Home Internet for Remote Indigenous Communities

A consumer research report by the ARC Centre of Excellence for Creative Industries and Innovation, the Centre for Appropriate Technology and the Central Land Council

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List of Acronyms

ABA	Aboriginals Benefit Account
ABC	Australian Broadcasting Corporation
ABG	Australian Broadband Guarantee
ABS	Australian Bureau of Statistics
ACCAN	Australian Communications Consumer Action Network
ACMA	Australian Media and Communications Authority
AFCCRA	Australian Financial Counselling and Credit Reform Association
ARC	Australian Research Council
CAHREC	Central Australian Human Research Ethics Committee
CAAMA	Central Australian Aboriginal Media Association
CAT	Centre for Appropriate Technology
CCi	Australian Research Council-funded Centre of Excellence for Creative Industries and Innovation
CDEP	Community Development Employment Projects
CHINS	Community Housing and Infrastructure Needs Survey
CLC	Central Land Council
COAG	Council of Australian Governments
DDSO	Digital Data Service Obligation
DBCDE	Department of Broadband, Communications and the Digital Economy
EU	European Union
FaHCSIA	[Department of] Families, Housing, Community Services and Indigenous Affairs
FTTP	Fibre to the premises
ICP	Indigenous Communications Program
ICT	Information and Communication Technology
IRCA	Indigenous Remote Communications Association
ISP	Internet Service Provider
NBN	National Broadband Network
NITV	National Indigenous Television
NT	Northern Territory
NTER	Northern Territory National Emergency Response
ORA	Outstation Resource Agency
PAW	Pintubi, Anmatjere and Warlpiri
RIBS	Remote Indigenous Broadcasting Services
RIPIA	Remote Indigenous Public Internet Access
SSS	Satellite Subsidy Scheme
SUHREC	Swinburne University Human Research Ethics Committee

TAPRIC	Telecommunications Action Plan for Remote Indigenous Communities
TCPSS	Telecommunications (Consumer Protection and Service Standards)
USO	Universal Service Obligation
VAST	Viewer Access Satellite Television

Acknowledgements

Executive Summary

Research to date shows that many remote Indigenous communities have little access to the internet and make little use of it. The Indigenous population living in remote and very remote parts of Australia comprises 108,143 people, or 0.54% of the total Australian population (ABS 2006a). In central Australia, where this study took place, Indigenous households are 76 percent less likely to have internet access than non-Indigenous metropolitan households[1]. Though the size of the broadband market in remote Indigenous communities may be miniscule in comparison with the national market, it is an important and evolving element in relation to social policy, the provision of basic communication needs, and the cultural prerogative of Indigenous people to live on their traditional lands.

This report outlines the reasons for the low level of internet take-up, and considers the future prospects for 'home internet' in these communities, that is, the use of computers and internet access in the home.

The report documents the circumstances and experiences of 3 remote Indigenous communities in central Australia: Kwale Kwale, Imangara and Mungalawurru. Residents in these communities provided significant insight into the social, economic and cultural aspects of communications access and use. This important evidence is used in the report to examine the drivers and barriers to home internet for remote communities. The report also discusses existing policy approaches to internet access, with a focus on the relationship between communications policy and broader social policies. We have included recommendations to achieve more available, accessible and affordable communications that enhance the lives of remote Indigenous communities.

This report is based on fieldwork undertaken from August 2010 to February 2011 by researchers from the ARC Centre of Excellence for Creative Industries and Innovation, the Centre for Appropriate Technology and the Central Land Council. The research method was primarily qualitative, involving 48 semi-structured interviews, observations and community meetings in the three communities. The project was conducted with the full consent of the Traditional Owners in each community and with full ethical approval in accordance with the National Statement on Ethical Conduct in Human Research.

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[1] ABS 2006a, statistical area: central Australia, outside of Alice Springs.

Policy Context

Indigenous social policy is trending towards the centralisation of services into larger settlements. This report argues that broadband solutions should be considered when addressing social policy problems as it may enable access to many services without requiring physical attendance at a particular location.

The dispersed nature and small size of most remote Indigenous communities continues to be a significant challenge for government in terms of service provision and basic communication. Policies under the Closing the Gap reforms direct funding to 29 larger communities (priority/growth towns), with the expectation that residents of smaller communities will travel between locations, or move to larger towns, in order to access government services. Broadband can assist those living in non-priority towns through applications such as e-health and e-education, thus helping to resolve the difficulties of physical service provision to these areas.

Providing services via broadband could also enable Indigenous people to live on their lands without having to suffer disadvantage as a result of that choice. Indigenous people choose to live in smaller communities for a variety of reasons, including maintaining connection to country and sacred sites, to avoid problems endemic in larger towns, or to avoid marginalisation in larger towns where they do not have kinship ties.

Communications Policy

The Commonwealth Government has been providing Australians residing in remote areas with satellite internet access, at metropolitan comparable pricing, via the Australian Broadband Guarantee scheme, which will be replaced by the Interim Satellite Scheme after July 2011 (administered by NBN Co).

A key motivation for the Australian Government's multi-billion dollar investment in the NBN is to facilitate the digital delivery of government and public services, including health and education, to all Australians (Conroy 2011). Although the nature and timing of these online services will ultimately depend on the agencies and businesses involved, the NBN may provide the necessary technical infrastructure from which next generation services may emerge. Other benefits are likely to include improvements in entertainment, e-business and social connectivity.

However, low take-up of internet in many remote Indigenous communities suggests that the full benefits of the National Broadband Network will not be realised for this segment of the Australian population. The report recommends that policies and programs intended to address this 'digital divide' be extended to encourage home internet adoption and use, particularly in smaller remote

Indigenous communities. Communications policy for remote Indigenous Australians has predominantly been directed at larger communities and is currently based upon a shared facilities approach, such as internet cafes or access centres. This approach is not viable for all communities, particularly those with small populations, due to maintenance and supervision costs. This report sets out practical steps to achieve greater take-up of home internet and computing in remote Indigenous communities.

Key Findings

Access to and use of communications and media technologies

The communications profiles of Kwale Kwale, Mungalawurru and Imangara reveal poor access on multiple fronts, which in turn has a substantial impact on everyday life in these communities. For instance:

- Only one household had access to the internet (out of approximately 30 homes)
- None of the communities had reliable mobile phone coverage
- A limited number of free-to-air television channels were available in Kwale Kwale and Imangara, while Mungalawurru had no free-to-air television transmission
- There was one shared public telephone in both Mungalawurru and Imangara (no home telephones). Kwale Kwale had two home telephones with restrictions on calls to one phone, and no public telephone.

We found that less than 6% of total residents had a laptop or home computer. Of the residents that we interviewed, 58% had used a computer at some time in the past. However, a third of those who had used a computer had never been online. Three quarters of internet users were under the age of 30. This level of internet use is extremely low when compared with existing studies on internet use in mainstream Australia, which show that eight out of ten Australians access the internet regularly.

Remote Indigenous communities have limited choice when it comes to broadband technologies and providers. Many areas are likely to remain without wireless (Next G and beyond) coverage due to market and geographical constraints. The participants in this study were unaware that satellite internet access is available, or that the government offers a subsidy to cover installation costs. The process for organising satellite broadband requires technical knowledge and regular telephone contact, both of which are significant limiting constraints in most remote Indigenous communities.

The access barrier could be resolved through an assistance program for satellite broadband. Such a program might entail community-level solutions where

connection is achieved with one or two satellite dishes per community and distributed to all dwellings via rooftop Wi-Fi transmitters, as opposed to individual household contracts for satellite infrastructure and internet. The intention of the Wi-Fi network would be to allow anyone in the community to access the network from any building, with one contract/bill per community. Such arrangements are likely to be better suited to the unique household economics of small Indigenous communities and would provide a more efficient solution to installation where travel costs for maintenance contractors are high.

Drivers and barriers to communications and media use

The physical and economic conditions of remote Indigenous communities may create significant obstacles for hardware maintenance after take-up has been achieved. Interviews with residents revealed a number of factors that might determine whether broadband is used effectively, including skills, housing conditions and security. Overall, those who had used a computer in the past responded positively when asked if they would like a computer in their homes. Participants who had not used computers or the internet found it difficult to identify needs, as their knowledge of what the technology could be used for was extremely limited.

The possible drivers for take-up, as discussed by interviewees, include:

- **Young people's education:** Young people currently have access to computers at school. Parents believed that home computers would be of educational value for their children. Older people in one community expressed an interest in learning computers so they could see what young people were using them for.
- **Access to services:** Residents in all communities were interested in using the internet for services such as banking, bill payment and online shopping. Residents experienced difficulties contacting service agencies. Although residents were not necessarily aware of how broadband might alleviate this issue, they were enthusiastic about the prospect of online services.
- **Access to information/contacting relatives and friends:** Staying informed can be difficult where telephones are in short supply and unreliable. Many people expressed an interest in using the internet for information retrieval, receiving notices and staying in touch with people in other communities/towns.
- **Enterprise and administration:** Those involved in some form of enterprise were aware that computers could assist them with basic tasks such as cataloguing and keeping track of CDEP hours.
- **Entertainment:** Young people in particular were keen to access the internet for entertainment purposes, including games, music and online video. Storing and viewing photos were also popular interests.
- **Creating local content:** A few community members expressed an interest in using computers to document local stories and language.

When asked to rate these needs, communities identified kids schooling, access to services and talking to friends and family as the main reasons why they might like access to computers and the internet.

Interviewees also discussed the factors that have stopped them from getting a computer. If not addressed, these obstacles may prevent further take-up even if access issues are overcome:

- **Cost:** Affordability is a significant issue for these low-income families. Maintaining ongoing internet subscriptions may also be a factor.
- **Concerns for children:** Adults (particularly younger adults) were concerned about young people wasting time playing games and fighting over the computer. There was only a very low understanding of cyber-safety issues.
- **Lack of support, training and maintenance:** Some were concerned that computers would get damaged or break down and that they would not be able to fix them.
- **Limited computer skills/experience:** Digital literacy was low, especially for people over 30. Even those who described themselves as "good" at using computers tended to have a limited knowledge of what computers could be used for. Although many identified everyday applications such as internet banking as something that would be useful, most did not know how to use them.
- **Limited English literacy:** Some participants were concerned that they would struggle to read the words on the screen.
- **Concerns over physical security:** Most adults asserted that they would need to be able to lock away their computer in order to protect it from theft and damage.
- **The home:** Some households were temporarily living in shared premises, due to home maintenance issues and energy consumption costs. These households were concerned about space for a computer, and that computers would keep people indoors.

In terms of barriers, all communities rated cost as the main barrier to them getting a home computer and internet access. This finding differs from studies of mainstream Australia where cost is not a significant factor for non-users (Ewing & Thomas 2010).

Further research

This report reflects the findings of the first stage of a longitudinal project. For the next stage residents in Kwale Kwale, Mungalawurru and Imangara will receive home internet, computers, training and maintenance assistance (funded through the Aboriginals Benefit Account). The research team will document ongoing issues that influence computer and internet use in these communities and work

with the communities to resolve problems as they arise (research funded through an Australian Research Council Linkage Projects grant).

Recommendations

Our view is that the NBN is not a tool for development in itself, rather practical and achievable steps need be taken to ensure that remote Indigenous communities can begin to benefit from broadband technology and this important national infrastructure.

1. That a **broadband assistance program** be established to serve remote Indigenous communities. The program would provide accessible information and consultation to remote Indigenous communities on their broadband options and assist with implementation of satellite broadband and Wi-Fi networks. The assistance program should also resolve related needs such as power points and protection from power surges. The program may provide some level of ongoing maintenance help.

2. Assistance programs for broadband access should include provisions for shared community **Wi-Fi networks** that can be accessed from any dwelling within remote Indigenous communities (using satellite technology for external connections where there is no mobile or fixed wireless coverage). Subsidies to retail services should take into account **community-level account holders** and billing options, not just individual household contracts.

3. Australian Government should provide **ICT training** for remote Indigenous communities, including smaller communities to encourage take-up. This would work best in conjunction with an internet access assistance program.

4. That funding support be provided to Indigenous organisations to assist in the **development of online services and content**, including e-health. The development of online services should be done in consultation with Indigenous organisations to ensure that content is culturally appropriate.

1. Introduction

Indigenous Australians living in remote areas are the least likely to have access to the internet from home. The most recent census figures (2006) revealed that 20% percent of Indigenous households in remote and very remote Australia had an internet connection in 2006 compared with 60% of non-Indigenous households in the same statistical area. The portion of households with internet connection was even lower in some parts of the country, including central Australia where take-up was 2.2% for Indigenous households[2] compared with 57% of non-Indigenous people in the same area. As the comparison with non-Indigenous households suggests, the low level of take-up is not simply a matter of availability. This report investigates the social, economic and cultural dimensions of internet take-up in remote Indigenous communities and considers the implications for broadband policy.

We focus specifically on smaller remote Indigenous settlements. Communications policy for remote Indigenous Australians has predominantly been directed at larger communities and is based upon a shared facilities approach, such as internet cafes or access centres. What are the prospects for internet take-up – whether that be at the individual, household or extra-household[3] level – for communities that have been left out? What does "home internet" mean for these small, dispersed clusters of households?

The objectives of the project were to:
- Assess the reasons and influences for low or no internet take-up and use through engagement with residents in small communities where there is currently no home access.
- Determine needs, including training, affordability, online service delivery, technology and maintenance, in regards to home internet in remote Indigenous communities.
- Build a research and development approach to ensure that internet access is provided for the benefit – and in full consultation with – the residents of Indigenous communities.
- Provide research that will guide policy makers, funders and service providers in providing effective and beneficial ICT services.

Although our research concentrates on communities where there is no shared access facility, and where satellite broadband is the only option, take-up at the

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[2] Excluding Alice Springs

[3] By 'Extra-household' we are referring to clusters of households where resources are shared. Section 3.2.1 provides further detail on what this means for household economics.

household level is also significantly low in larger communities. The findings presented here in relation to home internet are therefore also pertinent to larger remote Indigenous communities.

1.1. Context of the study

This report is focused on the extremities of broadband infrastructure, in areas with the lowest rates of internet take-up. The Indigenous population living in remote and very remote parts of Australia is 108,143 people, or 0.54% of the total Australian population (ABS 2006a). Although miniscule in market terms, these communities have always presented the greatest challenge for government, in terms of both communications and service provision.

The dispersed and remote nature of these communities means that residents face difficulties in accessing basic services. This has been a significant concern to government in recent years. The Commonwealth Government's targets for "Closing the Gap"[4] between Indigenous Australians and non-Indigenous Australians in the areas of life expectancy, education, employment and housing requires that agencies find alternative and improved ways to connect with those residing in remote Indigenous communities. This project therefore touches on the core political dilemma facing remote Australia, namely the tension between governmental domains of service provision and the cultural imperative of Indigenous people to live in remote areas. Can broadband provide a means for Indigenous people to remain living in remote settlements without suffering disadvantage when it comes to essential services? The long-term social benefits of broadband are beyond the scope of this report, which looks at the determinants for take-up[5]. However, even though remote Indigenous communities represent a very small segment of the Australian population, the social and political context of remote Indigenous communities provides a strong impetus to consider programs for improving broadband take-up.

Outstations and small communities

There are 1187 discrete Indigenous communities across Australia. Of these, 865 (73%) have a population below 50 and 987 (83%) have a population below 100 people. The average size of those with populations under 100 is 20 people. The majority of these small communities are located in remote or very remote

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[4] Closing the Gap is a commitment by all Australian governments to improve the lives of Indigenous Australians. The scope of the strategy, as agreed by the Council of Australian Governments (COAG), can be found at: http://www.fahcsia.gov.au/sa/indigenous/progserv/ctg/Pages/default.aspx

[5] Only longitudinal research into post-adoption will reveal the full potential of broadband. See section 2.3.3 for a brief description of stage 2 of this research project.

Australia, with the highest concentration of small remote Indigenous communities being found in the Northern Territory, Western Australia and Queensland. In the NT the total population living in small remote Indigenous communities is approximately 10,000 or 25% of the total Aboriginal population in all NT communities (ABS 2006a). Just over a third of the Aboriginal population in the NT live in small and medium size communities.

Many of these communities were founded as part of the "outstation movement". Families began returning to their ancestral lands in the 1970s in order to maintain traditional sites. Others moved to outstations to avoid political marginalisation in the larger missions and settlements, where the artificial collocation of diverse groups had resulted in significant stresses for those that were not traditional owners or where language groups were different. As time progressed, outstations also had the appeal of being removed from the social problems of larger settlements, such as alcohol and violence (Blanchard 1987, Altman 2006b).

Most recently, there has been a policy shift away from supporting small communities and outstations towards a focus on larger Indigenous communities. This is particularly evident in the most recent policy initiatives of both the Australian and Northern Territory Governments[6]. There are effectively three tiers of communities under the current arrangements in the NT:

- **Priority/Growth Towns:** The Council of Australian Governments (COAG) National Partnership Agreements and the NT Government's 'Working Future' strategy aim to develop the infrastructure and services in this group of 'priority communities' or 'growth towns' (the Governments' respective terms for these) to the point where they are comparable with those in equivalent sized regional towns. While the Commonwealth and NT Government groups are not identical, there is a high degree of overlap, and the total number of communities thus targeted in the NT is 20. All of these communities are upwards of 300 in population. These policies do not directly fund the smaller communities and outstations. The rationale is that the transport links between the 'hub' target towns and the smaller communities in their sphere of influence will be upgraded, with a view to encouraging and assisting residents of these smaller communities to utilise the hub services.

- **Remote Indigenous Communities (not priority communities):** Other communities receive funding targeted towards specific services such as local government municipal services (administration, power, water, waste management), health clinics, schools, and police stations. In this category,

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[6] For instance, four of the five child and family centres in the NT established through the National Partnership on Early Childhood are in Growth Towns, the fifth is in an urban location.

some staff (teachers, nurses, police, essential services officers, youth workers) may reside in the communities themselves. Larger communities or groups of communities in the NT may also have a resident Commonwealth Government Business Manager.

- **Outstations or homeland communities:** Outstations are loosely defined as having a population of around 100 or less. They receive general-purpose infrastructure and service funding through a network of outstation resource agencies, which are in turn funded by the NT Government. These agencies are in general centrally located in their geographic service areas, and are not large enough to have a staff presence in the outstations themselves.

Whilst the significant increase in funding is welcomed by large communities that have been categorised as priority communities, there is uncertainty in funding, programs and service delivery arrangements with respect to the great many communities that are not captured in priority/growth town policies. There is also evidence within the COAG documents that governments are trying to encourage people into larger settlements. As Moran (2010) articulates, such policies of coercing people do not fit well historically or currently as a development policy for remote Indigenous communities.

Further, Sanders (2010) analysed the populations that would be serviced under the growth towns policy. This work shows that there is a significant gap for central Australia regions where at best only 18% of population are likely to be captured within the 'hub and spoke' of the 20 priority communities. Even with the best transportation options between these large communities and their surrounding smaller communities, there is a significant lack of service coverage for many communities. Whilst not explicitly stated, these policies place smaller communities as a lower priority for government, despite evidence that Indigenous residents of smaller communities are often shown to have much better health and wellbeing than the counterparts in larger communities (Kerins 2010; Rowley et al. 2008; Smith & Claudie 2003; Rowley et al. 2000).

There is seemingly a disconnect between communications policy and Indigenous policy. The Australian Government's investment in broadband is intended to assist all Australians in gaining better access to services, regardless of where they live. While broadband has the potential to connect dispersed, small communities to services and enterprise development, social policy is moving towards the centralisation of services into larger towns as a means to overcome disadvantage. As long as take-up remains low the effects of this contradiction are likely to persist.

1.2. Indigenous ICT Policy

Getting communication technologies into remote Indigenous communities has been a long-term issue for government. There are three dimensions of communications policy that are pertinent to this study: Universal Service Obligation provisions for telephony, internet access subsidies via the outgoing Australian Broadband Guarantee, and the various programs designed to provide internet access and training to residents of remote Indigenous communities. As illustrated in section 3, small communities experience significant limitations when it comes to communication despite these programs.

Landlines: Existing telecommunications facilities and services in Indigenous communities and outstations are determined to a significant extent by the Universal Service Obligation (USO) provisions of the Telecommunications (Consumer Protection and Service Standards) Act 1999 (TCPSS Act). Specific regulations stemming from this Act relating to the provision of public payphones to Indigenous communities require the availability of at least one payphone for a community of 50 or more permanent residents[7]. For the past nine years, targeted Australian Government funding has been providing payphone services through several consecutive 'Community Phones' programs to larger communities and outstations to supplement the USO services, in some cases utilising satellite technology. Earlier telecommunications programs provided some phones to larger communities but the Indigenous Communication Program (ICP) targets its Community Telephones element to remote Indigenous communities with a population of less than 50 people, including children that are occupied for more than 6 months of the year. Phones provided under the ICP use satellite technology – whether fixed telephones for larger communities or mobile satellite handsets for smaller, more transient, communities (generally less than 10 people).

Mobile coverage: Other studies have noted the rapid take-up of prepaid mobile telephones in remote Australia (Brady & Dyson 2009, Brady & Dyson 2008, Tangentyere Council & Central Land Council 2007). However, while mobile phone coverage will go some way to providing a terrestrial option for both voice (phone) and data (Internet access) traffic, its effect is and will continue to be quite limited in central Australia. Telstra is the sole provider for terrestrial wireless broadband in much of central Australia, with no competition between mobile carriers outside of the Alice Springs township and Yulara (which provides

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[7] Under Division 5, Subdivision C of the TCPSS Act, Telstra is required to prepare a policy statement and Standard Marketing Plan (SMP), which states how Telstra will meet its requirements as the primary universal service provider to meet universal service obligations including the provision of payphones in Australia, and telecommunication services in remote Indigenous communities. Under the SMP, Telstra states it will supply one or more payphones in small, remote communities, including Indigenous outstations, where, as a general rule, there is a permanent population of more than 20 adult residents, or 50 people in total.

accommodation for visitors to Uluru). The Indigenous population living in remote and very remote parts of Australia is miniscule in market terms, making up only 0.54% of the total Australian population, or 108,143 of 19,855,288 people (ABS 2006b).

Mobile phone coverage for Indigenous residents of central Australia is now limited to about 7000 people in seven discrete locations (only about 50% of the total population): Ali Curung (300 people), Alice Springs (Town Camps, other town residents; Amoonguna gets coverage – collectively 4500 people), Uluru (Mutitjulu gets coverage - 200 people), Ti Tree (Pmara Jutunta has coverage 200 people), Hermannsburg (500 people), Santa Teresa (500 people) and Yuendumu (600 people). Erldunda – a highway stop – also has coverage but there are no communities nearby. Satellite broadband is therefore the only internet option for many remote Indigenous communities and is likely to remain so.

Internet access: Universal provision of data services is outside the explicit ambit of the USO and the Act, but the Australian Broadband Guarantee (ABG) has been assuming this role (to July 2011, see NBN below). There used to be a licence condition, the Digital Data Service Obligation (DDSO), which required Telstra to provide data speeds at a minimum of 64 kbps to 96 per cent of the Australian population. Due to improvements in broadband technology and coverage, the DDSO was revoked by the Digital Data Service Provider Declaration Revocation 2008 (No. 1) on 19 December 2008. For most communities and outstations, ABG providers have been offering entry level services (as well as threshold and added value satellite broadband services), effectively by meeting the full cost of premises hardware and installation. The customer must meet the recurrent usage cost, which is capped at about $70 per month. A proviso is that the customer must meet the eligibility criteria for the scheme. A number of administrative and logistical steps are involved in obtaining such a service, requiring a reasonably comprehensive grasp of both the English language and computer concepts to successfully navigate the process (see text box in section 3) – unlike the purchase of a mobile phone, or pre-paid mobile broadband, for example. The process does not lend itself to use by people who are unfamiliar with computers and/or where English is a second language. It is also not well marketed as an option for people living in remote Indigenous communities[8].

Indigenous ICT programs: The Australian Government has historically delivered assistance for the implementation of computing assistance to communities (and in some programs to the population at large) through a series of targeted programs, beginning with Networking the Nation, Telecommunications Action Plan for Remote Indigenous Communities (TAPRIC), Backing Indigenous Ability, and currently the Indigenous Communications

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[8] Each ABG provider, competing for business with other ABG providers, does the primary marketing.

Program (ICP). The ICP has two elements: community telephones and internet access and training. Services under the internet access and training element are delivered by participating state and territory governments through the National Partnership Agreement for Remote Indigenous Public Internet Access (RIPIA).

Most remote Indigenous community computer implementations have been in the form of shared community access centres, characterized by a strong emphasis on capital rather than recurrent funding. For a variety of reasons mostly centred on the cost of supervision, very few centres in central Australia have remained in operation. In late 2009 we conducted a snapshot survey of the status of shared Internet access facilities in central Australia (Rennie et al. 2010). Of 34 of the larger Indigenous communities surveyed (with a combined Indigenous population of 9724, or 72 per cent of the Indigenous population of central Australia outside Alice Springs) we found that fewer than half the communities had community internet access, and of those did have a facility, many were only semi-functional.

Northern Territory Emergency Response: In addition to general policy and ICT programs, the NT has been the subject of the much publicly discussed and debated 'Northern Territory Emergency Response' (NTER, also known as the NT 'intervention'). This has had serious consequences for existing ICT programs in remote areas and resulted in the closure of some successful community access centres.

In August 2007, the Australian Government legislated to allow it to intervene across a number of areas associated with the administration of Aboriginal affairs in the Northern Territory for a period of five years. The resulting Northern Territory National Emergency Response Act 2007 included (amongst other provisions) a number of requirements relating to publicly funded computers, with the intention of preventing such computers from being used to access undesirable content. These included the obligation to:

- Install an approved filter to block undesirable content

- Keep records of who has used the computer, and the times they have used it

- Develop and promulgate an 'acceptable use' policy

- Audit the use of the computer at 6 monthly intervals, and forward a report of the audit to the Australian Crime Commission.

The definition in the Act of what constitutes a publicly funded computer is in itself not straightforward, as it takes into account the nature of the public funding. However, the arduous reporting requirements have proven too much for some centres. We have heard anecdotally of some internet access points closing as a result, including the successful facility that was run by PAW media in Yuendumu.

The NTER legislation also raises significant issues around online freedom and filtering that we do not have room to discuss here. The point, however, is that government policies intended to resolve social conditions in remote Indigenous communities are having an adverse impact on public programs designed to encourage internet access. The internet is essentially deemed to be a "problem" that requires restrictions and monitoring rather than as a tool that could assist in overcoming social exclusion.

The National Broadband Network: In April 2009, Senator Stephen Conroy announced 'the single largest nation-building infrastructure project in Australian history' (Conroy 2009). The NBN will provide access to high-speed broadband to 100 per cent of Australian premises. The government's objective is to connect 93 per cent of Australian homes, schools and businesses with fibre to the premises technology providing broadband speeds of up to 100 megabits per second. All remaining premises will be served by a combination of next-generation fixed wireless and satellite technologies providing peak speeds of at least 12 megabits per second. The total capital expenditure for the project is estimated to be $35.9 billion, less than the government's original $43 billion estimate, in part due to the agreement between NBN Co and Telstra. The government expects to contribute $27.5 billion in equity for the rollout.

As elsewhere in Australia, Internet access services in remote areas will be progressively affected by the introduction of services under the NBN. The likely impact of the NBN on remote Indigenous communities is discussed below in the context of satellite Internet services, since most such communities and specifically the communities in this project, are outside the anticipated NBN fibre footprint and probably also outside the NBN wireless footprint, as projected in the NBN Co Corporate Plan 2011-2013. NBN Co has released indicative coverage maps for each technology footprint. The precise optic fibre footprint will only be known when NBN Co completes its detailed suburb-by-suburb, region-by-region, designs for the network[9].

Of the project communities, Mungalawurru is approximately 80 km from Tennant Creek, and would be unlikely to benefit from any such boundary adjustments. Imangara is 35 km from Ali Curung, and might obtain fortuitous coverage if Ali Curung, as an *NT Government Growth Town,* obtains special coverage consideration. Kwale Kwale is only 1 km from Larapinta Drive, which is the road route between Alice Springs (fibre cover assured) and Hermannsburg (another Growth Town and also Commonwealth Government *Priority Community*), and may receive improved coverage.

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[9] NBN Co will be considering proposals to extend FTTP coverage in some locations if external funding—such as from state or local governments—is provided to offset the incremental costs. This is currently being trialled in Tasmania.

The present commercial satellite plan offerings under the Australian Broadband Guarantee scheme, which run to a maximum peak speed under perfect conditions of 4/2 Mbps (download and upload speed respectively), will cease to be available to <u>new</u> customers at 30/6/2011. Services under the NBN satellite scenario will commence from that date, ahead of the long-term satellite due to come online in 2015. NBN Co has brought forward a service using existing satellites to deliver enhanced broadband services to regional Australia immediately. This Interim Satellite Service will use improved ground equipment to deliver peak speeds up to 6/1 Mbps, higher than many existing satellite end users experience today. As part of its long-term satellite solution, NBN Co will deploy two Ka-band satellites to provide access to the NBN outside the fibre and wireless footprint. These satellites will provide better quality services than those currently available via existing satellites. Unlike current satellite services, NBN Co's next-generation satellites will be purpose-built to provide high-speed broadband for the Australian population delivering peak speeds of at least 12/1 Mbps. The Government's uniform national wholesale pricing objective means that wholesale broadband prices for comparable products will be the same for households and business regardless of where they are located—in the city, in regional Australia or in more remote parts of the country.

The commercial structure under which these satellite services will be made available is centred on a wholesale-retail arrangement, with NBN Co as the wholesale provider and multiple retail ISPs. This structure is very similar to the present one, in that the ABG satellite consumer segment presently consists of two wholesale providers (IPStar and Optus) servicing a handful of retail ISPs. Pricing, on the NBN Co's projections, is predicted to be around $56 per month retail for all 12Mbps services, although some industry experts think prices will be higher than this. This pricing compares with the current price cap of around $70 per month for the ABG Threshold service (1M / 256K bps, with ABG providers offering lower prices for entry-level services).

Functionally, the initial impact of the NBN for satellite customers is likely to be felt through the improvement in available access speeds (and probably also quotas), and the improvement this introduces to the customer experience generally. As time goes on, all Internet customers are likely to be presented with a greater diversity of applications, some of which will only become practicable as speeds increase. It should be kept in mind however that latency on satellite links is an absolute physical limitation for geostationary satellite services, and will continue to constrain real time two-way communications applications including video and voice conferencing to some degree.

Another more subtle aspect of remote area service provision is the consequence for customers of the logistical complexity of provisioning, installation and support in the field. Installation and maintenance are no longer left up to the retailer (as occurred under ABG), but will be provided through NBN Co. The NBN Co Corporate Plan does not assume a charge for the standard installation of a

network termination device at an end user premises and NBN Co will be responsible for the installation and maintenance of the equipment in all technology footprints.

1.3. Approach to the project and information collected/Method

1.3.1. Partnerships with communities

The research team consisted of researchers from the ARC Centre of Excellence for Creative Industries and Innovation (CCi, Swinburne University), the Centre for Appropriate Technology (CAT) and the Central Land Council (CLC). During the planning stages of the project, researchers from CAT and the CLC created a shortlist of potential collaborating communities based on a range of factors including: distance from town, capacity, size and prior working relationship. Three communities were invited to take part: Kwale Kwale (about 40km from Alice Springs), Mungalawurru (70km from Tennant Creek) and Imangara (170km from Tennant Creek on the Murray Downs pastoral station). All three communities expressed an interest in receiving internet and computer hardware, and were willing to work with the researchers. Individuals and families had the option not to participate. The research was explained to the communities in detail and described as a distinct project that would nonetheless help the research team to determine the best approach to implementation for the next stage of the project.

As outlined above, we chose to focus on small outstation sized communities in this study as they are mostly not large enough to have been included in the scope of Government ICT strategies and are not considered 'priority communities' or 'growth towns' for services (under COAG Closing the Gap or the NT Working Future initiatives). An additional benefit to this approach was that the size of the communities also meant that we could get a clearer picture of communication needs across all households and thereby produce a more coherent portrait of the community as a whole.

1.3.2. Interviews and community meetings

The research was based on a qualitative approach to assessing the barriers and needs in relation to home internet, as well as contextual factors such as the connections between different media uses, priorities and mobility. The research team used open-ended interviews, observation, community mapping, and community meetings to collect data from communities. The project was conducted with the full consent of the Traditional Owners in each community and has been approved by or on behalf of Swinburne's Human Research Ethics

Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research, as well as the Central Australian Human Research Ethics Committee (CAHREC).

First fieldtrip: We identified and invited local people to work with us as paid research assistants. Their role was to help introduce us to residents, ensure that participants understood the permission forms, test questions to determine cultural appropriateness and assist by interpreting when necessary. This process was successful in two out of three of the communities. Although we were unable to identify a willing assistant at Imangara, the overall interest in the project was high regardless and the elders were active in ensuring that a large number of residents took part.

We conducted 46 interviews on our first fieldtrip and interviewed 48 individuals over the course of the project. We attempted to interview people from as many different households as possible. The interviews were conducted one-on-one, or in small groups at the request of participants. We approached data collection as a household study, in that we used the information gathered during interviews to map household residents and relationships to determine household size and to gauge available communications or media technologies.

The types of question and information elicited from these included:
- Demographic information
- Information about what information media people use generally, and where and how much they use it, with more specific focus on computers as a medium
- Questions around people's familiarity and comfort level with computers and the Internet, and the training they may have had
- The applications people use, or would like to use, on computers, both on- and off-line
- Questions about how people obtain information about events, weather, road conditions etc
- Information on people's mobility

Alongside interviews we also observed and participated in community meetings (organized by elders or assistants upon our arrival). These meetings allowed us to describe the project in detail, including the ethical protocols. Decision-making appeared to occur at the community level as well as at the household level, which in part reflected the small size of the communities and the fact that each community consisted of only a small number of family groups.

A number of residents were not present during our visits. Mostly, these were teenagers who were attending high school in town and staying with relatives there (we did not aim to interview all children as it was clear that they were using computers at school. See 3.1.3). It appeared that a smaller number of people were in custody or living in town for medical treatment, although it was difficult to

gauge whether these individuals would otherwise be permanent residents or visitors. We found that a few young men were often at work or in town and were therefore difficult to interview. As computer experience was more common than not for those in the under-30 age bracket (but not for over-30s), some proficient users may not have been captured in this study.

Second fieldtrip: The main objective of our second visit was to discuss the findings through group meetings with elders and others who wished to take part. We created a newsletter, which outlined the findings from the first field trip, to pass around and read through at meetings. By discussing the newsletter we were able to confirm that the communities were happy for us to continue with the study. The newsletter also provoked informal discussions on a number of points. We then drew up lists of barriers and needs and asked participants to rate each of these, using stickers. We then asked residents what their overall priorities for the community were, in order to understand how communications fitted within a broader agenda of community spending. We also conducted a small number of interviews with people who were not present during our first visit, as well as follow-up interviews with key people to learn more on particular topics. We repeated the mapping exercise to determine if there were any changes to households.

1.3.3. Future research

CAT has been granted infrastructure funding through the Aboriginals Benefit Account (via FaHCSIA) to provide internet access to all willing homes in Mungalawurru, Imangara and Kwale Kwale, as well as undertake training and maintenance when required. Kwale Kwale is the first to receive computers and internet (as of May 2011).

In 2011-2014 we will document the early adoption phase in relation to social, economic and technological factors[10]. This includes the day-to-day circumstances that complicate the use of ICTs in remote Indigenous communities, as well as usage and community/household responses to home computing and internet. In the long term we will monitor how perceptions towards ICTs change once a critical mass of residents have access and develop a wider portrait of these issues over time. We will investigate whether skills across a range of uses improve by having access at home, as well as family dynamics, such as intergenerational learning and supervision of children online. The research will also continue to examine home internet access in relation to broader policy issues arising from the NBN and *Closing the Gap*. The results of this second stage of research will be published in subsequent papers and reports.

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[10] This next phase of the research is being funded through an Australian Research Council Linkage grant. Swinburne University of Technology is the administering organisation. The industry partners are ACCAN, CAT and CLC.

1.4. About the communities

The three communities in this study: Mungalawurru, Kwale Kwale and Imangara are all considered small remote Indigenous communities/homelands (see map below). All of the residents of each community identify as Aboriginal people from central Australia, and most speak their traditional language as their first language. There are similarities between the communities, but there are also a number of unique characteristics of each community, which are highlighted in the discussion below.

Figure 1: Map of the three communities (fieldwork sites)
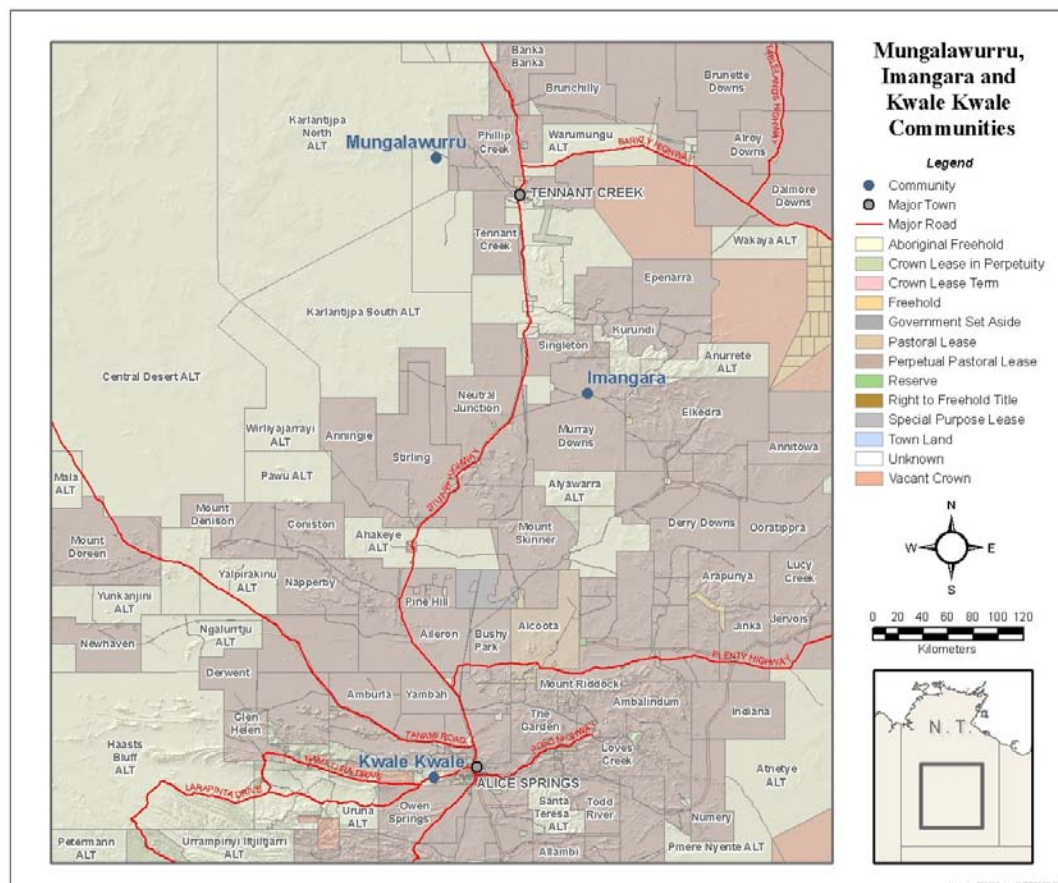
1.4.1. Kwale Kwale

Kwale Kwale is a small family homeland situated on the Iwupataka Aboriginal Land Trust[11], approximately 40 kilometres west of Alice Springs (see Figure 1 and Appendix). Kwale Kwale is one of 12 or so family homelands across the land trust, residents of which descend from four main family groups. Most residents speak Western Arrernte and Luritja. Kwale Kwale has 12-15 permanent residents with the majority of these descending from one family group, although two residents are not from this family group. The main family at Kwale Kwale has had strong affiliations with Yipirinya Primary School in Alice Springs and all children living at the community attend this school and one resident currently works at the school.

One resident of the community runs a youth respite service for troubled youths. The program takes on youth associated with law and justice problems and provides rehabilitation for them, away from town. Two other residents are employed in other full time positions in organisations in Alice Springs.

The homeland has six houses, four of which are permanently occupied and two are occasionally occupied. Two houses have a working telephone, one of these can only accept calls, but has a bar on making charged calls. The community houses and shed infrastructure are serviced by mains power and water supply from Power and Water, except for one outlying house in the settlement that has solar power. The municipal and housing service delivery is provided by Ingkerreke Resource Agency in Alice Springs. All other services, including health, education and Centrelink, can only be accessed by visiting services in Alice Springs.

Kwale Kwale receives adequate free to air television reception from the transmitters in Alice Springs.

1.4.2. Imangara

Imangara is the largest community involved in the work and is a Community Living Area[12] established on the Murray Downs pastoral station (see Figure 1 and

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[11] Aboriginal Land Trust is Aboriginal freehold land established under the Aboriginal Land Rights (NT) Act 1976.

[12] Community Living Areas are excisions of land from pastoral leases for the benefit of Aboriginal people who are or have been ordinarily resident on those pastoral leases. The Northern Territory Government has the power to grant CLAs under part 8 of the Pastoral Land Act.

Appendix). Imangara is 207 km by road south east of Tennant Creek. The excision was granted in 1979 in recognition of the close ties that a number of Alyawarra families have with the surrounding country. The fenced living area is 84.72 hectares located two kilometres east of Murray Downs homestead.

The community has a permanent residency of between 90-100 residents who primarily are descendents of five main family groups from the region. The residents primarily speak Alyawarra, but also Warlpiri and Kaytetye. The residents have close ties with Indarinya, Tara, Wutunugurra, Ampilatwatja, Jarra Jarra, Hatches Creek and Ali Curung. The residential populations at each of these communities are subject to periodic fluctuations as families move between the communities for work, ceremonies, and funerals, and to access services and visit family.

The proximity to Murray Downs Pastoral Station allows the community residents access to a store, to receive and send messages and mail, and some seasonal work for the men from the community. A small number of residents participate in work at the station or through the school. Other residents are on welfare payments. Community Development Employment Projects (CDEP) positions have existed in the past, however given the significant recent reforms to CDEP (APONT 2011) this work (community maintenance) is not currently occurring.

The community has 11 houses and 3 sheds, which are permanently occupied by family groups. The community has a generator for power supply and water is supplied from a nearby bore on the pastoral station. There are also other community facilities including a Women's Centre and a primary school. The night patrol service (scouting for banned alcohol consumption) is no longer operating. Ali Curung Health clinic staff visit the community on request, although residents expressed frustration at the level of service they received. Barkly Shire is responsible for municipal and housing services, and for coordinating the CDEP activity. There is only one public telephone in the community and no home telephones. Imangara receives five free-to-air television services as part of the Indigenous Broadcasting Program, via a Remote Indigenous Broadcasting Service unit (satellite reception dish and terrestrial analogue retransmission facility).

1.4.3. Mungalawurru

The Mungalawurru community is on Karlantijpa North Aboriginal Land Trust (ALT), along with the homelands of Napagunpa, Blue Bush, Kumunu and Kalumpurlpa, which are all to the north of Mungalawurru. To the south of Mungalawurru is Karlantijpa South ALT, west is Central Desert ALT and to the east Phillip Creek pastoral station and the old Warrego mine site. The Land Trust was granted in the mid 80s.

The community has close ties with other homelands on the Land Trust and the Land Trust to the south, with many family members residing in Tennant Creek, Mungkarta and Ali Curung. The residents primarily speak Warlmanpa, but also Warumungu and Warlpiri. Mungalawurru is home to approximately 22 permanent residents, but extended family frequently visit the community so the population can expand rapidly. There are no school-aged children as permanent residents.

The Mungalawurru community residents have a close association with Phillip Creek pastoral station and Warrego mine. Many senior residents were students at the Warrego Mine School, before the mine closed down. The historical pastoral connection, interest and skills have been retained in the community with the more recently established cattle project. The Mungalawurru cattle project has been operating for approximately 10 years and residents are building towards a self managed pastoral station. There are currently 4 permanent full time positions occupied by men from the Mungalawurra community. These positions are funded through the Australian Government's 'real jobs' program. The project is supported by staff in the Julalikari Council, the CLC and the Indigenous Pastoral Program.

The community has five occupied houses and 12 tin sheds, some of which are used as houses and others are used for community facilities including art shed, health clinic and CDEP shed. The community receives a fortnightly health services visit from Anyinginyi Aboriginal Congress, as the providers of the health outreach service. Essential, municipal and housing services are maintained by Julalikari Council's outstation arm - Buramana Resource Agency. They also provide support for three CDEP positions on the community. There is one public telephone in the community and no home telephones. Mungalawurru has no free-to-air television service. However, one house at the community receives an Austar satellite TV service (pay TV).

The community has solar power with back-up generator and water is supplied via a bore on the land trust.

1.4.4. Representativeness of the communities

In total, the study covered less than 30 households from three small communities in the area of central Australia. The fieldwork is representative of the three communities in the survey, in that 54 per cent of the combined adult population in the three communities participated in interviews. Whilst our research only captured around 48 Aboriginal people out of a possible 10,000 Aboriginal people currently living in small remote Indigenous communities across the Northern Territory, we are confident that the results provide a useful baseline to further investigations.

The communities included in this work are also fairly representative of other remote small Indigenous communities in terms of social factors, including

employment and education levels and access to services. For example, the employment results across the surveyed individuals in the three fieldwork communities are largely consistent with national indicators. A review of the Community Housing and Infrastructure Needs Survey (CHINS) indicators shows that the three communities are representative of the vast majority of remote Indigenous communities (ABS 2006), as shown in Figure 2 and in the table in Appendix 2.

Figure 2: Comparison of national average Indigenous social statistics with the 3 project communities
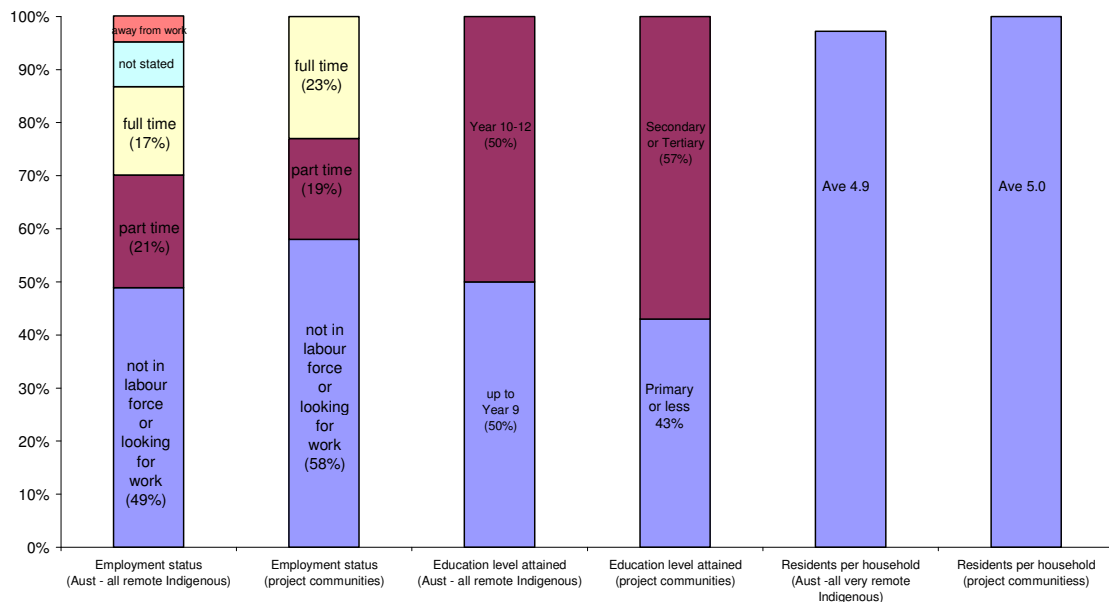
Source: ABS 4704.0 2008, 4713.0 2006; interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 2: Comparison of national average Indigenous social statistics with the 3 project communities. Horizontal axis, left to right: Employment status (Aust – all remote Indigenous); Employment status (project communities); Education level attained (Aust – all remote Indigenous); Education level attained (project communities); Residents per household (Aust – all very remote Indigenous); Residents per household (project communities). Vertical axis, bottom to top: 0%, 10%, 20%... 100%.]

The table shows the averages across small communities for employment (first column on the left), education level attained (third column from the left) and number of residents per household (fifth column from the left). Next to each column is the average for the project communities (Kwale Kwale, Mungalawurru

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and Imangara), indicating that these communities are similar to other small remote Indigenous communities (see detail in 6.1)

Whilst we are confident that the communities included in this work are collectively representative of other small remote Indigenous communities, additional survey work, particularly covering other jurisdictions and regions, and greater numbers of individuals, would be valuable.

It should also be noted that there are a number of differences between the three communities and these differences are reflected in the results. For instance, the largest community, Imangara (at least twice the resident population of the others), has its own school, which is attended by 26 students. The school had played a significant role in improving the digital literacy of students and also adult Imangara residents who were working at the school. Other differences include:

- Proximity to the local service town
- Free-to-air television availability
- The presence of school-age children (one community had none)
- Population size and the number of family groups

In general, the analysis in this preliminary report aggregates results across all three communities. However, where significant differences or characteristics of an individual community have been observed, these are noted in the text.

1.5. Demographic profile

We conducted interviews with 48 individuals over the course of the project. The average age of interviewees was 36. This figure is disproportionately high relative to the overall populations as we only interviewed a handful of children (with guardian consent and supervision), primarily to confirm the extent to which children were using computers at school. Also, a significant number of children were absent from the communities at school at the times of our visits. Of the total interviewees, the largest percentage (34%) were in the 18-30 age bracket (Figure 3).

We interviewed 27 women (including two girls aged 10-18) and 21 men (including three boys aged 10-18). The gender imbalance reflects the fact that a number of young men were unavailable for interviews during our visits, as well as there having been two female researchers and only one male researcher on the first field trip when the majority of interviews took place.

Figure 3: Age profile of residents interviewed
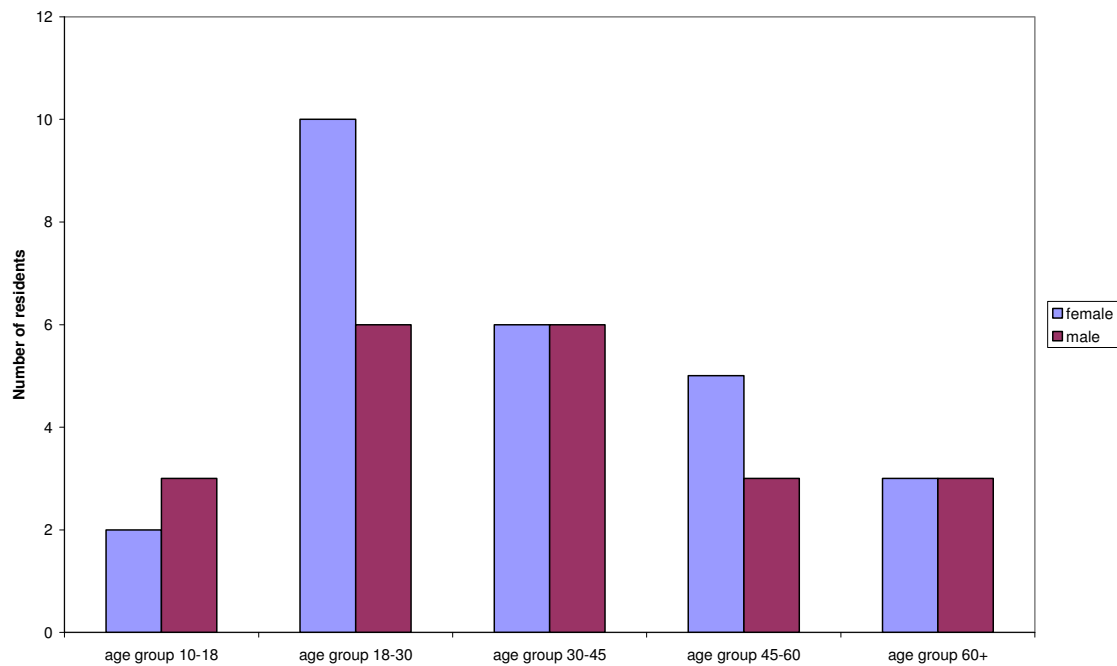
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 3: Age profile of residents interviewed. Horizontal axis, left to right: age group 10-18; age group 18-30; age group 30-45; age group 45-60; age group 60+. Vertical axis, bottom to top: Number of residents 0; 2; 4… 12. Lilac = female. Dark pink = male.]

In terms of education levels, two thirds of adult participants had attended secondary school and a quarter had only received a primary education. Three participants (out of a total of 43 adults) had a tertiary qualification.

Of the people we interviewed, only three lived elsewhere ('traditional owner visitors'). The rest were residents of the communities, either traditional owners or connected to the family by marriage. The exceptions were two individuals who were unconnected to the traditional owners, who were living in separate houses on the perimeter of the Kwale Kwale community. They had been invited to reside in the community as it meant the houses would be maintained. One of these houses was also being used as a youth respite centre (up to 15 young people at a time) and, on our first visit, a church group was constructing an extra building on the site to house these young visitors.

2. Access to and use of communication and media technologies

The Australian government provides subsidies for satellite internet access to households in remote areas via the Australian Broadband Guarantee (ABG) scheme. This program has made no impact on the three remote Indigenous communities in this study. We found that residents in Kwale Kwale, Imangara and Mungalawurru were not aware of the ABG scheme. Furthermore, even if residents were aware of the subsidy, the process of signing up to receive satellite internet services requires significant technical and service provider knowledge. Despite internet service availability, there is currently limited capacity amongst the residents of the communities to obtain these services without support.

In this section we outline the level of computer and internet access that currently exists, as well as access to information and communication more broadly. Lack of access to the internet is just one aspect of a wider communications gap that has a profound impact on daily life in remote Indigenous communities.

2.1. Current computer access and use

Only six participants owned a computer at the time of the study, which was approximately 10% of total adult participants. Only one of these computers was connected to the internet at home. By comparison, current findings from the World Internet Project found that eight out of ten Australians said that they currently used the internet, up from 72.6% in 2007[13]. The percentage of people who had never used the internet had also decreased to 13.5% (just under 20% in 2007), and the proportion of people that had used the internet in the past but had stopped using it had also fallen (Ewing & Thomas 2010, p. 1). For the Australian population generally, accessing the internet through a mobile device had "increased from around a quarter to more than a third (35%) of all internet users" (8).

Obtaining an ABG satellite connection

To connect their computers to the Internet through the Commonwealth Government's Australian Broadband Guarantee scheme (run by the Department

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[13] This telephone survey uses a random sample of 1000 Australians.

of Broadband, Communications and Digital Economy (DBCDE)), the householder or community based small business[14] has to proceed through the following sequence of steps:

- Run the DBCDE *Broadband Service Locator* online mapping tool to determine what services are available in their location. Where the customer does not have access to the Internet they can call DBCDE to talk them through this step over the phone. The *Locator* typically generates a list of about 6 DBCDE registered retail satellite service providers (ISPs) who may be prepared to offer and install services in the customer's area.

- Register their details on the website, resulting in them being posted an information pack by DBCDE, which lists the contact details for ISPs, and a *Customer Declaration Form*. The householder / customer must sign this form to confirm their permanent residency at the premises indicated, and the permanency of the building itself.

- Contact one or more of the listed ISPs, and obtain and compare their service offerings in terms of access speeds, quotas, pricing plans, shaping vs. excess charges, contract duration and any other features of interest.

Having selected an ISP, they then forward the signed *Declaration Form* together with their contract application form to apply for service. For customers in very remote areas, the ISP will then typically apply to DBCDE for approval for an additional incentive payment before an installation date can be set.

- When approval is received, the ISP or their installation sub-contractor contacts the customer to arrange a tentative installation date.

- When the date of installation is imminent, the installer contacts the customer again to confirm or adjust the time. This may involve several changes to the schedule due to weather conditions affecting road access either in that customer's area or for other customers who form part of that installer's current round.

- Assuming the customer has arranged to provide a continuous 240 volt power supply in advance, the on-site installation process itself is usually quite time efficient – taking about 2 hours to mount and align hardware (dish, receiver, and modem) and conduct tests to confirm Internet performance. The service is then signed over to the customer, and normal contracted ISP billing and support processes ensue.

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[14] A third category of Indigenous Community Council or Shire Council is typically not available to NT remote Indigenous communities

Power supply provisioning can raise some issues, as typified by the three outstation communities involved in the project:

Most of the Kwale Kwale buildings are connected to the Alice Springs electrical grid. Each of these is serviced via an individual pre-paid token based meter, where it is up to the householder to ensure that the meter is 'fed' with tokens if they wish to maintain continuity of supply. One of the houses is at some distance (>1km) from the others, and relies on a solar charged domestic battery and inverter system to maintain power.

The Imangara buildings are connected to a generator, which is shared with the adjacent Murray Downs pastoral station and school. This unit is managed by the NT Power and Water Corporation utility and provides 24 hour electricity, but again, the individual Imangara buildings are equipped with pre-paid meters.

Mungalawurru is equipped with a Bushlight solar power system, each building being configured with its own Energy Management Unit (custom designed smart meter) that is allocated a pre-determined daily electrical quota. Should the quota be exceeded, power to discretionary circuits (i.e. those supplying other than lights and fridge) is cut off until the start of the next 24 hour cycle.

All locations in this region are to some extent susceptible to power surges or outages, due to electrical storms. Computer equipment is especially vulnerable to disturbance or damage from such events. Equipment configuration needs to take this into account, and this typically involves the provision of surge protection on electrical circuits and connection of the computers via UPS devices.

In our study, the computer owner with home internet access had discovered he could get tolerable mobile internet access using a USB mobile broadband 'stick' modem, which was attached to a pole on his roof and connected to his computer via a cable. Another computer owner did not realize that he could connect his laptop to the internet when in Tennant Creek (he believed that the internet connection only worked in Victoria, where his sister had been using it at boarding school). He did, however, access the internet on his mobile phone when in town.

Others who had never owned a computer had gained some limited experience elsewhere, with over one third of participants having used more than one computer application. Of the 58% (28) who had used a computer, 18 said they had accessed the computer at school, 6 had accessed the computer at home, 5 at a telecentre, 4 at work, and one each at Congress, the library and a rehabilitation facility. Only 9 participants had accessed computers from more than one site.

The proportion of people who had any experience of using the internet was significantly low. Only two thirds of those who had used a computer had also

used the internet. Only 10% of total participants had accessed the internet from a mobile phone (mostly for downloading music and games), including one who had accessed the internet on a mobile phone but had never accessed the internet from a computer. Three quarters of Internet uses were aged 30 or under. Those in the 30-45 age bracket were most likely to have used a computer but not the internet (Figure 4).

Figure 4: Residents use of computers & internet by age group
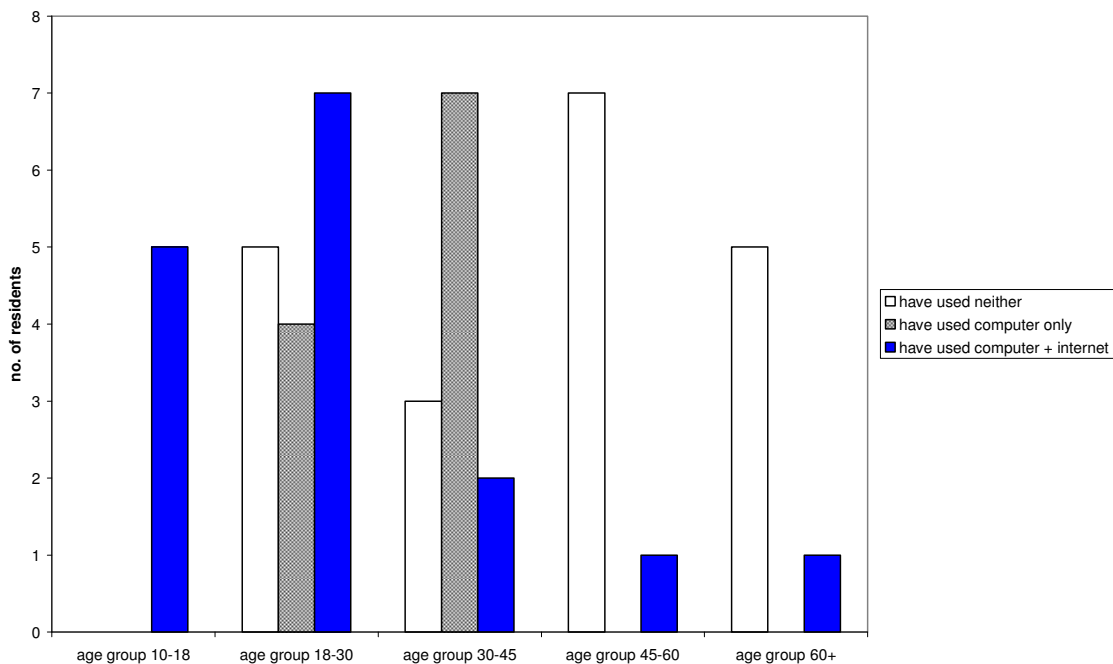
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 4: Residents use of computers & internet by age group. Horizontal axis, left to right: age group 10-18; age group 18-30; age group 30-45; age group 45-60; age group 60+. Vertical axis, bottom to top: Number of residents 0; 1; 2… 8. White column = have used neither. Grey column = have used computer only. Blue column = have used computer + internet.]

We divided the participants into two categories, adopters and non-adopters, in order to examine correlations between the context of use factors and level of skills. Being an adopter of computing and the Internet in this context does not necessarily mean a high level of proficiency; for this purpose we define an adopter as someone who has a computer and/or uses at least two of the applications that we asked about, whether offline or online. Approximately 40% of participants we spoke with (20 of 48) can be considered adopters. We found that those who had used a computer at school or work were most likely to be adopters, compared with those who had used a computer elsewhere (such as

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prison or Congress, although the number was too low to be conclusive). There was only a weak correlation between full time employment and computing/internet adoption.

Adoption was also classified against the parameters gender, age and education level. See Figures 5-7 below. Adopters were more prominent in the secondary schooled, female, and aged under 30 segments of our interview group. Those who cited cost as a factor in stopping them from getting a computer were more likely to be non-adopters (see 3.2.1). The same applied to those who cited practical problems such as maintenance issues, supervision of equipment and lack of access to a phone line for internet. Unsurprisingly, all of those who said that not knowing how to use a computer was a factor in stopping them from getting a computer were non-adopters.

Figure 5: Computer 'adopters' by gender
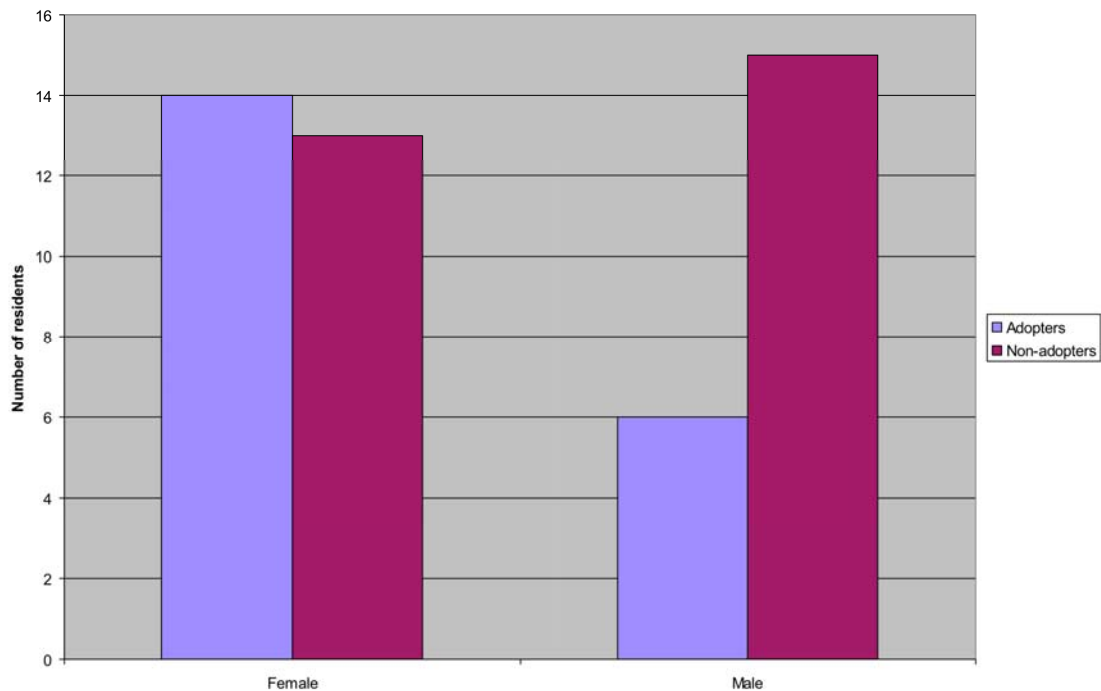
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 5: Computer adopters by gender. Horizontal axis, left to right: Female; Male. Vertical axis, bottom to top: Number of residents 0; 2; 4… 16. Lilac = adopters. Dark pink = non-adopters. There are significantly more female adopters than male adopters].
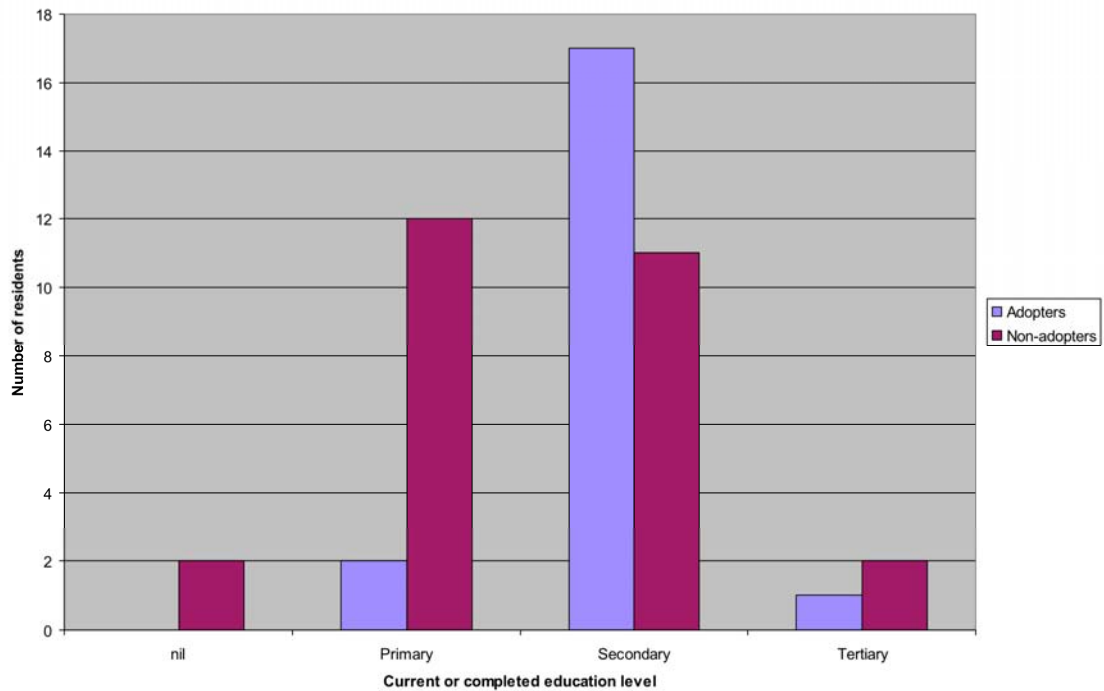
39

Figure 6: Computer 'adopters' by educational attainment

Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 6: Computer 'adopters' by educational attainment. Horizontal axis, left to right: current or completed education level nil; Primary; Secondary; Tertiary. Vertical axis: Number of residents 0; 2; 4… 18. Lilac = adopters; Dark pink = non-adopters. Those with a secondary education are more likely to be adopters than those with a primary education only.]

Figure 7: Computer 'adopters' by age group
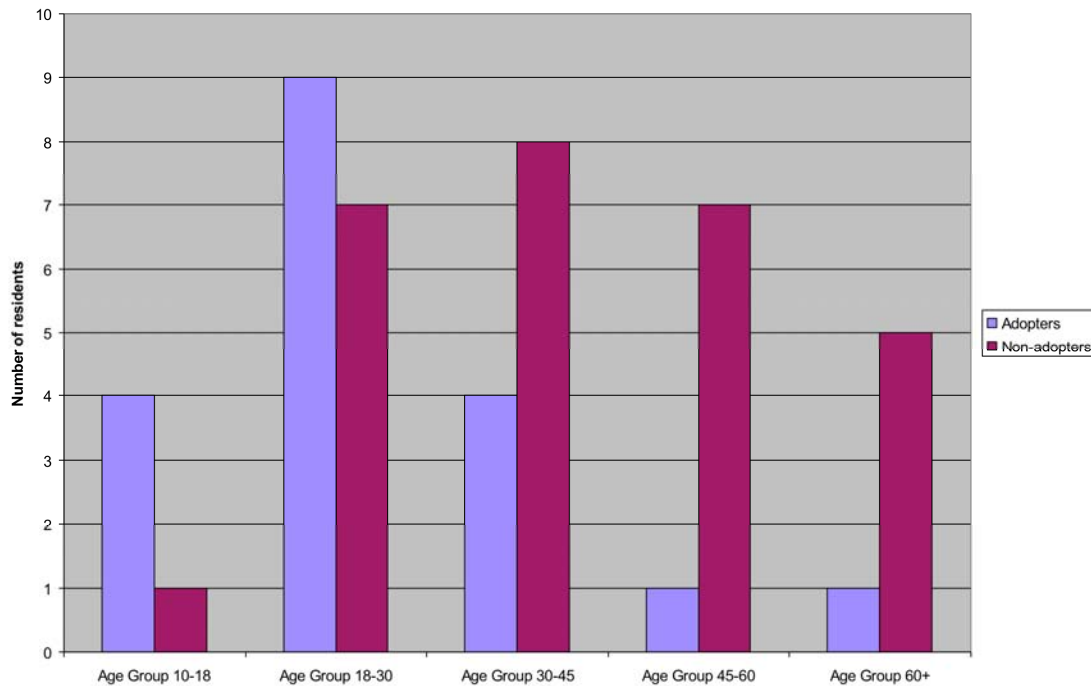
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 7: Computer 'adopters' by age group. Horizontal access, left to right: Age group 10-18; age group 18-30; age group 30-45; age group 45-60; age group 60+. Vertical axis, bottom to top: Number of residents 0; 1; 2… 10. Lilac = Adopters, dark pink = non-adopters. The graph shows that younger people are more likely to be adopters than older people.]

2.1.1. Applications and interests

Amongst those who had accessed the internet, the main uses were for search ("Google"), internet banking, storing/finding photos and watching video clips. Less popular uses included email, shopping and downloading music.

For those who had not accessed computers or the internet, it was difficult to determine what they might want to use the internet for as their understanding of computers was so limited. The uses that attracted the most interest when explained included internet banking, downloading music, and viewing videos and photos (Figure 6).

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Figure 8: What residents would like to use the internet for
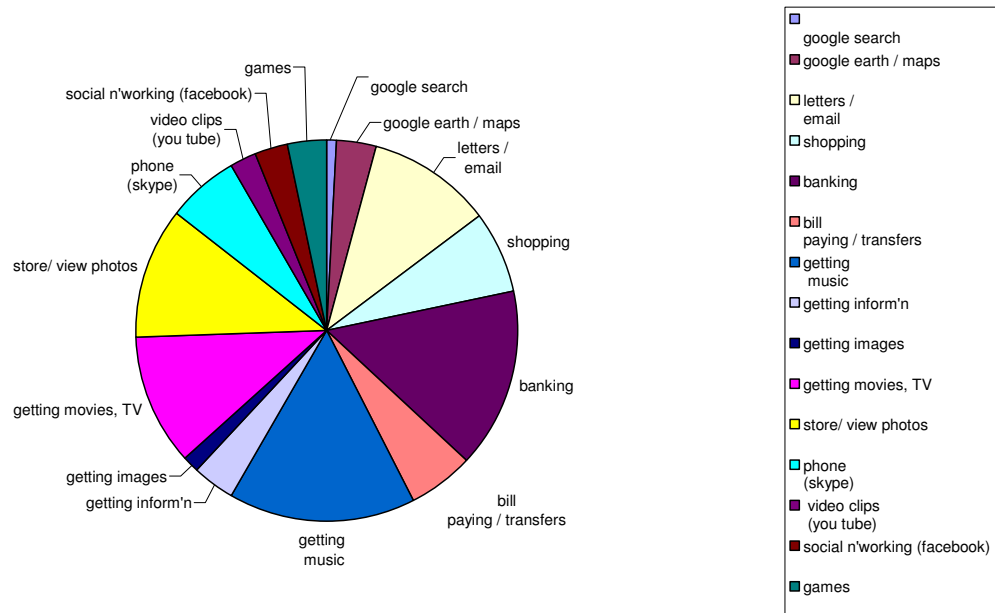
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 8: What would residents like to use the internet for? From top (clockwise): games (green); google search (lilac); google earth/maps (dark lilac); letters/email (cream); shopping (pale blue); banking (purple); bill paying/transfers (pink); getting music (blue); getting information (white); getting images (dark blue); getting movies/TV (bright purple); store/view photos (yellow); phone/skype (bright blue); video clips (purple); social networking/facebook (brown). Music, banking and viewing movies/TV rated highest.]

2.2. Television and radio consumption

Television, including playing DVDs on a TV set, was by far the most popular media platform across all three communities (see Figure 9). Kwale Kwale relies on free to air reception from the Alice Springs transmitters although not all stations are received well. Imangara receives free to air channels through a RIBS low power re-transmission facility located in the community. Mungalawurru has no free-to-air television at all. One household in each of the communities had Austar satellite TV subscriptions, although the Austar subscription at Kwale Kwale had lapsed. We found that Austar was shared; members of other households cited Austar as an information source and were seen going in and out of the house that owned the Austar-connected television. A Mungalawurru resident told us that, "we only need one Austar as everyone can watch it" (participant). Indigenous television (NITV) was available free-to-air in Imangara and on Austar elsewhere, but it was rarely watched. Television availability will improve with the new Viewer Access Satellite Television (VAST) satellite

services, which will provide households that do not receive digital terrestrial transmission with a full suite of free-to-air channels via individual domestic satellite dishes (see text box below).

Figure 9: Media and communications technologies by level of use
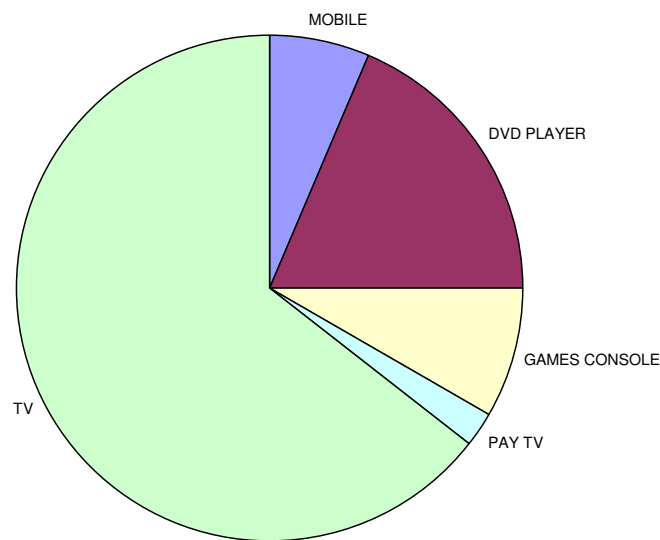
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 9: Media and communications technologies by level of use. From top (clockwise): Mobile (lilac); DVD player (purple); games console (cream); pay TV (pale blue); TV (pale green).]

Radio was far less popular than television, with only one third of participants identifying themselves as radio listeners. Those who did tune in did so in the car rather than at home. Only people over 30 listened to radio, with CAAMA (8Kin FM) radio being the most popular station.

Digital Television Switchover

Most Australians can receive digital television simply by purchasing a digital television set or set-top-box. However, digital receivers only work in places where terrestrial digital television transmission has been established. Although metropolitan and regional areas have been broadcasting in digital for some time, remote areas have only recently started converting transmission sites to digital and large areas will not have access to terrestrial digital television because their current analog sites will not convert to digital terrestrial television.

Over 120 remote Indigenous communities currently receive free-to-air television via 'self-help' analogue transmission repeaters, which also sometimes include Remote Indigenous Broadcasting Services (RIBS), under the Indigenous Broadcasting Program. Satellite-borne encoded TV broadcasts are received by central receivers and are re-broadcast via low power self-help repeaters. There are currently no plans for the digital conversion of these self-help analogue television services. Digital switchover is due to be completed in remote Australia by 31 Dec 2013. When this occurs, viewers will no longer be able to receive a signal through an analogue television set.

Instead, the new VAST service is intended to facilitate the delivery of digital television services by satellite to areas that will not undergo digital terrestrial television conversion. Viewers can receive the VAST service via a domestic satellite dish and VAST set-top box. The Minister announced in January 2010 that the Government has committed funding of $374m over 10 years for both the satellite service and a a Satellite Subsidy Scheme (SSS) for domestic satellite dish hardware and installation in areas where residents have been relying on an analogue self help transmission.

The VAST service is currently accessible to residents who live in the Remote Central and Eastern television licence area, which includes most remote Indigenous communities without analogue television. The VAST service also offers a significant improvement on the range of channels currently offered on the previous free-to-air television satellite service Aurora. However, unless they are already receiving TV via the Aurora satellite service, residents are unlikely to have the necessary equipment (domestic dishes and set top boxes) to move immediately to the VAST service.

The VAST service will be of significant benefit to towns such as Mungalawurru that do not currently receive free-to-air television terrestrially. However, as Mungalawurru does not receive free-to-air transmission residents will not be eligible for the Satellite Subsidy Scheme, which provides financial and practical assistance to change from the analogue terrestrial services to digital television via the VAST satellite service.

For RIBS and 'self-help' communities, such as Imangara, residents will be able to receive more channels than are currently available on analogue. These communities are likely to be eligible for the Satellite Subsidy Scheme. Applications for the satellite television subsidy scheme open for households in the Northern Territory in May 2012.

Areas such as Kwale Kwale, which currently receives only limited channels from Alice Springs and weak reception, will also benefit.

Switchover issues that are specific to remote Indigenous communities include:

Information: The Taskforce, in collaboration with stakeholders and specialist Indigenous communications consultants, is developing dedicated communications materials for remote Indigenous communities.

Cost: It is expected that the full cost will be covered through the SSS for communities currently receiving analogue television. However, this will be subject to commercial negotiations during 2011.

Stakeholders have raised concerns over the cost to consumers after the SSS time period is over. For instance, residents of remote Indigenous communities move between dwellings and may leave houses vacated if someone living in a house dies. Will families then have to pay the full cost to have a new satellite dish installed on a different dwelling? The Taskforce expects that VAST will become widespread through these communities in a similar way that rooftop terrestrial TV antennas are widespread and that this will not be a significant issue.

Concerns have also been raised on the cost of maintenance. There is some chance that costs will come down: with VAST 17-channel free-to-air TV being widespread in remote towns, many electrical and mechanical tradespeople are likely to 'up-skill' to become proficient at basic satellite cabling repairs and satellite dish re-pointing after major cyclones. However, even common trade services are currently expensive for residents in remote Indigenous communities.

Local Indigenous Content: Some remote Indigenous communities use their RIBS transmitters to play local content. The ability to insert local content will cease when analogue towers are 'switched off'. This is of significant concern to the remote Indigenous broadcasting sector (For further discussion of digital switchover see Rennie 2010).

2.3. Access to information and telecommunications availability

The lack of broadband access described above needs to be seen in the context of communications and information availability more generally. When access to telephones and broadcast media is taken into account, it becomes apparent that accessing information can be a multi-dimensional problem for these communities. When asked "how would you find out information such as the weather, road conditions or football scores?" common responses were television (where available) and word of mouth. A number of people responded that they would use the telephone, but this was far from straightforward.

Out of the three communities only two homes had active telephone lines, both in the same community (Kwale Kwale), and both in the homes of older people. One of these phones was restricted; residents could receive calls but could not make

any charged calls, except by using a pre-paid phone card. Both phones were initially installed to enable contact with medical services. Imangara and Mungalawurru both have a single public payphone in an outdoor cabinet. The distance to houses at the other end of the community was up to 400 metres. Three older people in Imangara expressed a desire for a home telephone: "[We] would like telephones. The one here breaks a lot. I need a phone to ring family and friends in other places" (participant). The older residents had limited knowledge of what services they were entitled to, or what was available for purchase. When asked how they would go about getting a telephone, none were able to provide a straightforward answer. One woman said she didn't have a home phone because she "hadn't been given one". Others said they would contact the council in the first instance (rather than a telecommunications company). The elders in Imangara said that they would like at least a public phone for each cluster of houses (camp) as it was too far to get to the telephone if someone was calling.

Although none of the project communities had mobile coverage, a number of people had purchased mobiles for use in town (approximately 30% of people we spoke to). Some mobiles had been given to school-aged relatives who were staying in town so the children could ring the community payphone when they needed to contact home. A third of mobile owners were aware of, or using, their mobile for internet access – mostly music downloads and/or chat.

When the public telephone is out-of-order (which occurs frequently), residents of Mungalawurru will drive 20 minutes down the road to a high point where they can get mobile phone reception (on some phones). In Imangara, we were told that you could get reception by climbing the water tower. On one visit, residents gathered around the HF radio in the CLC car, using the radio to call the hospital to check on a relative who had undergone surgery the day before.

In the absence of telephones, messengers play an important role. People who work in town often bring letters back to the community informing elders of Land Council meetings or other appointments. The same people also take phone messages to relay to others in the community. One woman, who has access to email at her workplace, said she prints out emails "like a leaflet". One participant observed that (residents) have to be careful not to 'shoot the messenger' or they will not know what's going on.

The larger community, Imangara, stays in contact with the outside world partly through the shop at nearby Murray Downs station (1 km away), which will pass messages to residents when they come to buy groceries at the station store. The community recently had a new fax machine installed in the women's centre. Imangara residents can pick up mail from the station or the nearby larger community of Ali Curung, which arrives via mail plane once a week. Mungalawurru and Kwale Kwale residents must pick up their mail from the post office in town (Tennant Creek and Alice Springs respectively).

3. Drivers for take-up and barriers to communications and media use

Developing programs to provide internet access is a necessary starting point for improving take-up rates in remote Indigenous communities. However, it does not resolve the long-term issue of whether computer use will endure, or whether ongoing physical, social or economic barriers will continue to impede full engagement. We interviewed residents about their needs and interests in relation to broadband, as well as the factors that have prevented them from getting a computer or internet connection to date. Using that evidence, this section looks at what the likely drivers for take-up, as well as the obstacles that may present ongoing issues for internet use in remote areas.

3.1. Drivers for take-up

3.1.1. Services

We conducted in-depth interviews with a smaller number of people in two communities to find out how they accessed health services, banking and council services. The purpose of this approach was to determine whether remoteness was preventing access to services, particularly services that might be accessible, in part, through communication technologies.

Aside from health workers, visiting services included arts workers, contractors or maintenance staff, Centrelink and Shire council or Outstation Resource Agency (ORA) workers (see Section 1.3). We found that residents experienced difficulties contacting service agencies. Although residents were not necessarily aware of how broadband might alleviate this issue, they were enthusiastic about the prospect of online services:

Health: Living in town to access medical services for chronic conditions was generally considered undesirable as it meant living away from family. One elderly couple had spent time living in a hostel in Alice Springs but preferred to be near family and where there was "less noise and no humbug". One resident expressed frustration at not having her own telephone because her daughter was living in town for medical reasons and she could not easily contact her.

Banking: Less than 20% of participants had used internet banking and some of these participants were not confident in using it. However, around half of all

participants expressed an interest in using the internet for banking. Follow-up interviews revealed phone banking, or checking a balance online either at a bank or through Centrelink, were common methods of basic banking. Fees associated with account balance checking and transactions on ATMs are often expensive on community store ATMs, and these can be avoided or reduced through online banking (see AFCCRA 2010).

3.1.2. Enterprise and administration

There were a few instances of enterprise, or potential enterprise, in the communities and some awareness that computers could be of assistance in furthering these opportunities. Mungalawurru has commenced a cattle business that has generated income for the community and currently employs four men from the community in full time positions. Some members of this community were interested in using computers to keep a database of stock, review finances and help with reporting. Although there are many other uses where computers could assist their enterprise, community members were not aware of other potential uses such as trading and advertising. In the same community, an artist was interested in using the internet to liaise with the local arts organization and to display her work. A few men and women from the other two communities who were involved in various paid cultural and educational activities said that they would like to document and self-publish cultural materials. The man who runs the youth respite service suggested that he might use a computer to keep a database of youth trajectories, tracking outcomes across five different projects. Additionally, having a computer to keep track of CDEP hours was identified as a priority need during community meetings in two communities. Given, the low skill levels associated with computers opportunities in the three project communities, the opportunities to support the development of enterprise are likely to develop as people's exposure to computers increases, and their confidence and skill level develops.

3.1.3. Education

We did not undertake a full study of children and the internet. However, we did find that this is a significant group of users, and that adults do consider children when discussing the benefits and obstacles of having a computer at home. Of the small number of children we interviewed, as well as young adults who had recently left the education system, all had some experience with computers at school, confirming schools as one of the most important points of computer and internet access for people living in remote Indigenous communities. The primary school at Imangara, for instance, is equipped with 9 computers, which are located in the main classroom. The Imangara school had also run adult computer training (some years ago), which was the only experience of the internet for some members of that community. Adults who had worked as teacher's aides in

all three communities had accessed the internet at the school in the past. The elders in Imangara asserted that they would like to know how to use computers so that they could know what children were doing. However, young adults who had used computers at school did not necessarily continue to use computers after they had left school or in any other context. School was the only site of access for 40% of computer users.

While it is significant that children in remote Indigenous communities are gaining experience of internet and computers at school, further research is required to determine whether school access is sufficient or whether home access can improve children's overall educational outcomes. For instance, findings of a 2002 US Study into the influence of home Internet use on the academic performance of low-income children (Jackson et al 2006) indicated that: "Having a home computer has been associated with higher test scores in reading, even after controlling for family income and other factors related to reading test scores" (p. 430).

Indigenous children living in remote Australia are unlikely to have internet access at home, whereas almost all other Australian children over the age of 12 are accessing the internet from home. The ABS has been collecting data on children's participation in cultural and leisure activities since 2000. The latest survey (ABS 2009), found that 96% of 12-14 year olds were accessing the internet. Children who reside in metropolitan and rural areas of Australia are accessing the internet more from home than from school: 92% of children access the internet at home, compared with 86% who access the internet at school. Similar findings are emerging from Sonia Livingstone's (Livingstone et al 2011) EU Kids Online project, which found that the most common location of internet use is at home (87%), followed by school (63%), but that "internet access is diversifying" with 49% using the internet in their bedroom and 33% via a handheld mobile device (p. 5). Children in mainstream Australia and Europe also use the internet for a wider variety of activities at home, with educational activities (such as homework) being the most popular use, followed by games.

When we asked participants how computers might be helpful, a handful of adults responded that it would be good for their children's education, or engaging young people more generally. This was confirmed in our follow-up consultations, when "kids' schooling" was rated as first or second on a list of priority needs.

3.1.4. Entertainment

All three communities confirmed that online entertainment, including games and downloading videos, are desirable, with an even spread of interest except for the oldest age group (60+). We found there was significant interest in accessing sites such as ABC iView (television programs) as well as YouTube, possibly due to the limited availability of television services. Amongst those who are currently using

computers off-line, games was the most popular activity. For some in this group, recreation in general (mostly games and music) was their sole experience of computers.

3.1.5. Local Content

A few residents expressed a desire to create content in Indigenous languages, including books and audio files, in order to document language and culture for teaching or cultural maintenance purposes. Some of these individuals had close ties with the school, including working as teachers' assistants. One woman was interested in making stories of animals and plants from an Indigenous knowledge perspective and had ambitions to use these as school resources. An older woman in one community was interested in recording language for the benefit of young people.

3.2. Barriers

3.2.1. Cost

'Money' was the main barrier to home internet in these communities and is likely to remain an obstacle to internet take-up into the future. 43% of the participants who did not have a computer said that money was the reason. Follow up consultations, whereby individuals considered and rated a shortlist of barriers, confirmed money to be the most significant barrier in all three communities. Of the six participants who currently own a computer, at least two had acquired their computer as a gift.

There are several costs associated with home internet, including: initial outlay for computer hardware and software, monthly internet connection service provider costs, and the ongoing repairs and maintenance costs. Whilst participants often did not distinguish between the different costs in interviews, when a discussion was prompted by researchers around on-going costs of internet services, some participants began thinking about ways that community residents can contribute.

There was also significant discussion across all three communities around how much power computers use. In Kwale Kwale and Imangara, where prepaid power tokens are used for power, there is strong awareness about cost of power. In Mungalawurra where their primary power supply source is from solar power, residents are aware of the limitations on the system. Many residents were so concerned about power requirements that researchers needed to explain that computers use about the same amount of power as a few light bulbs.

This finding is important as it stands in strong contrast to the mainstream population, where non-users say they simply have 'no interest' (41.5%), or cite 'lack of skills' (30.4%). Ex-users claim 'no interest' (20.3%) and 'no time' (18.6%) are the main impediments. Cost is not the primary reason why people decide not to use the internet amongst Australians generally (Ewing & Thomas 2010, p. 5).

The issue of money is more complicated than simply affordability. Billing and household economics also play a role, as we explain below. Other factors that influence household economics include: the higher than average number of dependents in remote Indigenous communities, and the nature of the economic relationships across households, high unemployment and dependency on social security payments. Combined, these issues make it difficult to compare household spending and priorities with those of the mainstream population.

Although we did not ask participants to disclose their income, high unemployment (compared to a national unemployment rate of 5.6%) across all three communities suggests that families are getting by on low incomes:
- Only 38% of non-school aged participants were involved in some form of employment or business enterprise, either full-time or part-time, including CDEP.
- 52% were unemployed (including those on benefits such as pensions).
- 10% of those we interviewed were still in school.

In-depth interviews revealed that income is mostly spent on food, rent and bills. There was a significant awareness of cost in relation to appliances and energy consumption. Power bills were a significant expense at around $50 a month (higher during winter).

Existing studies into mobile phone take-up provide valuable insight into the issues of telecommunications affordability and consumer awareness in relation to billing. In the 2007 Ingerrekenhe Antirrkweme study (Mobile Phone Use Among Low Income Aboriginal People: A Central Australian Snapshot), conducted by researchers from the Tangentyere Council and the Central Land Council, participants on Centrelink benefits were spending on average 13.5% of their income on their mobile phone and those on CDEP were spending 8.3% of their income on their mobile phone. The report did not outline whether those living in locations without mobile coverage spent less or more on mobile phones than those living in Alice Springs and town camps with coverage. However, on average, participants were spending $42 of their fortnightly income on their phone.

The same study found that prepaid mobiles were overwhelmingly preferred over contracts: "Almost all of the mobile phone users surveyed, 93%, were using a prepaid mobile phone service" (Tangentyere Council and Central Land Council 2007, p6). The major motivation in using prepaid phones is the wish to avoid potential credit management problems. In Alice Springs, of those who had a home phone, 29% reported having been disconnected by the phone company

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because of problems paying bills. The issue of billing appears to be common across different regions. For instance, a study in Bloomfield River, Queensland, found that some people who had once been contracted to a mobile phone plan had incurred bills of up to $4,000. The authors write, "people obviously learned from experience by disconnecting or replacing phones on plans with prepaid phones. Others heard about the bad experiences and either bought prepaids in the first instance or avoided mobile phones altogether" (Brady & Dyson 2009, p. 31).

Billing has also been a barrier to internet access on the mobile phone. Residents in the Bloomfield River Valley, Queensland, where 3G reception is available, were found to have "experimented with Internet connections but did not use the Internet because of the cost" (Brady & Dyson 2009, p. 36). Brady and Dyson note that it can be difficult to determine what costs actually are being incurred, "for example browsing Bigpond on a Telstra mobile is free but browsing other websites incurs charges" (p. 36).

Demand sharing

For individuals living in remote Indigenous communities, economic decision-making is often influenced by factors that most Australians do not experience, notably, the system of "demand sharing". Simply put, Aboriginal people may frequently give away resources in circumstances when non-Indigenous Australians would consider it wiser to hold on to that resource. Anthropologists have identified this form of behaviour as one of the defining qualities of Aboriginality, common to groups of people living in urban, region and remote contexts. Known as "demand sharing", or colloquially as "humbugging", this form of exchange is said to have foundations in traditional lifestyle when sharing was a matter of survival in a situation of scarcity and unpredictable food supply.

Today, demand sharing acts as a levelling mechanism, whereby those with more resources give to those with less when asked. The terms upon which such sharing occurs are complex, dependant on kin (birth or marriage) and other long-term relationships, either within one's household or outside of it. When someone within this network makes a request for assistance (such as cash, use of a car, shelter) it can be difficult to refuse without significant social consequences. Unlike typical Western sharing, the obligation is on the giver as opposed to the receiver, in that it is "not the borrower that needs to make a case, but the giver needs to explain why they can't" (Schwab 1995, p. 8). As Schwab writes, this form of giving is strategic and based on a set of social obligations. To refuse is a poor economic decision that may also "derail an otherwise predictable, stable set of interactions". The considered way in which this occurs can be described as a "calculus of reciprocity" (p. 7).

> When it comes to payment of bills and other expenses, typical methods of measuring household expenditure do not work (Smith 1991). Residents might seek contributions to bills quickly from a number of people who are not necessarily residents of that household. For instance, in a 1988 study of town campers, Rowse found that almost one third of people who contributed rent were not officially responsible tenants nor even recorded members of households (1998, 60). Therefore, while household might refer to the physical dwelling, as Smith (1991) writes, "many Aboriginal households are compositionally complex and often characterised by a state of considerable flux in membership and by economic vulnerability" (p16).

In terms of pay television, we observed that the cost of maintaining the subscription fell on an individual, although people from other households were often using that television, some of them citing it as their primary source of information. Sharing can also extend to mobile phones, whereby "the collective nature of mobile phones" means that not everyone needs to own a phone. The difference with mobile phones is that the cost can increase for the individual the more the phone is shared. The Ingerrekenhe Antirrkweme study quotes one participant who no longer owns a phone: "Everyone uses my phone and makes the bill bigger for me" (Tangentyere Council & Central Land Council 2007, p. 33).

3.2.2. Computer literacy

One third of those without a computer said either they didn't know how to use it (21%) or had never considered getting one (12%). This last group generally had very little knowledge of what a computer could be used for and some older people asked us to explain what we meant by the words "computer", "laptop" and "internet". A man who had accessed a computer at a former workplace said he "didn't go near it" (he had played solitaire on the computer but someone had to set it up for him). Overall, it was difficult to ascertain whether training or particular uses were of interest to these participants and substantial prompting by the researchers may have skewed what answers we did receive.

The fact that a significant proportion of people had not obtained a computer could also suggest that perhaps it was not relevant to daily life. We attempted to test this theory on our second field trip by asking people to rank the reasons why they did not have a computer. Using this method, the reason "not important" rated very low in all three communities, leaving us with the finding that perhaps the cost, 'not knowing how to use', and maintenance issues are dominant.

Approximately 60% of those who used a computer considered themselves to be good at it. This is despite the fact that many in this group had only a limited knowledge of applications, with only a third having used more than five different computer programs or applications. Many thought that learning how to use a

computer was "hard at first", but having some experience generally meant that they didn't fear learning as much as those with no experience. Some participants stated that they had figured out how to use computers on their own, or that it was possible to become more proficient through trial and error.

Participants who had no experience of computers generally perceived it to be difficult to learn. However, one man reflected that when he had seen other people using computers he was "surprised how well they do it, so it can't be that hard". The lack of access to support services, for instance online help and face-to-face training, is a significant barrier for those who have not received computer training at school or work. It is possible that demand sharing systems have a negative impact on skill-sharing, whereby those with computers are reluctant to teach others as that may increase demand for use of that computer (this theory requires further evidence and testing).

3.2.3. English literacy

All three communities rated difficulties with reading the English language as the third most significant barrier to computer use. As one woman commented, "the issue is that English is a written word but my language is spoken". Observation of training sessions would be an effective means of testing this perceived barrier.

3.2.4. The home

The government's strategy for broadband policy for mainstream Australia is firmly centred around the home as an economic unit, either as a family, share house, couple or single person household. However, the term "household" may not mean much more than simply the physical space in the context of remote Indigenous communities. This has implications for how we understand home internet and the factors influencing take-up.

In her book 'Yuendumu everyday', Musharbash (2009) describes intimately the comings and goings associated with camps at Yuendumu. Whilst the project communities are linguistically and culturally distinct from the Warlpiri at Yuendumu there are many parallels in the way houses and camps are configured and the interactions between family as they move around their community. In Imangara, the breaklines in fences around houses provide one indicator of the closeness between particular houses and their family connections. Given the limits on private space and privacy in these communities, residents are often acutely aware of the security of personal items, such as a computer.

Housing conditions and occupancy vary within communities. For instance, in one community an older couple was obliged to provide shelter for relatives from two other houses. The couple was concerned that having a computer in the house would keep people indoors in an already crowded house, which they did not wish to encourage. Although the couple said there were too many people in their

house, they discussed moving out themselves rather than deny shelter to family, which implied that they had an obligation that was difficult to refuse.

Residents also moved between houses within a community due to building maintenance or habitability issues. In Mungalawurru, repairs to a wasp damaged building made it habitable again, resulting in a family moving in, while the art centre moved out of that building to another. Some individuals lead a more "maverick" existence (Smith 1991), living between households and across different outstations. Some houses experience a large number of houseguests, particularly during school breaks.

The 2006 Census showed that a third of Indigenous people (39%) living in occupied private dwellings at the time of the 2006 Census were children under 15 years, about twice the proportion of the non-Indigenous population (20%). Indigenous households in very remote areas consisted of an average of 4.9 persons, compared with 2.5 in non-Indigenous households and were far more likely to be multi-family households (20% of all households, compared with 1% of non-Indigenous households) (ABS 2006). Although these figures do not demonstrate the mobility that occurs between houses, they do show that households may be comprised of more than one economic unit, such as a couple, a family with dependents and single individuals.

In smaller communities, the "extra-household" economy (whereby linked households share resources) may be more important than the individual household, thus providing a better indicator of the economic capacity of the community. One of the reasons for people living on an outstation is that they provide "more politically manageable social units away from the social pathologies of overcrowded centralised settlements" (Taylor 2006, p. 53). Reciprocity between households can therefore be an indicator of social cohesion or insurance against individual hardship rather than vulnerability (Altman cited in Smith 1991, p. 15). Such systems of sharing across households raise the question of whether a more communal approach to internet is appropriate for small communities, such as a shared satellite point. Moreover, if the consumption of goods and payment of bills are not be organised according to household at all then this may have consequences for how "home internet" is conceived and managed.

The large numbers of residents per house means that space is an issue (in terms of where to put a computer), although we found that this did not necessarily rule out the possibility of having a computer. A number of people suggested that, ideally, they needed an extra room to house a computer and spoke of the ideal room. The various suggestions that computers be housed in another building, such as a multi-purpose shed, could be interpreted as the equivalent of wanting a separate office for people to work in rather than taking up space in small or crowded houses.

This also has implications for how we conceive of public and private use of computers. In her ethnographic study of young people, Kral (2010) argues that communal spaces, such as youth programs or media centres, are a kind of "digital bedroom" for adolescents in remote Indigenous communities – a place for retreat and self-expression. These public spaces give them a level of privacy "that is so difficult to attain in the home" as well as safe storage for their work. Young people experience a "sense of ownership, belonging and control" that is otherwise difficult for them to attain (p. 6). A significant issue for outstations, where shared access facilities are unavailable, is whether such private use can occur in the home and whether a critical mass of computers across all dwellings may eventually provide some level of privacy for users.

A significant number of residents expressed concerns about the security of the computers. For some, there was a risk of theft by visitors or passers by. Those who owned computers guarded them carefully as computers had "been taken" in the past. Others were concerned that some within the community or home, particularly younger people, might mistreat the computers. The small number of individuals who owned a computer (or had in the past) were conscious of who they let use the computer. One young man kept his laptop locked away when he was not using it. Having only a small number of computers in a community also created annoyances for owners, mostly in the form of "humbug" from others who wanted "to put songs on their mp3 players". Various adult residents suggested construction of lockable covers for computers would help them to manage these problems.

### 3.2.5. Access to installation and maintenance services

Service installation and maintenance is a very challenging problem for people living in remote Indigenous communities. Tradespeople charge very high rates for time and travel. For instance, CAT reported that they were initially quoted $1100 to have an additional power point installed in a shed already serviced with power (CAT managed to bring down the price in this instance). Computer maintenance and repairs were listed second (after cost) as a barrier to computing in Kwale Kwale and Mungalawurru, and fourth in Imangara. Minor concerns included care for computers and electrical equipment generally. One participant said that "[electrical] leads get in the way because people put them anywhere". A woman who owns a laptop was protective of it, telling us that "people want to use it but I tell them no because they might spoil it". Participants were mostly concerned about children and dogs damaging computers, especially by causing spills. This fear proved to be well-founded; on a return visit to Mungalawurru we discovered that the community's one laptop had been damaged when a small child threw a rock at the screen (the owner of the computer was worried that they had lost information as a result and was not aware that she could plug a separate monitor into the laptop and retrieve the information). There was also a perception that children could damage computers if they "press the wrong buttons".

When we discussed the differences between laptops and desktops, many people expressed a preference for desktops, as they are likely to stay in one place, look somewhat more robust and easier to use (with bigger display etc), and as the individual parts (keyboard, monitor, mouse) could be replaced. In Imangara, we found a discarded laptop on the back of a trailer that was missing a keyboard.

3.2.6. Cyber-safety and 'worry about kids'

We asked residents whether they thought computers were good for children, and whether they had any concerns in this regard. The chart Figure 8 shows how the responses to the basic question varied with the age of the respondent.

Figure 10: Are computers good for kids?
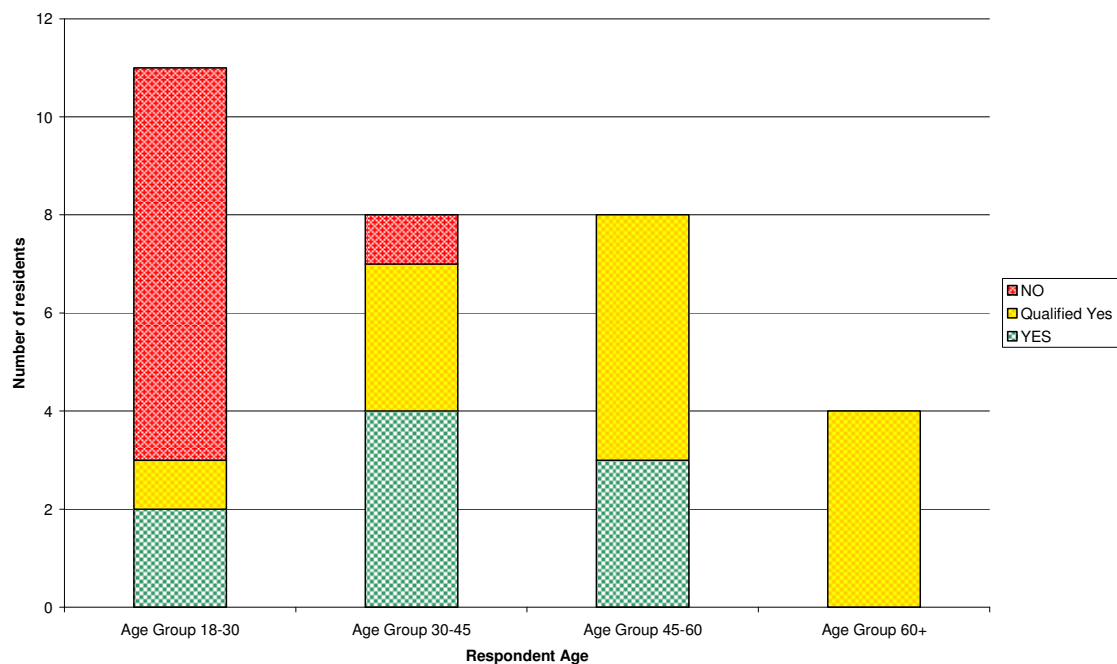
Source: Interviews with residents of Imangara, Kwale Kwale, Mungalawurru August-November 2010

[Figure 10: Are computers good for kids? Horizontal axis, left to right: respondent age group 18-30; age group 30-45; age group 45-60; age group 60+. Vertical axis, bottom to top: number of residents 0; 2; 4… 12. Red = No; yellow = qualified yes; green = yes. All people over 60 answered a qualified yes to the question. More people in the 30+ age groups responded yes than in the 18-30 age group.]

The level of concern for cyber-safety amongst parents and guardians was low and difficult to gauge. However, we found that adults were just as, if not more, concerned about addiction to games and time-wasting behaviour than the content that children might access online. Children were considered pests when it came to media devices, especially as they "get upset when they don't get to use it" or fight over it. Participants spoke of kids bugging adults to play games on mobile phones. Adults also told us that they locked away their games console and would do the same with a computer if they had one. A smaller number of people responded that children should nonetheless be allowed on computers because they can teach others.

In contrast, a report commissioned by the Australian Media and Communications Authority (ACMA) found that 71% of Australian parents "were concerned about cyber-safety, with 32% of this group reporting that they were 'very concerned'" (ACMA 2010, p. 6). It is worth noting that most Australian parents regularly use the internet (88%) and access the internet from home at least several times a week (81%), whereas adults in our project communities were only 53% likely to have used a computer and only 14% of adults owned a computer of their own. It is possible that these adults' limited use of computers reflects their lack of knowledge of cyber-safety.

4. Conclusion

Securing the benefits from computer and internet use is a challenge in the remote Indigenous community context. First and foremost, people's limited access, previous use, and awareness of the relevance of computers and the internet to their lives, are significant factors. Despite these obstacles, there is much interest and curiosity about computers and the internet, particularly in terms of children's education, access to services, administration and entertainment.

We found that a 'home internet' model is likely to be a viable alternative for small communities to the shared facilities approach currently favoured by government-funded programs and targeted at larger communities. However, if home internet is to significantly increase in smaller communities, this must start from a different conception of the household unit, with consequences for subscriptions and billing. This study has shown that residents of the three participating communities are well aware of the practical domestic considerations involved with computers and internet. These include security of equipment and the family rules associated with usage. However, they were less aware of how to acquire an internet connection and what type of internet connection was available in their area. The cost of internet access is a significant barrier, as is space for private use, particularly in multi-family homes.

Resolving Broadband Access

Remote Indigenous communities face limited choices in terms of broadband access. The presence of optical fibre, which is the usual backhaul technology for mobile base stations, is largely limited to the proximity of the north-south road corridor (Stuart Highway, Darwin to Adelaide via Alice Springs). Even where residential phone lines are present, most of these phone services are provided on low-capacity radio infrastructure that does not have the speed per service to support effective data communications. For the vast majority of communities that do not have access to Next G mobile broadband, satellite is the only option. We found that residents are not necessarily aware of the choices on offer, or that subsidies are available for satellite access. This is a substantial obstacle to internet take-up. The issue of access could be resolved through an appropriate assistance program, although the other barriers to take-up (as discussed in the post adoption section of this report) would need to be taken into account.

The NBN is unlikely to resolve issues of access and adoption. As it stands, the NBN not a mechanism for development; it will provide technical improvements in bandwidth, and this will in turn encourage new applications, some of which may hold substantial social value for people in remote areas. However, the current scope and commercial design of the NBN will maintain the status quo in terms of

fixed service retail offerings in remote areas – mass marketed products that are known to be unattractive and problematic to Indigenous households.

One area where current broadband policy might be adapted to better suit remote Indigenous constituents is at the level of implementation assistance. The Australian Government currently provides remote Indigenous communities with pro-active assistance across a number of areas, including the Community Phones element within the Indigenous Communications Program. These programs are designed to help people who, for a number of reasons, do not have the necessary information, or ability, to go through the standard channels. However, as in the case of the Australian Broadband Guarantee, providing a telephone service to respond to requests (to arrange times and provide the information necessary for installation) is insufficient, because it is beyond the capacity of people in many communities to take advantage of this given their unfamiliarity with the technical terminology and administrative processes involved. This is particularly true where there is only one shared phone in the community to call from, and that is frequently out of order. In addition, we found that although the ABG removes the cost of broadband installation, not all participating companies will necessarily install to all communities, and this reduction in choice can translate to longer installation times. This is despite the fact that ABG providers are required under their funding agreements to make services available to any eligible customer in their service areas, regardless of the customer's location (facilitated by access to additional subsidy payments to offset the costs of servicing remote locations). Moreover, English is a second or third language for some residents and this creates difficulties with filling out forms.

Aside from these basic consumer concerns, there is a strong practical argument that each satellite broadband connection should be shared across multiple houses, rather than contracted individually for all houses in a community. A shared access point makes sense in terms of maintenance and the high contract fees that are associated with remote broadband installation, as well as the unique economic systems that exist in remote Indigenous communities. In small communities, WiFi transmitters could connect a number of households to the one satellite broadband service. However, setting up and managing a shared internet connection entails significantly greater technical knowledge than a single household subscription. As retail models do not generally provide this level of service, an assistance program is the most straightforward way to resolve technical networking solutions on a community-by-community basis.

Policy and programs: beyond infrastructure

Broadband has the potential to connect dispersed, small communities to services and enterprise development. Indigenous social policy is moving towards the centralisation of services into larger towns. Broadband is therefore an opportunity for those living in smaller remote Indigenous communities to access some

services on a regular basis without having to relocate to larger centres. Indigenous communications policy, however, is currently targeted at the larger communities, despite the fact that smaller communities are less likely to have alternative internet access options through mobile phones. Aside from services such as health and education, residents identified more general needs such as small business support, content creation, entertainment and keeping in touch with family.

We conclude that, while the NBN will result in faster speeds and more applications for satellite customers, it will not address the issues that are currently influencing low internet take-up in remote Australia. The potential of the NBN in remote Indigenous communities will not be realised without a new approach to installation, billing and pricing, together with a pro-active model of support. This report aims to provide a starting point, from which new approaches to internet in remote Indigenous communities may emerge.

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6. Appendices

6.1. Comparison of project demographic data with relevant ABS data

ABS Source	Data item	Scope	ABS Data for communities population less than 50	ABS Data for communities population 50 or greater	ABS Data for all communities	Data for project communities (Source: community observations/ interviews)			
						Kwale Kwale	Mungalawurru	Imangara	All 3 communities combined
CHINS 2006 4710.0	**Number of communities**	Australia - very remote Indigenous	767	95		<50	<50	>50	
CHINS 2006 4710.0	**Access to public phone in community?**	Australia – all regions Indigenous	364 of 764 (48%)	95 of 123 (77%)		No	Yes	Yes	
CHINS 2006 4710.0	**Access to nearest Primary School**	Australia – all regions Indigenous							
	Have Primary School in community		62 of 764 (8%)	41 of 123 (33%)	103 of 887 (12%)			Yes	
	Travel <50km to Primary School		413 of 764 (54%)	66 of 123 (54%)	479 of 887 (54%)	Yes			
	Travel >=50km to Primary School		289 of 764	16 of 123	305 of 887		Yes		

ABS Source	Data item	Scope	ABS Data for communities population less than 50	ABS Data for communities population 50 or greater	ABS Data for all communities	Data for project communities (Source: community observations/ interviews)			
						Kwale Kwale	Mungalawurru	Imangara	All 3 communities combined
			(38%)	(13%)	(34%)				
CHINS 2006 4710.0	**Access to nearest Hospital**	Australia – all regions Indigenous							
	Travel <50km to Hospital		133 of 764 (17%)	42 of 117 (36%)	175 of 881 (20%)	Yes			
	Travel >=50km to Hospital		631 of 764 (83%)	75 of 117 (64%)	706 of 881 (80%)		Yes	Yes	
4704.0 2008	**Highest year of school completed (not incl. those at school now)**	Australia – remote Indigenous							
	Year 9 or below				50%				Nil + Primary =

ABS Source	Data item	Scope	ABS Data for communities population less than 50	ABS Data for communities population 50 or greater	ABS Data for all communities	Data for project communities (Source: community observations/ interviews)			
All combined						Kwale Kwale	Mungalawurru	Imangara	All 3 communities combined
									18 of 42 (43%)
	Year 10-12				50%				Secondary + Tertiary = 24 of 42 (57%)
4704.0 2008	**Labour force status**	Australia – Remote Indigenous							
	Employed full time				16.7%				Full time = 10 of 43 (23%)
	Employed part time				21.2%				CDEP + Part time = 8 of 43 (19%)

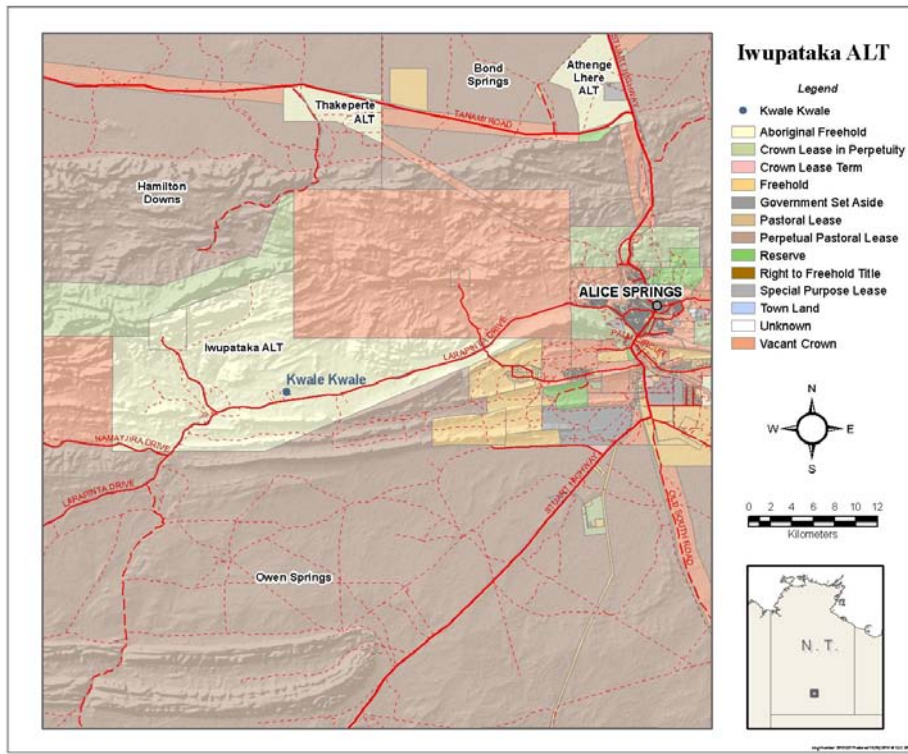| ABS Source	Data item	Scope	ABS Data for communities population less than 50	ABS Data for communities population 50 or greater	ABS Data for all communities	Data for project communities (Source: community observations/ interviews)			
						Kwale Kwale	Mungalawurru	Imangara	All 3 communities combined
	Employed, but away from work				4.9%				
	Unemployed looking for work				5.8%				Unemployed = 13 of 43 (30%) [15]
	Not in labour force				43.1%				Pensioner + Parenting = 12 of 43 (28%)
	Not stated				8.4%				
4704.0 2008	**Households without access to a motor vehicle**	NT – all Indigenous households			44%				
4713.0 2006	**Average number of residents per household**	Australia – Very remote Indigenous			4.9	3.8	3.7	6.1	5.0 [16]

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[15] Not directly comparable with ABS data – some of these would be 'not in labour force'

ABS Source	Data item	Scope	ABS Data for communities population less than 50	ABS Data for communities population 50 or greater	ABS Data for all communities	Data for project communities (Source: community observations/ interviews)			
						Kwale Kwale	Mungalawurru	Imangara	All 3 communities combined
All communities combined									

6.2.   Community maps

Map of Kwale Kwale community

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[16] Including residents absent at times of project visits

Iwupataka ALT

Legend
- Kwale Kwale
- Aboriginal Freehold
- Crown Lease in Perpetuity
- Crown Lease Term
- Freehold
- Government Set Aside
- Pastoral Lease
- Perpetual Pastoral Lease
- Reserve
- Right to Freehold Title
- Special Purpose Lease
- Town Land
- Unknown
- Vacant Crown

N. T.

Map of Imangara community

Map of Mungalawurru community