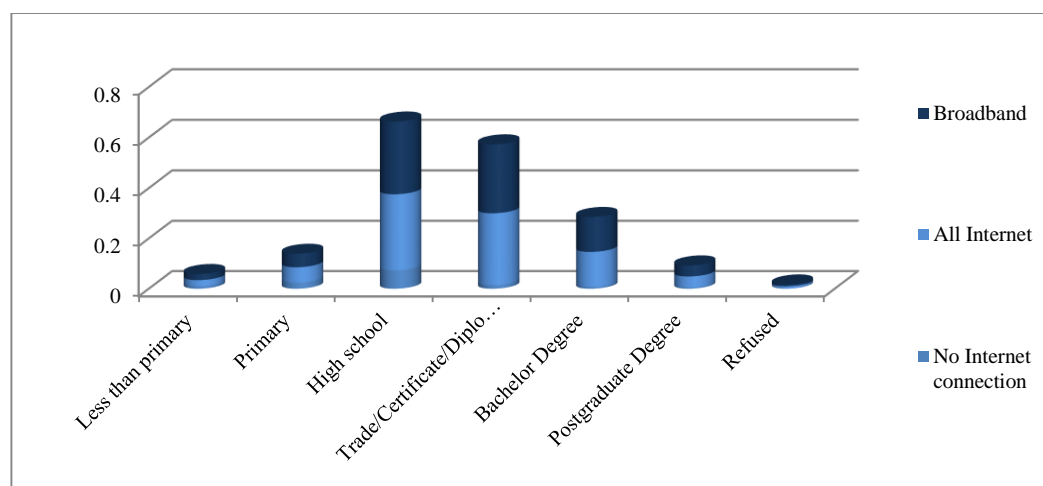
Figure 3.7: Education of the participants with Internet access.

An education divide exists in the region. Ninety percent of the participants having the highest level of education (a postgraduate degree) use broadband (Fig. 3.7) while less than 75% of the participants with minimal education (less than primary) have access to broadband.

Digital divide due to disparity in income is strong in the Western Downs region. Almost 99% of the participants in the highest income bracket of the region use broadband while slightly more than 75% of the participants in the low income group do so (Table 3.2). This finding is consistent with most of the empirical studies which support the view that income is a vital factor in digital divide.

Table 3.2: Income distribution of the participants having access to the Internet.

Level of household income (before tax)	No Internet connection	All Internet connection	Only broadband connection
$19,999 or less	11	12	12
$20,000–$39,999	14	49	46
$40,000–$59,999	8	38	36
$60,000–$79,999	4	60	59
$80,000–$120,000	2	64	62
Over $120,000	1	65	62
Total	55	352	341

Also, the presence of digital divide due to age is apparent. Relatively older people have been found to use the Internet less than their younger counterparts.

All the key factors identified in recent literature (e.g., Alam and Imran, 2015; Bowles, 2012) as being responsible for digital divide in regional Australia are present in the Western Downs region.

3.4 Correlation between Internet use and demographic variables

Table 3.3 shows that there is a statistically significant positive correlation between Internet use (hours spent per week), income and education. A negative significant correlation is found between age and the Internet use (-0.08) which means that the older participants spend less time on the Internet than the younger participants. No significant relationship between gender and Internet use is found in the Western Downs region. This finding corroborates the recent claim in the empirical literature that the gender divide in Australia was closing (Atkinson *et al.,* 2008).

Table 3.3: Correlation between Internet use and socio-economic variables.

Variables	Correlation coefficient
Income	0.190**
Education	0.154***
Age	-0.081*
Gender	0.084*

*, ** and *** denote significance levels at 1%, 5% and 10%, respectively.

Table 3.3 shows that socio-economic factors contribute significantly towards digital divide in regional Australia. Age and gender impact on Internet use very significantly.
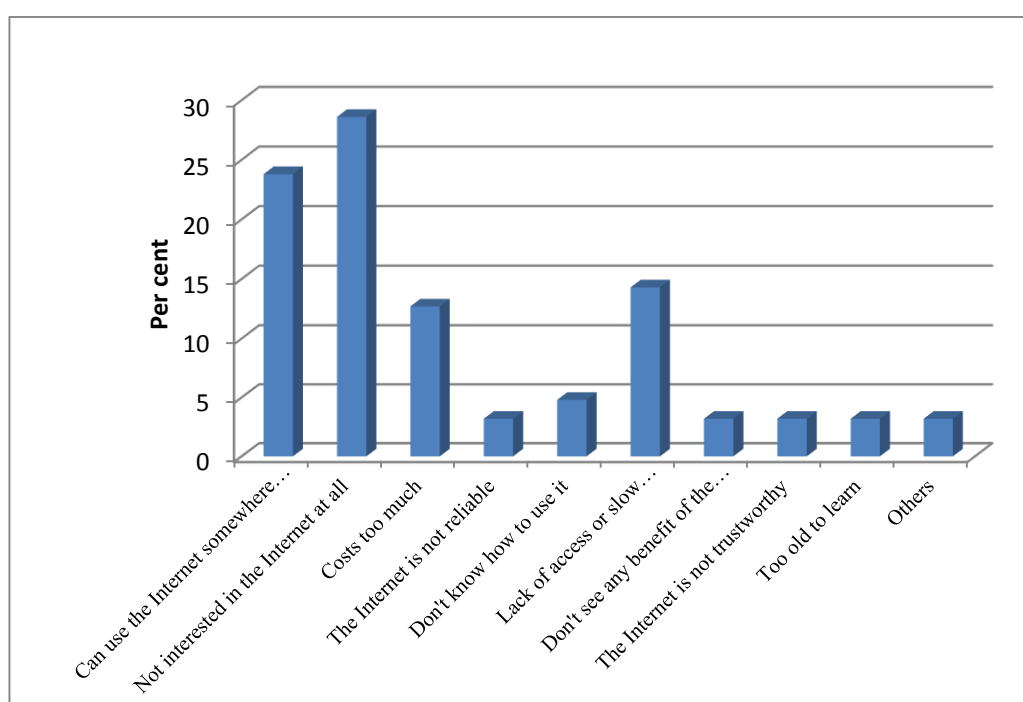
Figure 3.8: Reasons for not having the Internet at home.

Most of the participants who did not use the Internet expressed a lack of interest or having the opportunity to use the Internet elsewhere as the most important reasons for not having Internet access at home (Fig. 3.8).

The following figures (3.8–3.22) show how the participants responded to different items of the constructs of the household's behaviour.

Perceived ease of use

Figure 3.9 reveals that more than 60% of the participants said that the Internet connection was easy for their household.
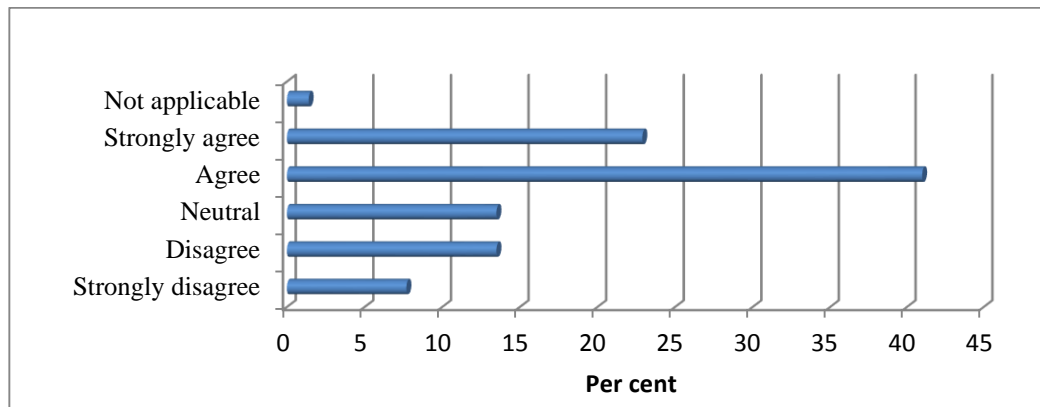
Figure 3.9: It is easy for this household to connect to the Internet.

Figure 3.10 indicates that more than 65% of the participants feel that learning to use the Internet is easy for them.
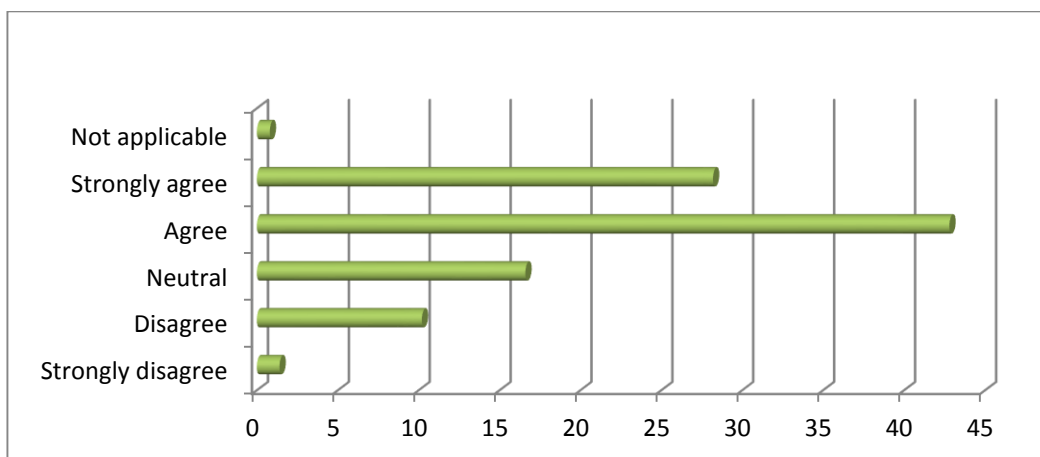
Figure 3.10: Learning to use the Internet is easy.

A significant number of the participants expressed dissatisfaction with the speed of their Internet connection. Figures 3.11 and 3.12 show that approximately 48% of the participants are either dissatisfied or neutral about the download and upload speeds of the Internet.
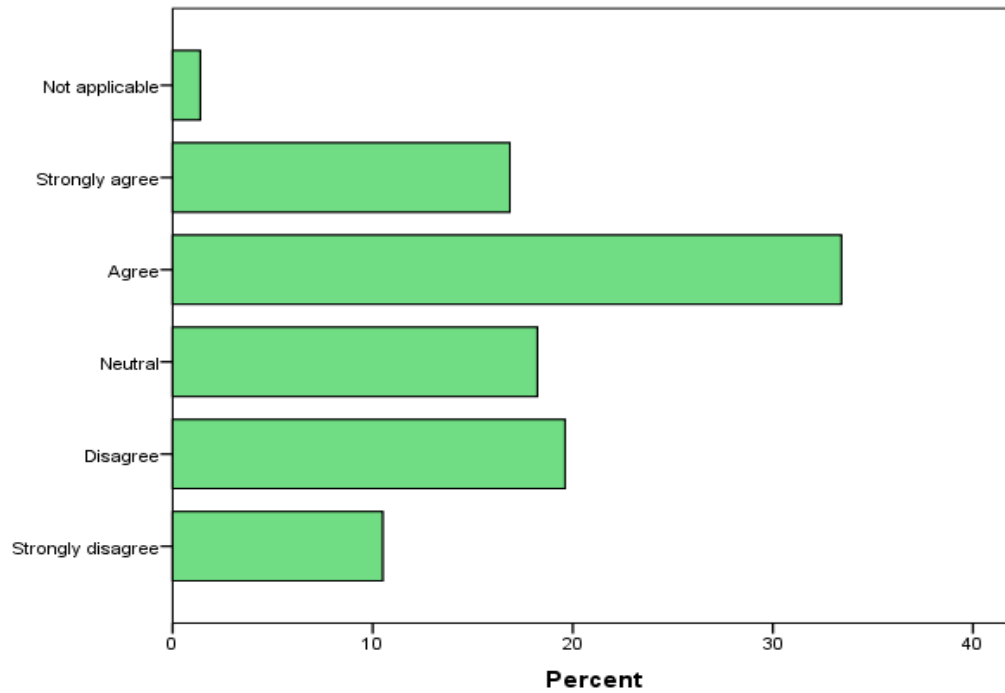
Figure 3.11: Internet download speed is appropriate.
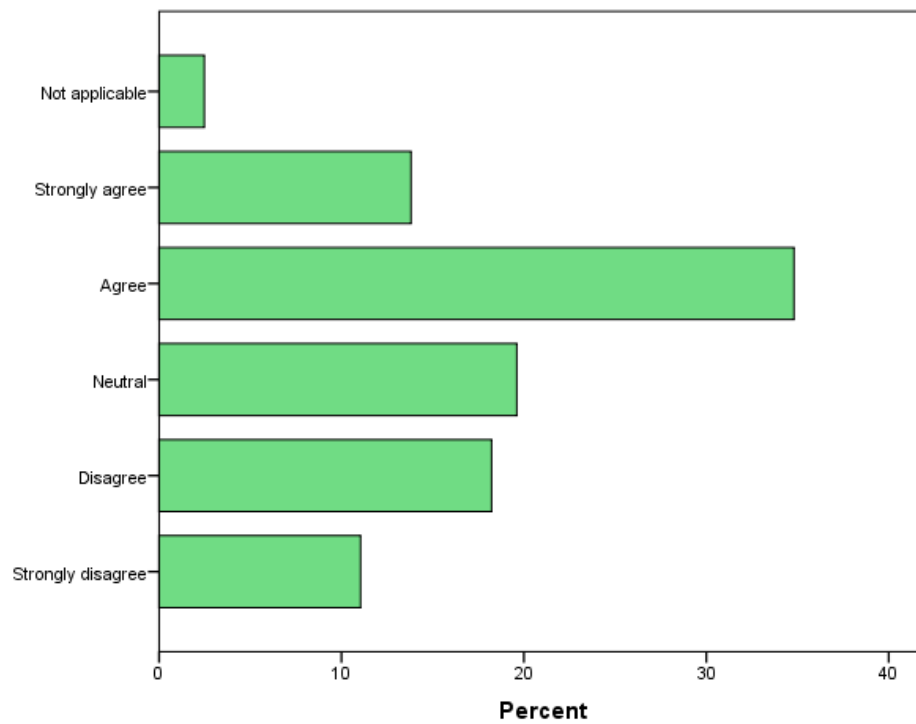
Figure 3.12: Internet upload speed is appropriate.

23

Perceived usefulness

Figure 3.13 shows that about 70% of the participants accomplish tasks quickly with the help of the Internet.
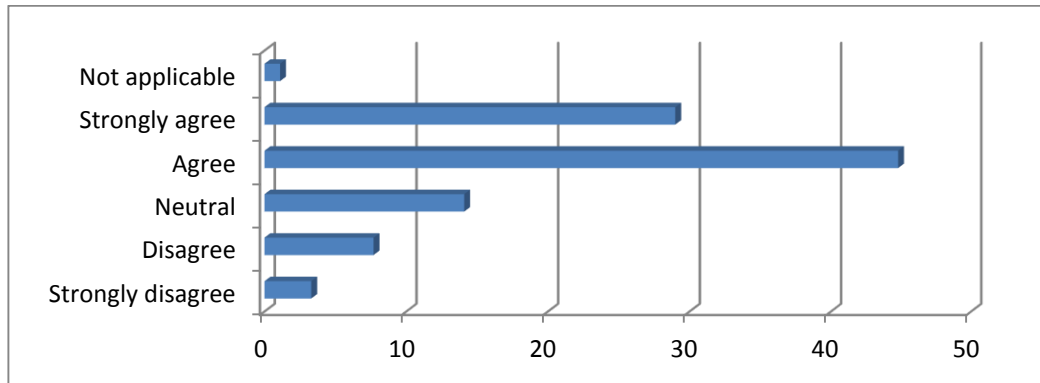
Figure 3.13: The Internet enables me to accomplish my tasks more quickly.

Figure 3.14 indicates that around 75% of the participants feel that they learn and develop new skills and knowledge by using the Internet.
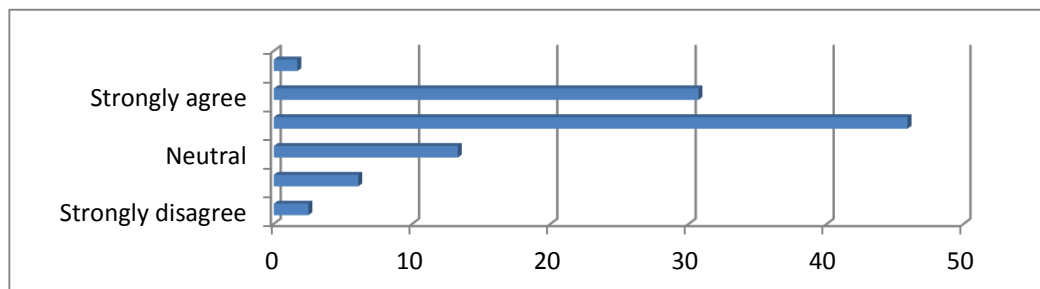
Figure 3.14: The Internet helps me to learn and develop new skills and knowledge.

Affordability

Figure 3.15 indicates that around 51% of the participants think that the cost of the Internet is reasonable. This implies that although the Internet is now more affordable than before, cost is still a factor for users in this region of Australia.
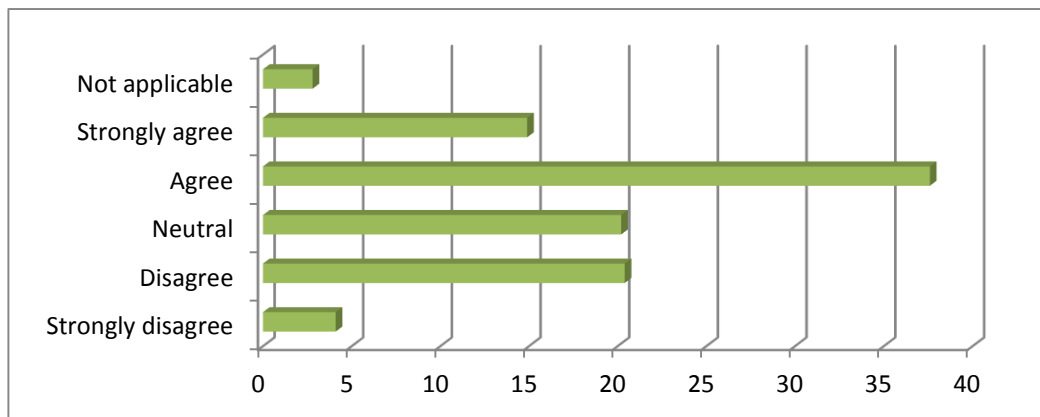
Figure 3.15: The cost of the Internet connection is reasonable.

Self-efficacy

Figure 3.16 suggests that approximately 74% of the participants feel that the Internet is user friendly.
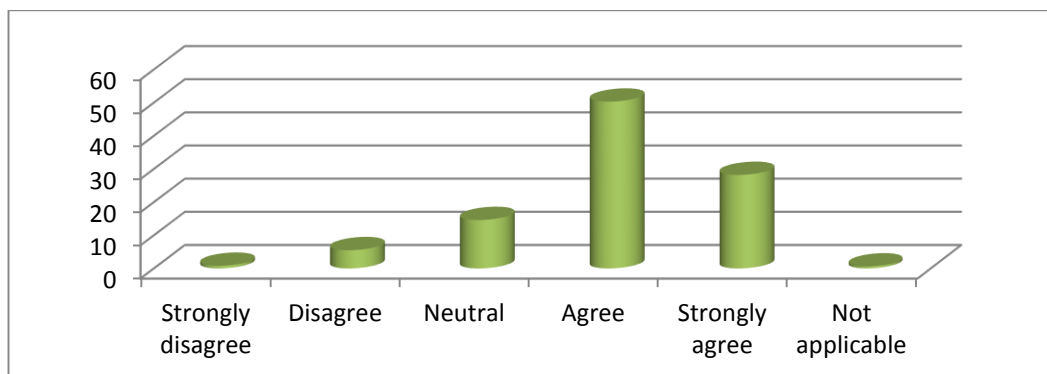
Figure 3.16: I find the Internet user friendly.

The majority of the participants are confident in using the Internet, which reflects their strong level of efficacy in using the technology (Fig. 3.17).
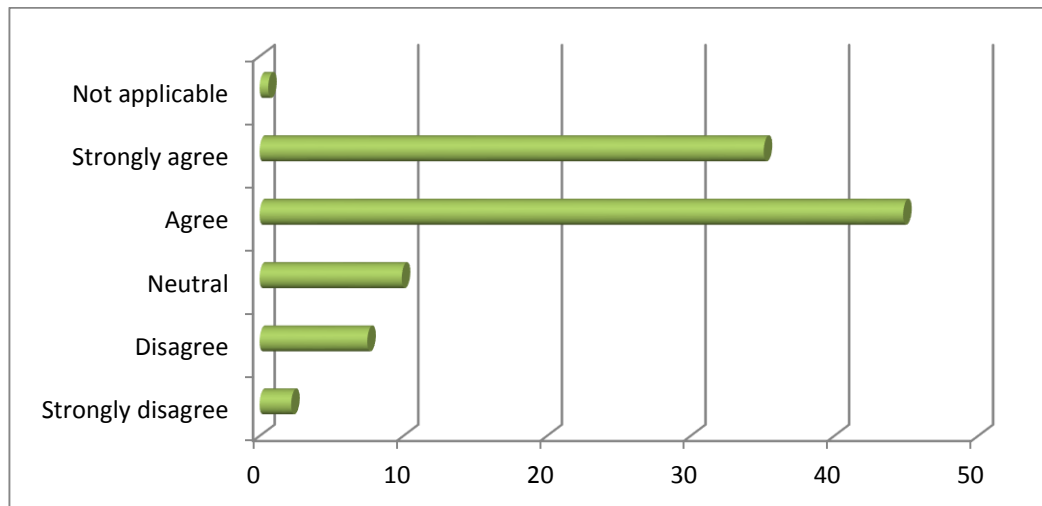
Figure 3.17: I can use the Internet very confidently.

It is clear from Figure 3.18 that more than 70% of the participants believe that they are competent in using the Internet.
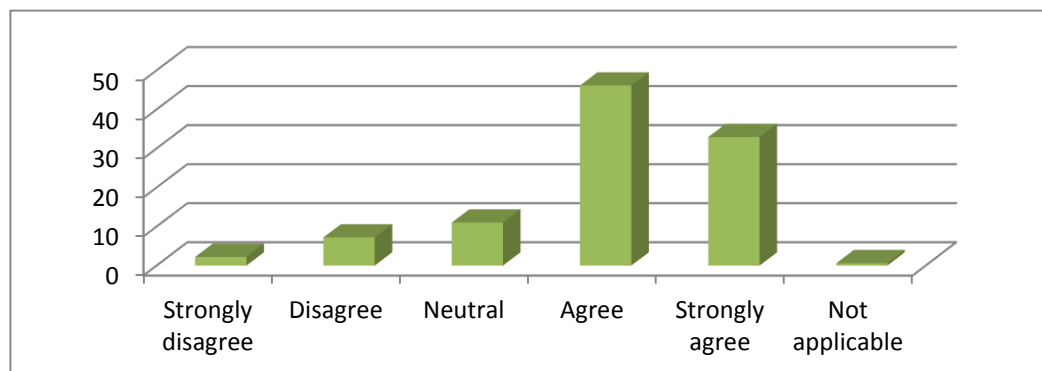
Figure 3.18: I feel very competent with the use of the Internet.

Attitude

Around 80% of the participants had a positive attitude towards the Internet (Fig. 3.18).
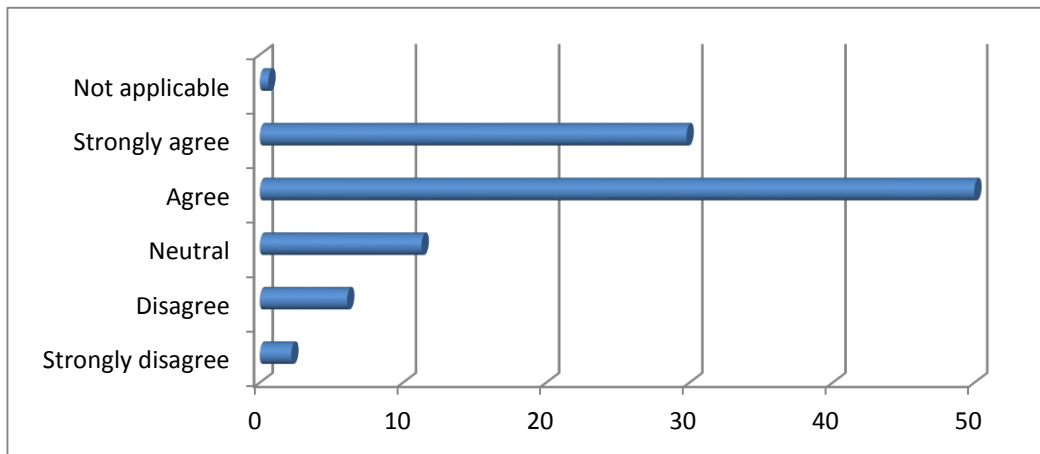
Figure 3.19: I feel positive towards the use of the Internet.

More than 55% of the participants noted a positive impact of the Internet on their work performance (Fig. 3.20).
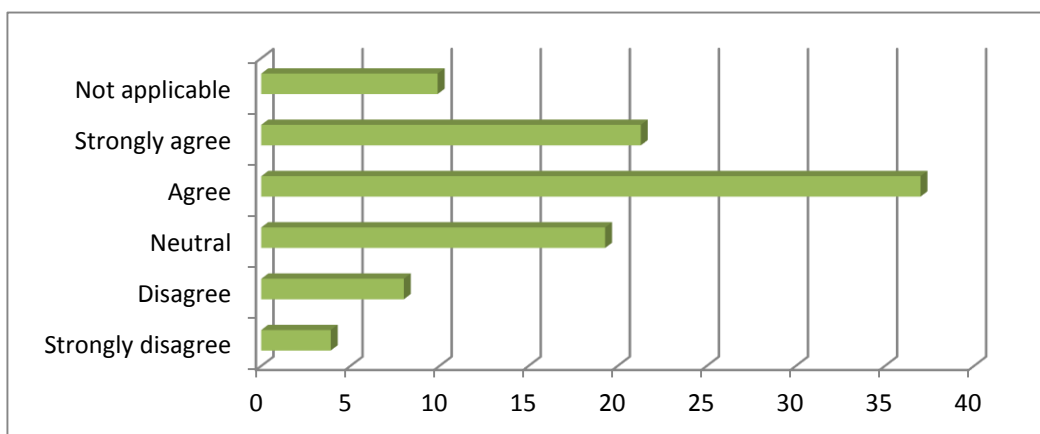
Figure 3.20: The Internet has positive impact on my work performance.

Internet use

Around 80% of the participants use the Internet regularly (Fig. 3.21).
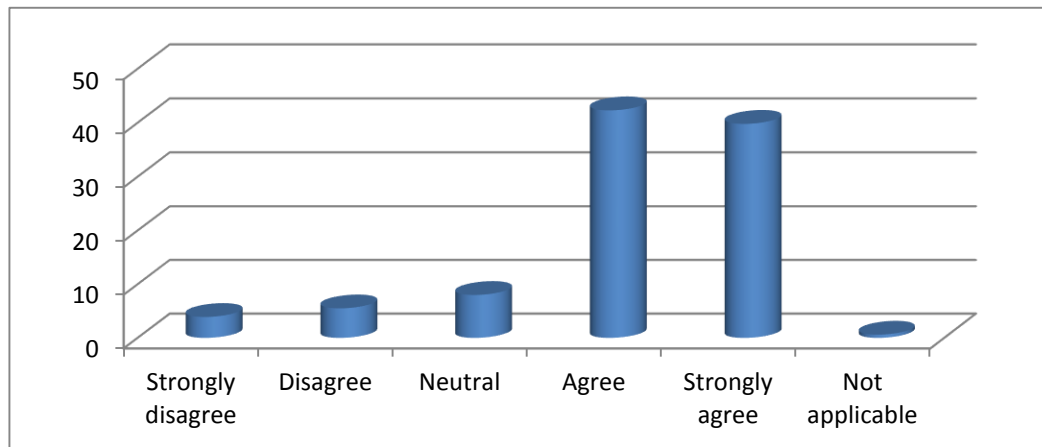
Figure 3.21: I regularly use the Internet.

Around 72% of the participants believe that they use the Internet effectively (Fig. 3.22).
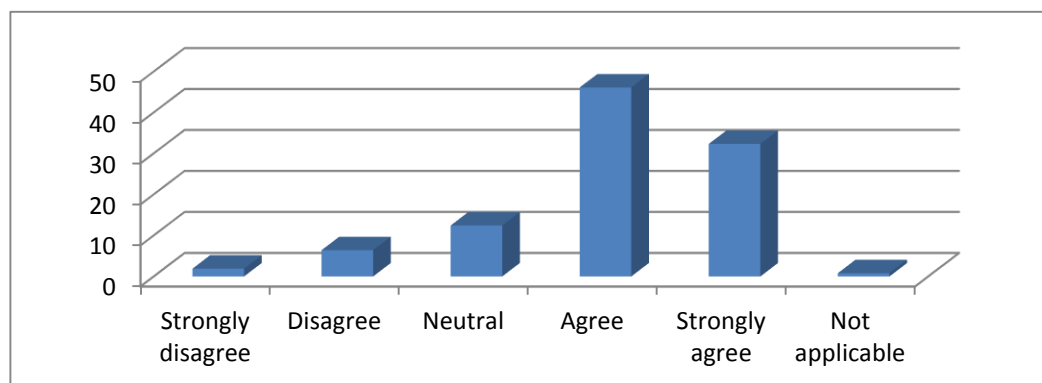
Figure 3.22: I make effective use of the Internet.

3.5 Internet literacy

The survey combined various indicators to create an index for the variable 'Internet literacy'. There were 16 indicators: email; online social media, networking sites or content creation; online newspaper reading; online games; online gambling; downloading content from the Internet to the computer/phone; uploading content to Internet sites from the computer/phone; listen to/watch online content like music, videos, TV, movies and

podcasts; video communication via the Internet such as Skype and Facebook; online shopping/booking; online education/learning; online business banking; work-related activities; online job searches; online bill payment; and online access to government services. The index was created by the summated scale method which means that the scale values of these indicators for all Internet users were summated to obtain a unique value for each of the users. Thus a distribution of the Internet literacy variable for all 355 Internet users was obtained. A positive significant correlation is found between Internet use (average number of hours spent by each Internet user per week) and the Internet literacy index which confirms that a 'skill divide' exists in the Western Downs region.

Table 3.4 lists the multi-purpose and multi-dimensional use of the Internet. These multi-scale measures are our indicators of Internet literacy.

Table 3.4: Internet literacy indicators – multi-dimensional use of the Internet.

Indicators of Internet literacy	Internet users (%)
Email	88
Online social media, networking sites or content creation	58
Online newspaper reading	54
Online games	33
Online gambling	14
Downloading content from the Internet to the computer/phone	75
Uploading content to Internet sites from the computer/phone	53
Listen to/watch online content like music, videos, TV, movies, podcasts	50
Video communication via the Internet such as Skype and Facebook	40
Online shopping/booking	53
Online education/learning	34
Online business banking	70
Work-related activities	53
Online job searches	37
Online bill payment	70
Online access to government services	56

3.6 Digital inclusion and social inclusion

This survey also explored the social inclusion capabilities of Internet users in the region. The survey questionnaire included items that asked the participant about aspects of their social inclusion capability. These questions covered issues such as how the Internet helps users to improve their knowledge and skills. The participants also were asked to express their opinion on how the Internet helps them in activities that improve their work performance and/or business.

Social aspects such as social engagement, community cohesion and political participation by the Internet users were covered in the survey. A significant percentage of the participants expressed an opinion in support of the role of the Internet in improving their knowledge, skills and social engagement. Most of these participants were aged between 25 and 54 years. Also, diverse use of the Internet has contributed towards enhancing knowledge, social capability and skills. Most of the participants indicated that the Internet's diversity had improved their social capability.

Therefore, it is evident that the Internet contributes positively towards strengthening social inclusion and social capabilities in the region. This means there is the potential for social inclusion in the region to be facilitated by the Internet.

3.7 Responses to the questions related to social inclusion and social capital

The core constructs of social capital were drawn from the studies of the pioneers of the social capital concept (Bourdieu 1980, 1986; Coleman 1988, 1990; and Putnam 1993, 1995, 2000). Thus, key concepts of social capital such as bridging and bonding of relationships, trust, neighbourhood effect and social cohesion were considered in this survey. The responses of the participants support the proposition that the Internet generates social capital in regional Australia. Single and multi-scale items were used to measure aspects of social capital and social inclusion to assess the role of the Internet in generating social inclusion through social capital. The responses of the participants to these constructs follow.

Around 25% of the participants believe that the Internet helps them in their relationships with neighbours (Fig. 3.23).
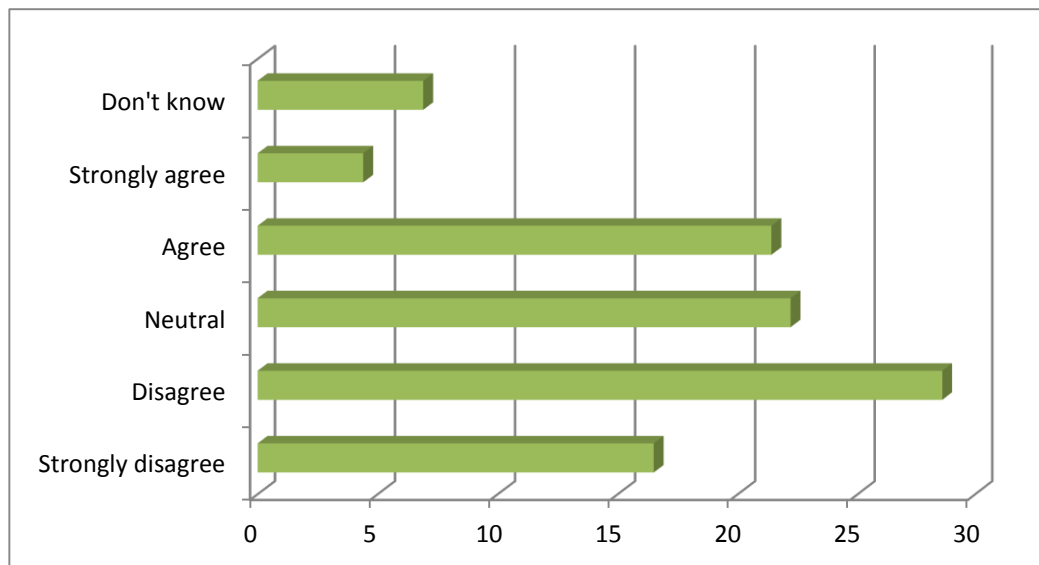
Figure 3.23: The Internet helps me coordinate activities with neighbours in my area.

The Internet helps participants to connect with their community, social or sporting groups (Fig. 3.24).
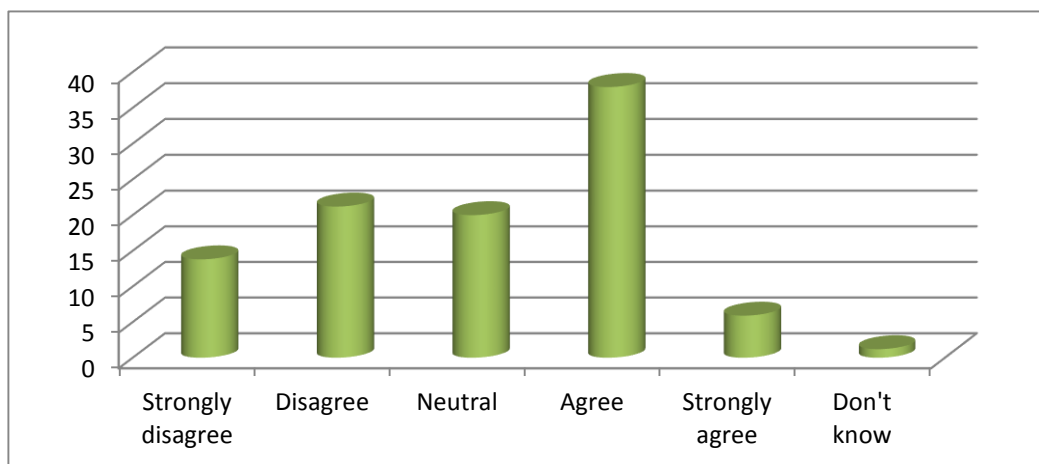
Figure 3.24: The Internet helps me to connect with community, social or sporting groups.

Around 30 % of the participants claim that Internet use has strengthened their trust in friends and families (Fig. 3.25).
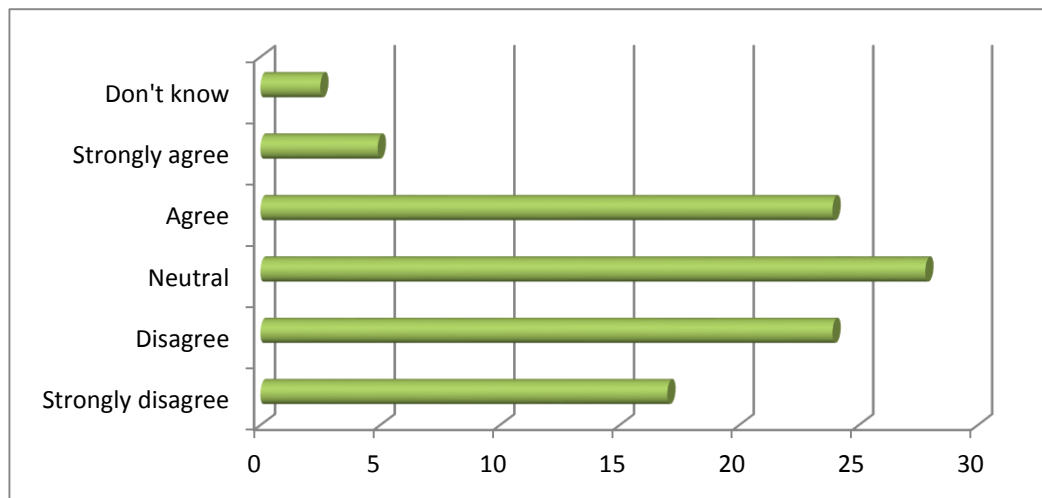
Figure 3.25: The Internet has strengthened my trust in my friends and family.

Around 45% of the participants use Facebook (Fig. 3.26).
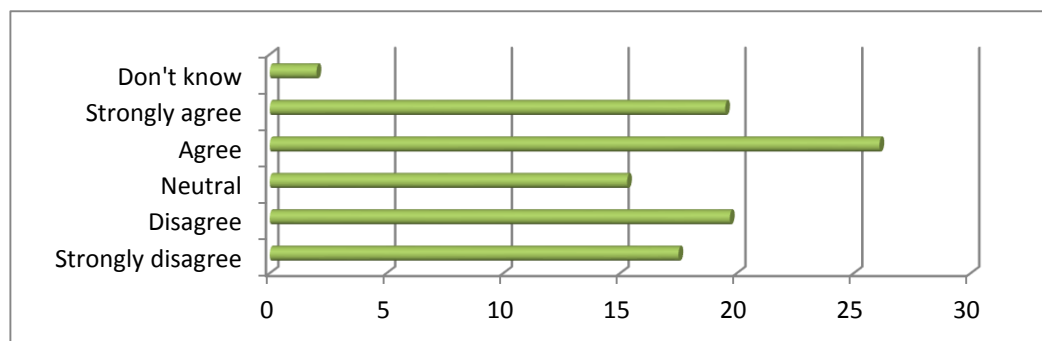
Figure 3.26: I regularly visit Facebook or other social networking sites.

Around 27% participants agree that the Internet has made them politically more conscious and/or active (Figure 3.27).
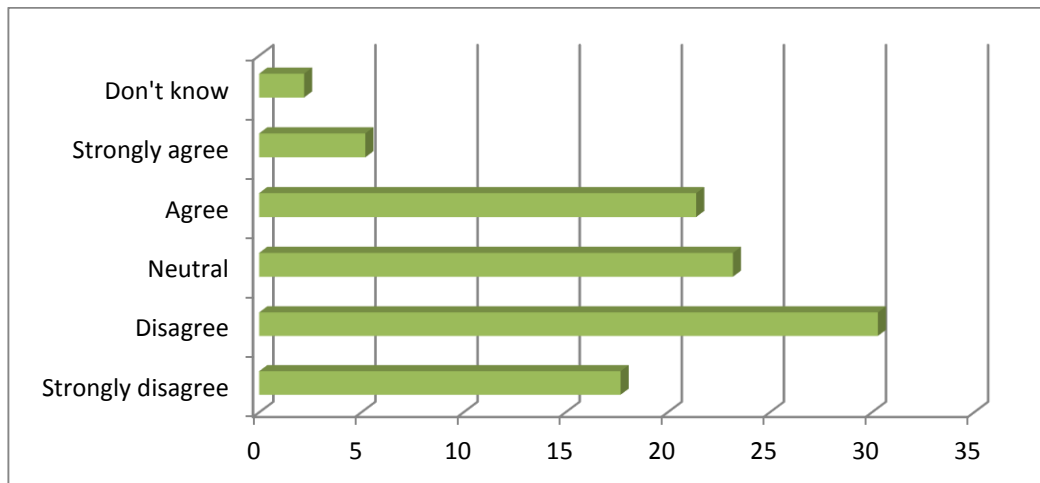
Figure 3.27: The Internet has made me more politically conscious and/or active.

3.8 Non-users of the Internet

The socio-demographic pattern of Internet non-users in the Western District region is shown in Table 3.5. The percentage of male Internet non-users is slightly higher than that of female non-users, which implies that gender is not a significant factor in the non-use of the Internet.

Table 3.5: Gender distribution of non-users of the Internet.

Gender	Participants (% of total)
Male	28 (50.91)
Female	27 (49.09)

Also, the highest percentage of non-Internet users was found to be from the 65 years and over age group while the lowest percentage of non-Internet users was from the 25–34, 45–54 and 55–64 age group. The highest percentage of non-Internet users were participants who had completed high school only, while the lowest percentage of non-Internet users was found in the group of those with postgraduate education.

3.9 Barriers to the digital inclusion

Digital inclusion refers to the universal access among citizens to ICT. It is becoming one of the major social justice challenges of our time. Digital inclusion is very important for employment participation, economic development, educational achievement, social and civic inclusion, and health and wellbeing (Walton et al., 2013). It is now considered critical in finding employment, gaining educational qualifications, social and community participation, and health and wellbeing. Lack of access to ICT and associated services is increasingly recognised as a dimension of social exclusion (Eardley et al., 2009).

The concept of digital inclusion can be a means of focusing not only on access to technology but also on how this access and use can impact on different forms of deprivation of relatively disadvantaged people (Alam and Imran, 2015). For quite a while, social inclusion has been used to develop the concept of digital inclusion which means to improve the lives of the disadvantaged through the use of technology.

Recent research has revealed significant social and economic benefits associated with digital inclusion for people who have access to a computer at home (Walton et al., 2013). These include improved educational achievement, higher lifetime earnings, increased chances of unemployed people gaining work through online information and networks, potential personal savings through access to online shopping and banking transactions, and potential government savings as a consequence of people accessing government services online.

Despite these benefits, a digital divide persists in Australia. The ABS annual survey of household Internet use indicates that higher income households are more likely than lower income households to have Internet access at home. In 2012–13, 98% of households with an income of $120,000 or more had Internet access, compared to 57% of households with an income of less than $40,000 (ABS, 2014). For people living with a disability, in a low-income household or dependent on a Parenting Payment, Age Pension, Disability Support Pension or Newstart Allowance, the likelihood of having no Internet at home is twice to almost five times higher than the national average (Walton et al., 2013). The digital divide is also evident across various regions of Australia.

Nevertheless, social capital is a way to more broadly the value of Internet use at both a community and individual level for defined disadvantaged and disengaged groups. It is believed that society has never been so well connected than it is now through the Internet and other networked ICT. This connectivity can be further strengthened by a combination of social inclusion and social capital, referred to as the network society thesis (Barney, 2004; Castells, 2000). The network society thesis has two frameworks that provide policy makers with a way of using online participation and of addressing inequities in the use of the

Internet. Social inclusion provides a way to address the online needs of specific disadvantaged groups while social capital offers a framework through which policies can provide citizens with online opportunities to build social, cultural and economic capital which are likely to eventually boost regional economic development. Thus, the network society thesis offers opportunities for both inclusion and exclusion in the social, economic, political and cultural spheres of a nation. One of the conditions for inclusion is access but it is not enough. The use and exploitation of the Internet also requires specific skills, literacy, information and knowledge.

It is evident from the survey that barriers exist to impede and slow down the digital inclusion in the Western Downs region. The survey revealed that Internet skills or digital literacy is a key stumbling block to digital inclusion. Education is another barrier as the Western Downs region is lagging in education compared to many other regions of Australia. A lack of positive perception about the Internet among aged people is another hurdle for digital inclusion. Although many participants considered the Internet to be more affordable than before, income and cost are still factors that influence the access and use of the Internet in the region.

3.10 Conclusion

The survey results reveal that a digital divide exists in the Western Downs region although the level of Internet uptake is high and is representative of the same at the national level. Socio-economic factors such as age and education contribute to the digital divide. Elderly people are lacking both Internet access and use. The intensity of use of the Internet also depends on the skill or ability to use it. Lack of education is found to be a vital factor for lower level of the Internet use. A high school level of education dominates the non-users of the Internet. This finding implies that a lack of education is a considerable barrier to digital inclusion in the region.

CHAPTER FOUR
Conclusion, Recommendations and Policy Implications

This study provides an insight into the current level of digital divide within Australian regional households and the factors that are associated with the extent of Internet use. It is expected to contribute significantly to a better understanding of digital divide in the Western Downs region.

One of the key objectives of the survey was to examine the extent of digital divide in the Western Downs region. The study also looked at various socio-economic dimensions for the Internet use behaviour. The most fascinating feature of this study was to assess the presence of a so-called skill divide. In other words, to see whether Internet skills or literacy matters for the inequity in Internet use. The majority of non-Internet users cited a lack of skill as the reason for their lack of interest in using the Internet: 65% of the non-users expressed the view that they do not feel comfortable in using the Internet because they do not have enough skills to use it.

Interestingly, it was also found that the participants with higher skills for using the Internet (measured by a summated scale method) use the Internet more than those having a low level of Internet literacy. Such findings clearly demonstrate that Internet skill or literacy not only influences individuals' use of the Internet, but it also has a significant effect on the extent of the use of the Internet. Thus, we conclude that a skill divide exists in the Western Downs region.

This study also finds the existence of digital divide with respect to socio-economic factors such as education, income and age. It found that most of the Internet non-users were participants who had completed high school only. Also, participants with a higher level of education were found to use the Internet more than less educated participants.

A statistically significant correlation was found between education and Internet use. Although cost or affordability are still factors affecting access to the Internet, reducing financial barriers and making Internet access cheaper would not achieve much unless efforts are directed towards improving Internet skills and other aspects in order to use it effectively.

The findings in this study are very consistent with those in other recent Australian studies, including Alam and Imran (2015) and Bowles (2013). Although, the NBN aims to make the Internet more accessible and more affordable, efforts to enhance e-skills seem to be far from adequate. This survey also examined the relationship between age and Internet use. It

was found that the smallest percentage of Internet users were from the 65 years and over age group. Also the non-users of Internet was dominated by the same age group. The survey also reveals that participants aged 65 or over, not only use Internet less frequently than their younger counterparts but also the diversity of their use of the Internet is less than the younger users. This claim was also reflected in the much lower mean score of the Internet literacy scale of the Internet users from age group 65 and over as compared to mean scores of other age groups. Such outcome was also corroborated by other findings of the same survey. Among the non-user participants of the survey, majority from the age group 65 and above claimed that they do not have adequate skills to use the Internet effectively. Therefore, it is clearly evident from this survey that there is an age divide in the Western Downs region.

This lower level engagement of the older-age individuals with the Internet has the potential risk of making older Australians even more disadvantaged in terms of health and other government services. According to Deloitte Access Economics (2013), health and education are the two key government services where the Internet has high potential to play significant role in the delivery of such services to the disadvantaged in remote and rural Australia. Therefore, it is not unlikely that older Australians might be even more disadvantaged as a consequence of their low level of Internet usage.

Also lack of Internet skill or literacy might be a contributing factor for depriving older Australians of health service delivery making them further disadvantaged, a circumstance referred to as 'digital vicious cycle'(Baum et al., 2012). To protect the already disadvantaged people from being victims of such cycle, it is suggested that policy designed to provide free Internet access to the community combined with a range of other related services required to support the use of the Internet effectively may have positive effect on the uptake of the Internet of the already disadvantaged and disengaged people (Baum et al. 2012). Research shows that healthy participation in new inventions can be expected by ensuring convenience, visibility, familiarity and trust. Finally, this survey also explores the relationship between the Internet usage and social capital. This was done in two phases. In the first phase, data were gathered from survey participants on the key constructs of social capital and based on the data, some descriptive statistics are presented. In the second phase, the reliability of the items were tested with Chronbach's alpha.

The study reveals that it is not merely access divide that exists in regional Australia but also other forms of divide such as usage divide and skills divide persist. Although NBN roll out is not expected to eliminate the digital divide between urban, and rural and regional areas, it should be able to significantly reduce digital divide in the Western Downs region by making Internet more accessible and more affordable. The mining boom in the region is expected to

reduce income heterogeneity which is likely to play a role in reducing digital divide as income is still a vital factor for disparity in the use of broadband in the region. The region is lagging behind in terms of education. Promoting higher education is expected to play a positive role in this regard because evidence of the survey also suggests the presence of education divide in the region. There should be schemes that would generate interest among the elderly people to use Internet. To address skill divide, various types of computer training at affordable or no cost should be extended to the relatively disadvantaged people of the region.

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APPENDICES

Appendix 1: Glossary of terms, abbreviations and acronyms

ADSL: A broadband connection type, an Asymmetric Digital Subscriber Line is used to connect users to the Internet.

ADSL2+: A faster type of broadband connection than the normal ADSL.

Bandwidth: Measured in bits per second, bandwidth is the rate of transferring data.

Bit: An abbreviation of the term binary unit, a bit is a unit of information that is conveyed in either a 1 or a 0.

Broadband: Broadband refers to the type of Internet connection that is high speed and high quality. ADSL, cable, naked and wireless are some of the broadband plans.

Byte: Mostly consisting of 8 bits, a byte is a unit of digital information.

Dial up Internet: It is a dialled Internet connection that uses the home phone line and a modem.

Digital divide: The 'digital divide' is a gap between those who have access to the Internet and those who do not (the so-called first level digital divide). As the Internet has become more accessible, researchers have reconceptualized this concept by focusing on the inequities of the use of the Internet (the so-called second level digital divide).

Digital Subscriber Line; Internet access offered over phone lines. Digital Subscriber Line (DSL) allows access at speeds greater than dial-up while also using the phone line for telephone conversations. A DSL uses frequencies not used by the human voice. Unfortunately, these frequencies degrade quickly over distance, meaning customers must live within a mile of the central location to get the fastest speeds.

Fibre-optic: A system that uses glass (or plastic) to carry light which is used to transmit information. Typically, each side of the fibre is attached to a laser that sends the light signals. When the connection reaches capacity, the lasers may be upgraded to send much more information along the same strand of fibre. This technology has been used for decades and will remain the dominant method of transmitting information for the foreseeable future.

Fibre-to-the-home: As most telecommunications networks use fibre in some way, fibre-to-the-home (FTTH) is used to specify those who use fibre to connect the subscriber.

Household: A person living alone or a group of related or unrelated people who usually live in the same private dwelling.

Information and communication technology: Information and communication technology (ICT) includes computing and communications equipment and related software.

Megabyte: A unit byte multiplied is a megabyte (MB). It is generally used to stand for either 10002 bytes or 10242 bytes.

Megabytes per second: The speed of an Internet connection is normally calculated by the megabytes per second (Mbps) which is the amount of data being transferred by second.

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

Satellite broadband: Internet connection provided by a satellite.

Technology Acceptance Model: The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technological device. The model suggests that users presented with new technology are influenced by several factors about how and when they will use it.

Wi-Fi: A wireless connection to a nearby wired network. This wireless technology differs from mobile network/3G/4G connections. This is a suite of protocols that allow wireless devices to exchange information using unlicensed frequencies. Equipment carrying the Wi-Fi brand is interoperable. Recently, numerous cities and some private companies have attempted to blanket their cities with Wi-Fi. Wi-Fi has proved tremendously successful in homes and businesses.

Appendix 2: Survey Questionnaire

U n i v e r s i t y   o f   S o u t h e r n   Q u e e n s l a n d

P a r t i c i p a n t   I n f o r m a t i o n   S h e e t

Household Use of the Internet Survey

University of Southern Queensland Ethics Approval Number: H13REA150

YOUR OPINION MATTERS TO HELP SHAPE OUR ECONOMIC FUTURE

Western Downs Regional Council and University of Southern Queensland (USQ) are currently seeking the opinions from households so that we can develop appropriate and effective Information and Communications Technology (ICT) strategies to enhance our regional economic development.

The information that you provide is essential to help us form the most effective and appropriate strategies and guide ICT investments for our regional development. Your opinion is significant in this development process.

THINGS YOU NEED TO KNOW

- Your answers will be anonymous and all your information is strictly confidential and private, in compliance with the Federal Privacy Act (1988).
- Your participation in this survey, whilst extremely important, is voluntary. Your informed consent is given when you complete and return the questionnaire.
- The questionnaire will take about 20 minutes to complete.
- The questions cover information about you and your household, your use of the Internet and any difficulties with using the Internet, how the Internet has affected you and your community and your social participation. We are also interested in how you use the Internet in your everyday life.

WHO CAN COMPLETE THIS SURVEY?

- To be eligible to participate in this survey, you must be living in this household permanently and aged 18 years or over. If there is more than one adult living in this household, we would like the survey to be completed by the adult in the household whose birthday occurs next; or if that person is currently unavailable, by the adult whose birthday is next in line.

NEED MORE INFORMATION?

If you want to find out more, or need help filling in the questionnaire or want to tell us more about your opinions on ICT in the region, please

- Visit: www.advancewesterndowns.com.au/addressing-the-digital-divide-in-the-western-downs
- Email:business@wdrc.qld.gov.au

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

USQ Ethics Committee Support Officer, Office of Research, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 4631 2690, Email: ethics@usq.edu.au

Thank you for being involved with the study.

Yours sincerely

Associate Professor Khorshed Alam, Principal Investigator
University of Southern Queensland,
Phone (07) 4631 1291; Email: khorshed.alam@usq.edu.au

Office use only
Date: …………………………….
Code: ………………………………

Household Use of the Internet Survey Questionnaire

Section A: Basic information about current Internet usage

1. In what locality/suburb do you live: _____ Post code: _____

2. How many computers (desktop and laptop) are there in this household?

   ☐ None   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5 or more

3. How many smartphones (e.g. iPhone, Android phones), tablets (e.g., iPad, Galaxy Tab) and other digital devices (e.g. eReader, feature phone and digital radio) do you have in this household?

   ☐ None   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5 or more

4. Does your household have access to the Internet?
   (Tick the one most frequently used)

   ☐ No Internet connection *(Please answer Questions 5 and 6 and then move to Section D)*

   ☐ Yes, dial-up connection including analogue, modem and ISDN connections

   ☐ Yes, broadband connection through ADSL/ADSL2+

   ☐ Yes, broadband through Wireless or3G/4Gconnections

   ☐ Yes, broadband connection through Satellite

   ☐ Yes, broadband connection through Cable

   ☐ Other (please specify, e.g. Internet access through any other digital devices):

   _____

   ☐ Don't know/Not sure

5. Where do you mostly use the Internet? Please rank from 1 to 3 for the most frequently used places – write the number 1 in the box next to your main place of the Internet use, followed by 2 for the second, and then 3 for the third, if applicable.

   ☐ Don't use the Internet at all

   ☐ Only at my home   *(Please move on to Question 7)*

   ☐ At my work   ☐ At my educational institution (e.g. school, TAFE, university)

   ☐ At a library   ☐ At an Internet Café or public Wi-Fi Hotspots

   ☐ Almost everywhere (e.g. using smartphone, tablet) ☐ Other (please specify):

   _____

6. If you do not have the Internet at home, please rank up to 3 of the key reasons why you do not have the connection? Please write the number 1 in the box next to your main reason, followed by 2 for the second, and then 3 for the third, if applicable.

☐ Can use the Internet from somewhere else

☐ Not interested in the Internet at all

☐ Costs too much

☐ To me, the Internet is not reliable

☐ Don't know how to use it

☐ Can't get access/slow connectivity at my home address

☐ Don't see any benefits of the Internet

☐ To me, the Internet is not trustworthy

☐ Physically unable to use it (e.g. poor eyesight or disabled)

☐ I feel that I am too old to learn

☐ To me, using the Internet is a waste of time

☐ Worried about privacy and security (viruses, spam, spyware, hackers)

☐ Other (please specify): _____ -

7. On average, how many hours per week do you spend on the Internet?

☐ Less than five hours ☐ 5-10 hours ☐ 11-20 hours

☐ 21-40 hours ☐ more than 40 hours ☐ Don't know

8. What is the most important reason for using the Internet at home? *(Please tick one)*

☐ Work/business ☐ Education/study ☐ Volunteer/community

☐ Entertainment ☐ Personal/private

☐ Other (please specify) ……………………………………….. ☐ Don't know

9. Including yourself, how many members of your household use the Internet at home?

☐ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

10. How much does your household currently pay <u>per month</u> to access the Internet from your home?

☐ $30 or less   ☐ $31–$50   ☐ $51–$70

☐ $71–$100   ☐ more than $100 ☐ Don't know/not sure

Section B
Please skip this section if you don't use the Internet at all.

Your responses to the statements tell us about your perceptions on the Internet's accessibility, usefulness, affordability, efficacy and ease of use.   (please tick the relevant box)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
11. In this household, it is easy to connect to the Internet	5	4	3	2	1	9
12. Internet download speed is appropriate for my household	5	4	3	2	1	9
13. Internet upload speed is appropriate for my household	5	4	3	2	1	9
14. The Internet service is available all the time	5	4	3	2	1	9
15. The cost of the Internet connection is reasonable for my household	5	4	3	2	1	9
16. The cost of reliable and high-speed Internet is becoming expensive	5	4	3	2	1	9
17. Learning to use the Internet is easy	5	4	3	2	1	9
18. In general, I find the Internet user-friendly	5	4	3	2	1	9
19. I can use the Internet very confidently on my own	5	4	3	2	1	9
20. I feel very competent with the use of the Internet for different purposes	5	4	3	2	1	9
21. I feel positive towards the use of the Internet	5	4	3	2	1	9
22. It is sensible for my household to use the Internet	5	4	3	2	1	9
23. The Internet has mostly positive effects on society	5	4	3	2	1	9
24. The Internet enables me to accomplish my tasks more quickly	5	4	3	2	1	9
25. The Internet helps me to find new opportunities (e.g. employment, education and business)	5	4	3	2	1	9

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
26. The Internet helps me to learn and develop new skills and knowledge	5	4	3	2	1	9
27. The Internet has a positive impact on my work performance	5	4	3	2	1	9
28. I regularly use the Internet	5	4	3	2	1	9
29. I make effective use of the Internet	5	4	3	2	1	9
30. The Internet use has become an everyday part of my life	5	4	3	2	1	9

Section C: Ability to use the Internet

Please skip this section if you don't use the Internet at all.

How often do you use each of the following online activities?

(Please tick the appropriate box in the table below)

Activities	Frequently (e.g. more than once per week)	Regularly (e.g. at least once per week)	Occasionally(e.g. once every 2–3 weeks)	Seldom	Never
31. Emails	5	4	3	2	1
32. Online social media or networking sites (e.g. Facebook, LinkedIn, Twitter) or content creation (e.g. blogging)	5	4	3	2	1
33. Online newspaper reading	5	4	3	2	1
34. Online games	5	4	3	2	1
35. Online gambling	5	4	3	2	1
36. Download content (e.g., files, images, audio visual media) from the Internet to the computer/phone	5	4	3	2	1
37. Upload content (e.g., files, images, audio visual media) to the Internet sites from the computer/phone	5	4	3	2	1
38. Listen to/watch online content like music, videos, TV, movies, podcasts etc	5	4	3	2	1
39. Video communication via the Internet such as Skype, Facetime etc	5	4	3	2	1
40. Online shopping/booking	5	4	3	2	1
41. Online education or learning	5	4	3	2	1
42. Online business and banking	5	4	3	2	1
43. Work-related activities	5	4	3	2	1
44. Online job searches	5	4	3	2	1
45. Online bill payments	5	4	3	2	1

Activities	Frequently (e.g. more than once per week)	Regularly (e.g. at least once per week)	Occasionally(e.g. once every 2–3 weeks)	Seldom	Never
46. Online access to government services	5	4	3	2	1
47. Online access to health services and health information	5	4	3	2	1

Section D: The Internet and your friendship and community

Regardless of whether you currently use the Internet or not, please respond to the following questions.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
48. The neighbours in my area are connected together online (e.g. through a community blog or Facebook or emails)					
49. The Internet helps me co-ordinate activities with neighbours in my area (e.g. scheduling meetings regularly, visiting different places together or participating in sports, social or religious activities)					
50. Because of the Internet, it is easier to ask for, give and receive help from neighbours					
51. The Internet helps me to connect with community, social or sporting groups					
52. I find out about community, social or sporting events through the Internet					
53. The Internet helps my household and me to plan and attend community, social or sporting events					
54. The Internet helps me maintain good communication with friends, family and others					
55. My interaction with friends and family has improved through the use of the Internet					

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
56. Frequent contacts through the Internet have strengthened my trust in my friends and family					
57. Online communication has given me the impression that most people in Australia can be trusted					
58. I have friends who do not live in the same city/town but are connected through the Internet					
59. I regularly visit Facebook or other social networking sites to interact with friends, family and others					
60. Interaction through the Internet has widened my friendship network					
61. I have built stronger relationships with distant family members because of regular online interactions					
62. The Internet has helped me strengthen professional and/or business relationships with people					
63. The Internet has improved my sense of belonging to the team I work with					
64. The Internet use has made my professional activities much easier					
65. The Internet has helped me become socially more active compared to when I did not have the Internet					
66. The Internet has made me more politically conscious and/or active compared to when I did not have the Internet					
67. The Internet has reduced face-to-face meetings with my friends and family and thus affected my relationships negatively					

Section E: Socio-demographic information

68. What is your gender? ☐ Male ☐ Female ☐ Other

69. Which age bracket do you belong to?

   ☐ 18–24 ☐ 25–34 ☐ 35–44 ☐ 45–54 ☐ 55–64 ☐ 65 and above

70. What is the highest level of education you have completed?

   ☐ Less than primary ☐ Primary ☐ High school

   ☐ Trade/Certificate/Diploma ☐ Bachelor Degree ☐ Postgraduate Degree

71. Which of the following best describes your occupation?

   ☐ Community or personal service worker ☐ Technician or tradesperson

   ☐ Manager ☐ Professional ☐ Clerical or administrative worker

   ☐ Retail worker ☐ Machinery operator or driver ☐ Home duties

   ☐ Student ☐ Caregiver ☐ Labourer ☐ Not working/looking for job

   ☐ Other (please specify): _____

72. Including yourself, how many people usually live in this household?

   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

73. How many persons in this household attend a school or any other educational institution?

Kindergarten/pre-school:	☐ None	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 or more
Primary school:	☐ None	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 or more
Secondary school:	☐ None	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 or more
University:	☐ None	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 or more
Others:	☐ None	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5 or more

74. What is your average household income level (before tax) per year?

   ☐ $19,999 or less ☐ $20,000–$39,999 ☐ $40,000–$59,999

   ☐ $60,000–$79,999 ☐ $80,000–$120,000 ☐ Over $120,000

75. Are you of Aboriginal or Torres Strait Islander origin? ☐ Yes ☐ No ☐ Don't know

76. Which of the following best describes your ancestry?
   (you can choose up to two answers)

   ☐ Australian   ☐ European   ☐ Asian   ☐ African   ☐ North American

   ☐ South American

   ☐ Middle Eastern   ☐ Other (please specify) _____

   ☐ Don't know/refuse to answer

77. Which language do you primarily speak at home?

   ☐ English   ☐ Other (please specify) _____

78. How do you rate your English language skills for the needs of everyday life (e.g. work,
    reading newspapers, understanding and filling in forms)?

   ☐ Excellent   ☐ Good   ☐ Fair   ☐ Bad   ☐ Very Bad   ☐ Don't know/refused

79. Which of the following best describes your current living arrangements?

   ☐ Single   ☐ Couple without children   ☐ Couple with school-age dependent children

   ☐ Couple without any school-age dependent children

   ☐ One parent family with school-age dependent children

   ☐ One parent family without any school-age dependent children

   ☐ Other (please specify): _____

80. Of the following categories which best describes your current employment status?

   ☐ Employed full-time   ☐ Employed part-time/casual   ☐ Self-employed

   ☐ Volunteer work   ☐ Retired   ☐ Working within home (unpaid)

   ☐ Career   ☐ Pension recipient   ☐ Student (full/part time)

   ☐ Unemployed – seeking full/part time work   ☐ Unemployed, not seeking work

   ☐ Prefer not to answer

81. Please feel free to include any other comments below on why and how you use the
    Internet and how it affects your quality of life.

   _____

   _____

Thank you for your patience and very valuable time.

The key findings from the combined results will be available to you if you provide your contact details. The full report will be accessible through academic publications and the Regional Council.

Would you like the key findings of this research to be mailed to you?

☐ No   ☐ Yes, Please provide your contact details below:

Your mailing address: