



Regional
Development
Australia

NORTHERN TERRITORY

SUMMARY REPORT 2016

Meeting the Challenges of a Digital Economy

*Digital Workplaces in Outer Regional, Remote and
Very Remote areas of Australia: experiences from the NT.*



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Introduction

Just as the printing press changed European economic geography, the Internet is re-shaping economies and industries around the world. This transformation process cannot be avoided, nor delayed. In March 2015 the value of Australia's digital economy was estimated to be \$79B and 5.1% of GDP¹.

Embedded in an increasing number of Australian Government policies, such as the Digital Transformation Plan², is the assumption that we are all digital-ready. Likewise, implicit in the Government's proposal to develop Northern Australia³ is an assumption that telecommunications will enable future growth and prosperity.

Despite the well-documented benefits of participating in a digital economy⁴, research indicates that there are still significant barriers to Information and Communications Technology (ICT) adoption and usage in Australia. Compared to households, Australian businesses do not appear to be embracing the Internet⁵. Globally, some industry sectors have struggled to make the transition and some, such as Kodak, have failed altogether⁶. In order to survive it is vital that organisations have the digital capacity and capability to meet the challenges associated with digital transformation.

In recent years Australia's international standing with regard to our ICT capacity and capability has fallen. In 2013, according to the World Economic Forum, we lagged behind many other developed countries in terms of our "networked readiness"⁷. In 2014 we fell further behind in the global rankings for average and peak connection speeds, high broadband connectivity (>10mbps) and 4K video (Ultra HD) readiness.⁸ This was attributed to affordability issues as well as the Government's decision to switch the National Broadband Network (NBN) from fibre-to-the-premises to a mixed fibre/copper network.⁹

In the same year, the Australian Infrastructure Audit found that the Northern Territory (NT) had "the lowest coverage of the states and territories for fixed and mobile broadband services" and that "remote communities in the NT lack contemporary communications infrastructure."¹⁰ As of June 2014, 41% of these communities lacked access to traditional fixed-line telephone services, 91% lacked access to digital subscriber line (DSL), and 52% lacked access to mobile networks. Overall, there were 44 remote communities that did not have access to even basic fixed and mobile services.¹¹

While it is clear that the Australian Government sees telecommunications as a critical enabler for regional growth, policy has largely focused on rollout of the NBN, which effectively locks very remote users into satellite connectivity, and the Mobile Black Spot Programme. The Australian Infrastructure Audit has noted that "Following completion of the NBN roll-out, governments will still need to consider what steps are required to provide appropriate and equitable rural and urban telecommunications services."¹²

In contrast, the NT Government is providing alternative telecommunication infrastructure solutions through initiatives such as the \$30M joint NT Government-Telstra program to further improve telecommunications infrastructure in remote communities, and funding the installation of the Centre for Appropriate Technology's mobile hotspots.¹³

While the Commonwealth and some state and local governments have developed digital strategies¹⁴ to date there is no specific digital strategy for the Territory available in the public arena. In order to develop appropriate strategies, policies and programs that maximise participation in a digital economy, it is essential that we understand the current digital capacity and capability of organisations in the NT.

While national studies of Internet adoption and usage have included the NT, these studies focused primarily on the business sector in larger urban areas. Accordingly, the Digital Workplace Assessment Tool (DWAT) was created to capture Internet usage data for the Outer Regional area (Darwin-Palmerston) and, importantly, the Remote and Very Remote areas of the NT, which encompass about 42% of the Territory's population. Given the importance of government and the not-for-profit (NFP) sectors as major employers and service providers in the Territory, this survey also included government and NFP/community groups, in addition to the business sector.

Outer Regional, Remote and Very Remote areas of the NT

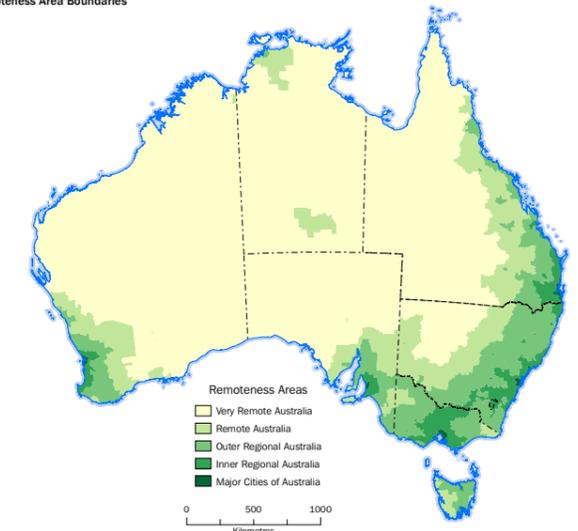
While the word 'remote' is commonly used to refer to parts of the country outside of the major service centres, this report uses the terms Outer Regional, Remote and Very Remote to refer to specific geographic areas as defined by the ABS Remoteness Structure.

Outer Regional NT is essentially limited to the Darwin-Palmerston area, which is the primary administrative centre of the NT. Remote areas include the towns of Katherine, Alice Springs and surrounding hinterlands, as well as the hinterlands of the Outer Regional area. Remote areas are in relatively close proximity to larger service centres that provide a range of services. The NT Government is the largest government employer in Remote areas.

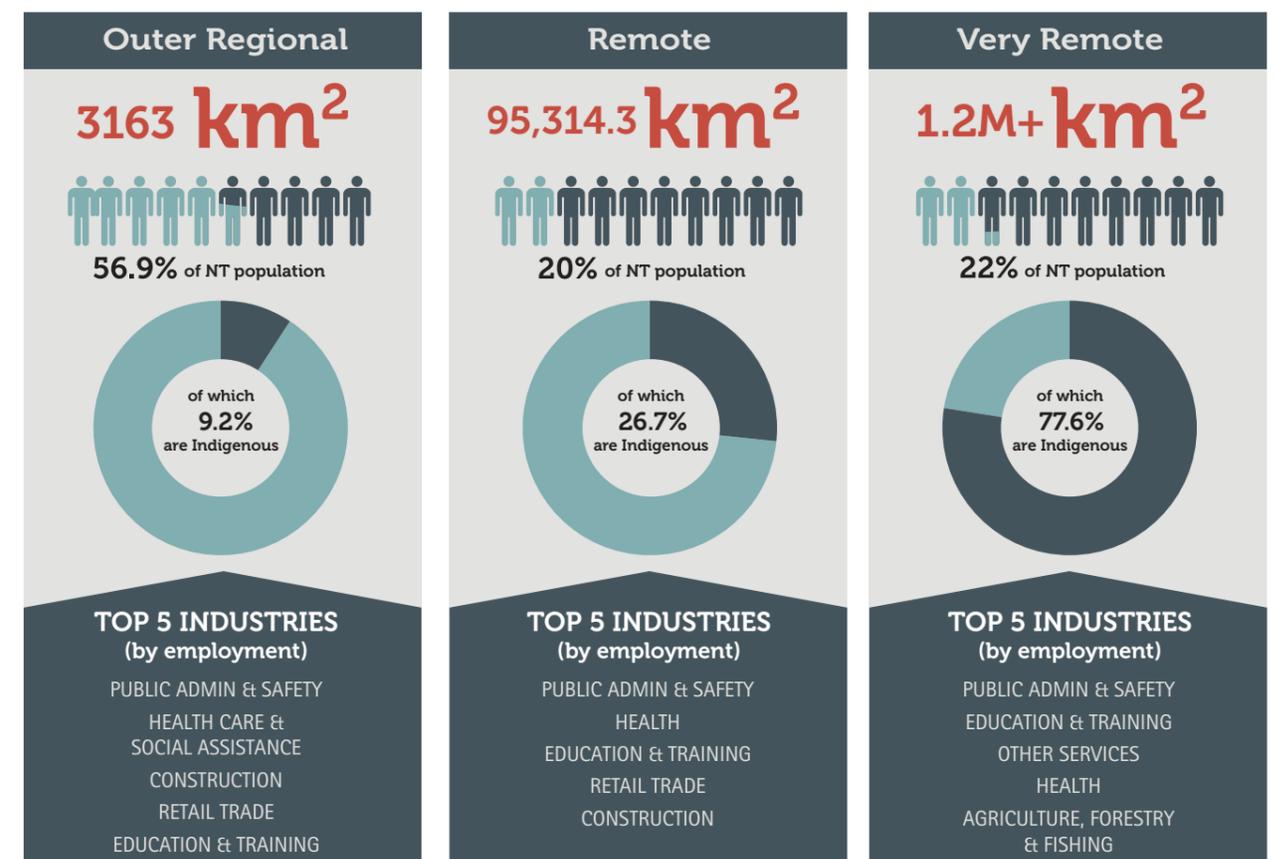
Most of the NT is identified as Very Remote. These areas include Arnhem Land, towns such as Elliott and Boorooloola, the Victoria-Daly, Roper Gulf, Barkly and Central Desert local government areas (LGA), most of MacDonnell LGA, the Tiwi Islands and islands along the northern coast and Gulf of Carpentaria. Unlike Outer Regional and Remote areas, in Very Remote areas local government is the largest government employer.

FIGURE 1. REMOTENESS AREAS ACROSS AUSTRALIA

2011 Australian Statistical Geography Standard: Remoteness Structure
Remoteness Area Boundaries



Source: ABS 2011¹⁵



DWAT Survey

Developed in 2013-14, the DWAT Survey focused on aspects of connectivity, Internet usage, digital capability and capacity in Outer Regional, Remote and Very Remote workplaces of the NT. The survey collected both quantitative and qualitative data regarding workplace ICT and Internet usage, drivers and barriers. Further details regarding the survey design and methodology are in the full DWAT Report, available via www.rdant.com.au.

Participant Profile

There were 160 respondents to the DWAT Survey from 108 different organisations in government, NFP/ community group and business sectors. The majority were from the NFP/community sector (48.1%), followed by government agencies (34.4%) and business (16.25%).

This is broadly representative of NT workplaces as a whole. All three tiers of government were represented and the business sector included sole traders and companies.

The majority of participants' workplaces were located in Remote areas (39.4%), followed by Very Remote (35%) and Outer Regional (25.6%) NT. Outer Regional respondents were dominated by NFP/community group workplaces, whereas most Very Remote respondents were government employees (Figure 2).

Individuals from small, medium and large workplaces participated in the survey although micro/non-employing organisations with 0-5 employees dominated the sample and only 6% of respondents represented workplaces with over 200 staff (Figure 3).

Most participants in the DWAT Survey worked in the Other Services sector (religious services, personal services, etc), followed by Healthcare and Social Services, Arts and Recreational Services, Public Administration and Safety, Education and Training (Figure 4). Some sectors were over-represented and others such as Accommodation and Food Services and Retail Trade were under-represented in the DWAT Survey. Wholesale Trade, and Rental, Hiring and Real Estate Services, were not represented at all.

Of participants, 63.8% were based in workplaces that provided services to rural and/or remote areas with limited or no telecommunications. Of these, 40.2% were from government, 42.1% from NFP/community groups, with the remainder from the business sector.

5% of participants did not use the internet in the workplace. Of these, 75% said they did not use the Internet in their workplace because the Internet was not available in their area. Non-users were excluded from the remaining survey analysis.

FIGURE 2. LOCATION (REMOTENESS) OF RESPONDENTS WITH INTERNET ACCESS BY WORKPLACE TYPE.

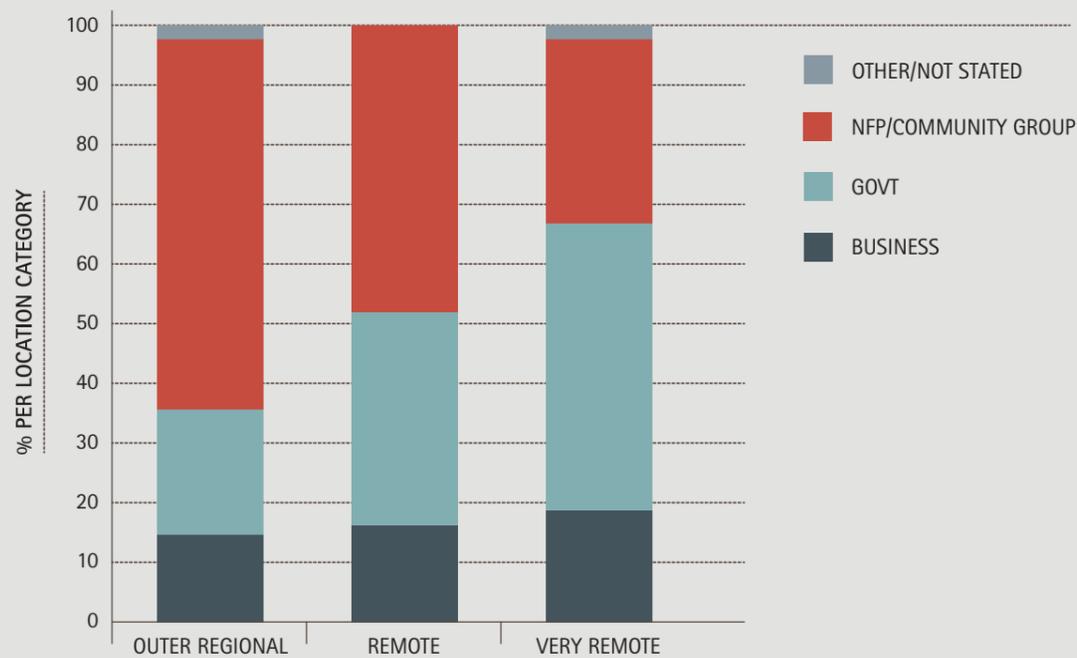
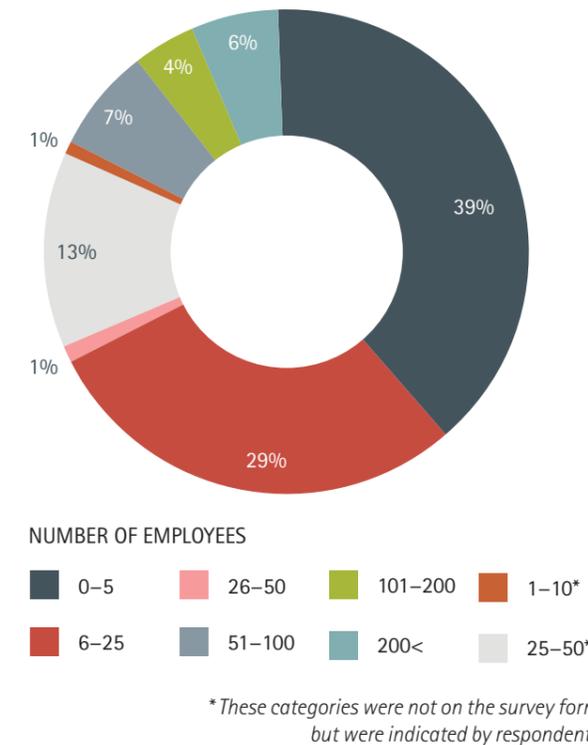


FIGURE 3. PERCENTAGE DISTRIBUTION OF WORKPLACE SIZES REPRESENTED IN THE DWAT SURVEY



Summary of results

95% of respondents in the DWAT Survey said they accessed the Internet in their workplace (of these, 46.3% worked for a NFP/community group, 35.1% government agency and 17.2% business, with the remainder Not stated or Other).

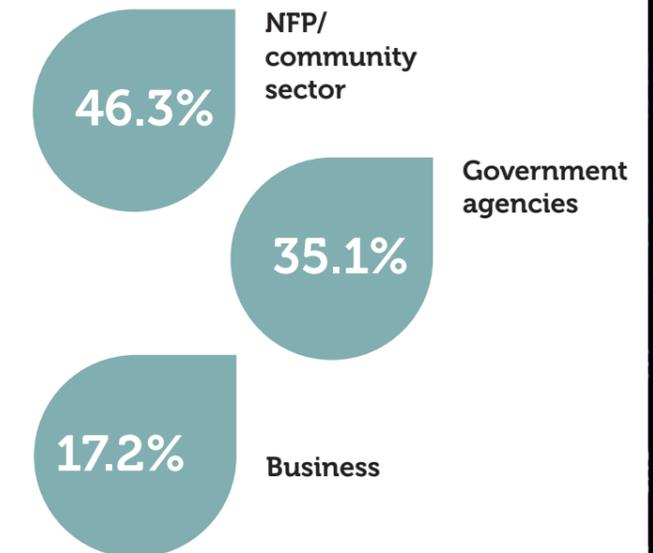
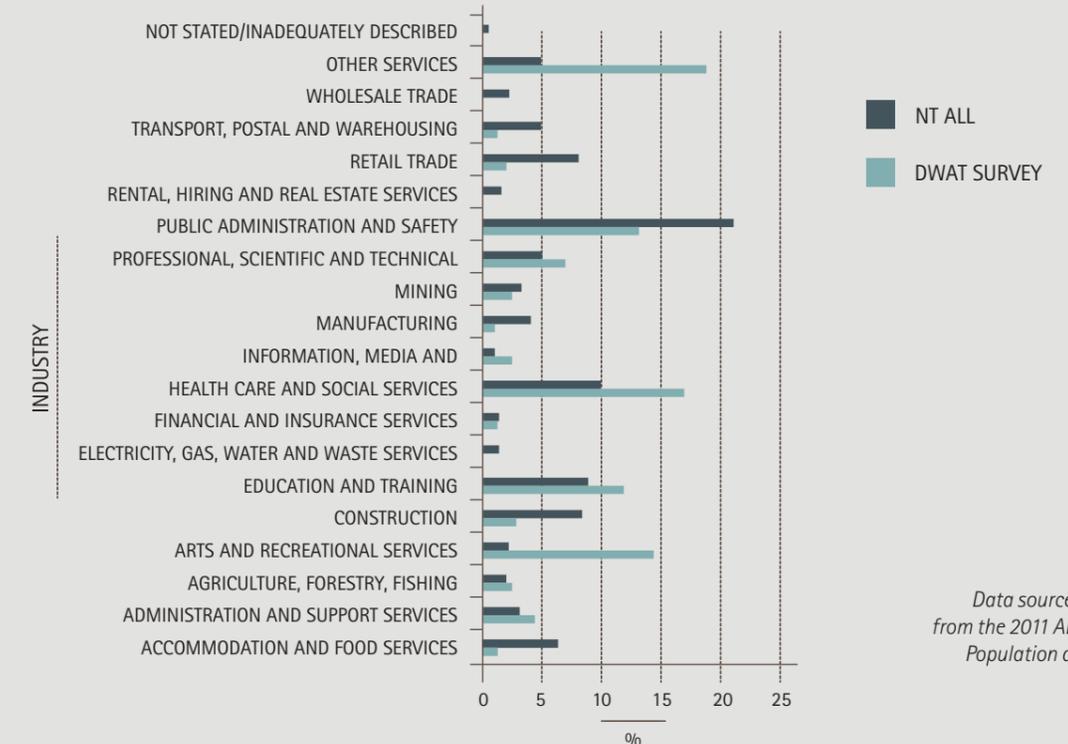


FIGURE 4. INDUSTRY REPRESENTATION IN THE DWAT SURVEY COMPARED TO THE NT AS A WHOLE.



Connectivity

Type and nature of connectivity

Most respondents' workplaces used a form of Broadband to access the Internet. However, unlike other parts of Australia where ADSL/ADSL2 or ADSL2+ are most common, the majority of respondents in the DWAT Survey used wireless (24%) closely followed by ADSL2 or ADSL2+ (22.7%) (Figure 5). Almost 12% used satellite, which is higher than the national average of 1%.¹⁶ This is not surprising given the extent of Remote and Very Remote areas in the NT and proportion of participants from these areas represented in the survey. The majority of respondents in Very Remote areas (77.8%) were reliant on satellite, while most of those in Outer Regional workplaces used wireless or ADSL/ADSL2+ (Figure 6).

"Internet is too slow to run some applications"

– Very remote user, East Arnhem

"Internet speeds impede use of multiple forms (email, web, etc) at once"

– Very remote user, Tennant Creek

"While we get ADSL2 we only get about half ADSL2 speed"

– Outer regional user, Palmerston

FIGURE 5. FREQUENCY DISTRIBUTION OF INTERNET CONNECTIVITY TYPES USED BY PARTICIPANTS IN THE DWAT SURVEY.

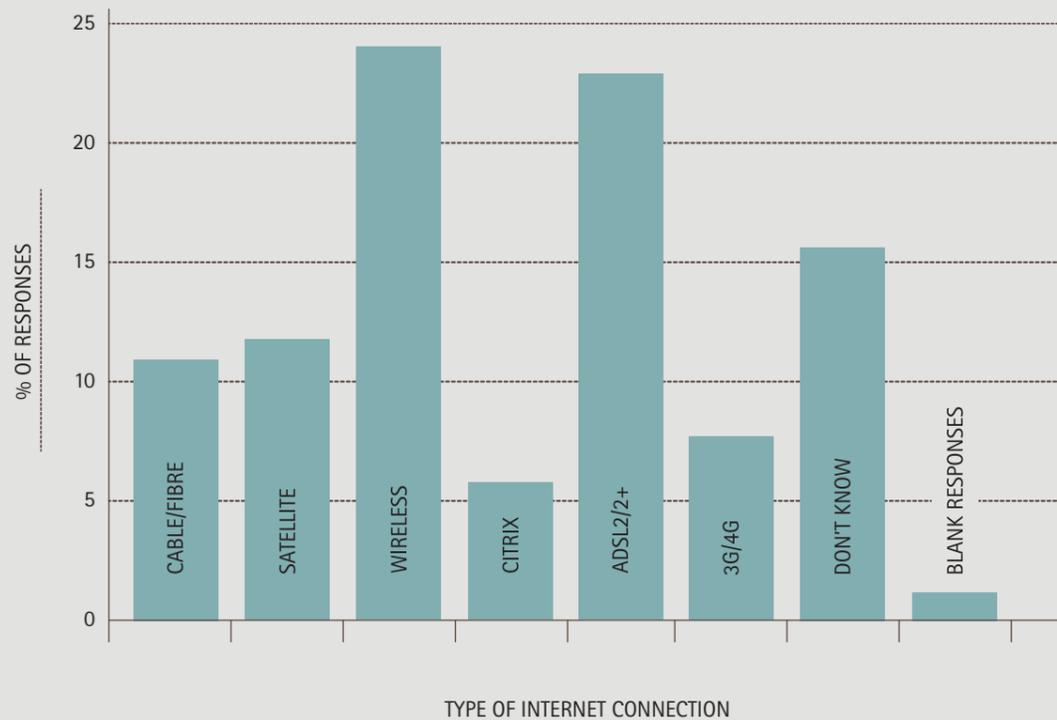
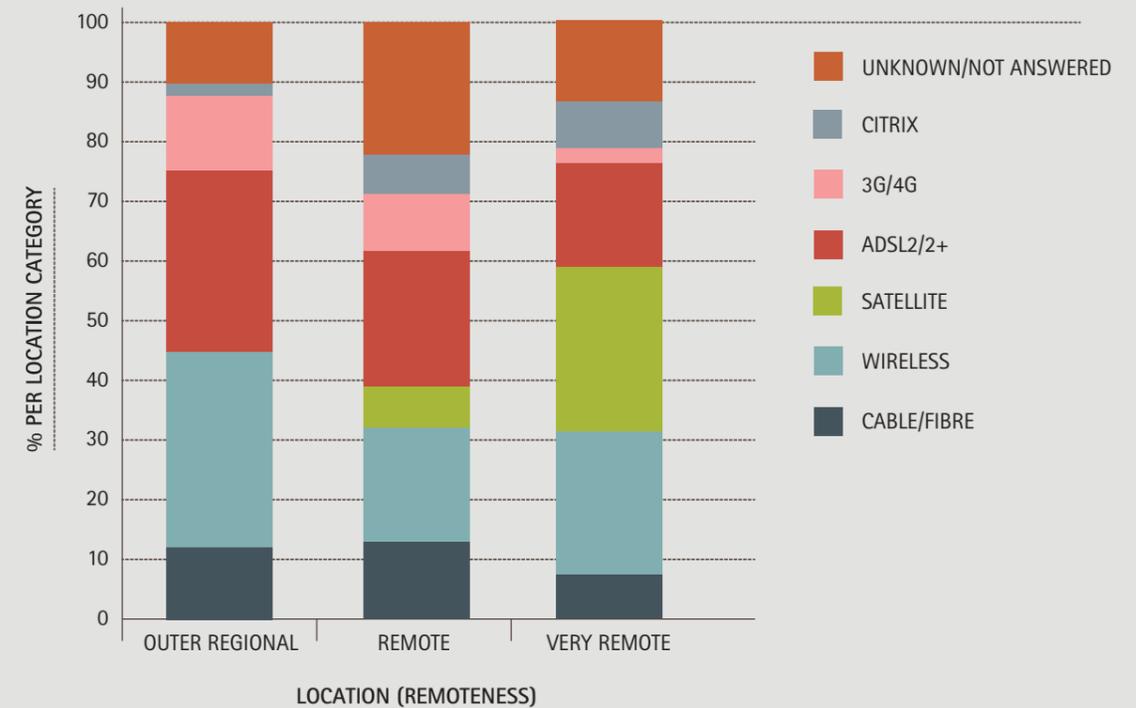


FIGURE 6. FREQUENCY DISTRIBUTION OF CONNECTIVITY TYPES BY WORKPLACE LOCATION (REMOTENESS).



Participants were asked if their level of Internet access enabled them to adequately utilise the applications they used in their workplace. About three quarters (75.5%) answered Yes. Of the 21.9% who answered No, speed and reliability were most commonly raised as issues. Notably, amongst respondents who could not adequately utilise applications in the workplace, 42.4% relied on satellite connections, 15.1% relied on wireless and 12.1% on 3G/4G.



When all responses to this question were compared to connectivity type, 77.8% of those using satellite indicated that their level of Internet access was inadequate.

Fewer users in Remote (78.3%) and Very Remote (63.5%) workplaces said that they had an adequate level of Internet access to enable them to utilise their applications, compared to those in Outer Regional NT (87.2%).

Of those respondents with inadequate Internet access 57.6% were from government workplaces, and of these 68.4% worked in local government.

66.2% of participants indicated they would use applications such as cloud services or videoconferencing if they had adequate Internet access.

"On satellite we do not get regular usage. [The] Internet keeps dropping out"
– Very remote user, Laramba

"Our satellite service is well below a standard where we can use cloud services. We are expected to move to digital record keeping yet our Internet connection means this is borderline impossible due to slow speeds"
– Very remote user, Tiwi Islands

Use of mobile devices to access and transfer data

In order to address challenges posed by the NT's particular geography and demography, the DWAT Survey gauged the extent to which workplaces used mobile, as opposed to fixed technologies and devices. Participants were asked whether their workplace used mobile phones, tablets and laptops to access and transfer data. In response, 84.8% answered Yes while 12.6% answered No. This high level of mobile device usage is consistent with the recent Australian Communications and Media Authority (ACMA) report, which found that mobile phone use is significantly higher in regional areas compared to capital cities.¹⁷



In the DWAT Survey, amongst those who did not use mobile devices in their workplace to access and transfer data, 47.4% were from workplaces that relied on satellite connectivity. This suggests that connectivity has a major impact on the use of mobile devices and technologies. For the remainder who did not use these devices in their workplace, it is likely that other factors such as organisational culture and operational requirements influence these decisions.

Usage

Questions relating to different types of Internet use, such as emailing, banking, buying and selling online, were not asked as part of the DWAT Survey as it was felt these questions were unlikely to yield new information not already recorded in previous research.¹⁸ Instead, questions regarding usage aimed to capture other aspects of internet use that have been identified as important for the digital transformation of workplaces.

Cloud technology

The DWAT Survey found that just over half (50.3%) of all workplaces used the cloud and that 61.5% of business workplaces used the cloud compared to around 45% of SMEs nationally.¹⁹

"ALL of our applications needs are in the cloud" – Outer Regional business user, Nightcliff.

The non-use of cloud technologies does not appear to be associated with the type or size of the workplace, type of Internet connectivity, nor location. Indeed, 75% of non-users of cloud technologies were located in one of the four main urban areas of Darwin-Palmerston, Katherine, Tennant Creek or Alice Springs.

While our survey did not explicitly ask respondents why they did not use cloud technologies, research elsewhere suggests that concerns about data security, privacy, cost or lack of awareness/understanding are impacting this decision.²⁰ As cloud computing plays a significant role in adapting to the digital economy the reasons why some NT workplaces do not use the cloud (e.g. cost) should be further investigated.

"Cloud services are available but costs are prohibitive." – Very remote user, Ali Curung.

Telework (working from home)

Overall, around 70% of DWAT Survey participants said people in their workplace used ICT to work from home. There were no significant differences between workplace types with 75.5% of government, 73.1% business, and 67.6% of participants from NFP/community groups using telework).

In the DWAT Survey 73.1% businesses used teleworking, compared to just under one-third recorded nationally.²¹ Remote and Very Remote workplaces were slightly more likely to telework (70% and 71.1% respectively) than respondents in Outer Regional workplaces (64.1%).

Our survey found no significant evidence to suggest telework was used to reduce operational costs and/or travel. It found that the suitability of certain industry sectors, individual positions, workplace/organisational capacity and culture were more likely to influence the decision to use teleworking than connectivity type.

As participants stated, work is "restricted to the workplace" or "client focused – they come to the workshop." One Remote user commented that "All work [is] done during office hours in the office."

Use of the Internet for recruitment

About three quarters of participants (75.5%) said they used the Internet to assist with recruitment processes. Amongst business workplaces in the DWAT Survey, 61.5% used the Internet for recruitment, compared to only 34% of businesses nationally.²² There were no significant differences between workplaces based on remoteness.

"[We are] starting to use Skype more often when interviewing" – Remote user, Alice Springs.

Online training and digital training

Nearly 58% of respondents said that their workplace used online training to up-skill staff. Of these, most (44.8%) worked in government organisations, followed by NFP/community groups (35.6%) and businesses (19.5%). The proportion of business respondents who indicated that their workplace undertook online training (19.5%) was lower than that recorded by the ABS for all Australian businesses (31.1%).²³ The DWAT survey results suggest that remoteness location and connectivity types are not the main factors determining whether or not a workplace engages in online training.

While the capacity of staff to undertake training online was not explored as part of the DWAT Survey it was raised as an issue by one participant. This serves to highlight that for some Territory workplaces their digital capacity and capability is limited by gaps in literacy and numeracy skills that must be overcome before other professional skills can be enhanced.

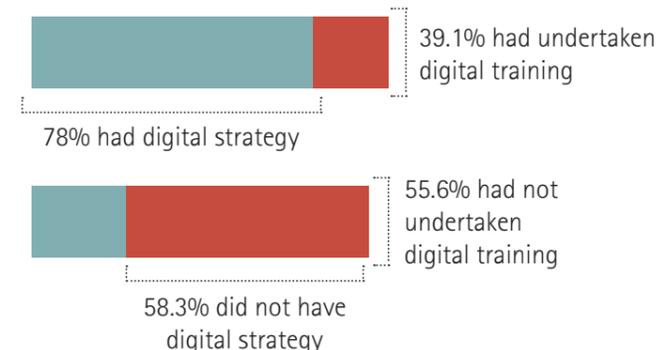
"Staff do not have the LLN skills to be trained online" – Remote user, Alice Springs

While 58% of respondents indicated that their workplace used online training, only 39.1% undertook digital training. Workplace type and remoteness did not appear to be key factors in determining whether or not a workplace engaged in digital training.

"Staff need ongoing training to use technology" – Remote user, Alice Springs

However, there did appear to be a relationship between online training and digital training. Workplaces that undertook online training were much more likely to also provide digital training. There was also a link between digital training and having a strategy to increase online presence.

Of those respondents whose workplaces undertook digital training 78% also had a digital strategy, compared to only 36.9% of respondents whose workplaces had not undertaken digital training. Of those respondents whose workplaces did not undertake digital training, 58.3% did not have a digital strategy. Our survey did not explore whether digital training occurs as part of a digital strategy or whether the training is a driver for strategic development, however further investigation of this relationship is recommended.



Reliance on government websites

Participants were asked if their workplace relied on Government websites for up to date information, for example, regarding programs or compliance. Just over three quarters of respondents replied Yes (76.8%). Not surprisingly, a greater proportion of participants from Government workplaces relied on Government websites (86.8%), compared to the nfp/community group (74.3%) and business sectors (69.2%).

Location clearly played a role in terms of reliance on government websites as a source of information. While 61.5% of respondents in Outer Regional areas relied on government websites, this figure increased to 78.3% in Remote areas and just over 90% for respondents in Very Remote areas. These results are not surprising given that respondents in Remote and Very Remote areas largely work for government and have less access to alternative sources of information such as industry association gatherings and business networks.

Innovation

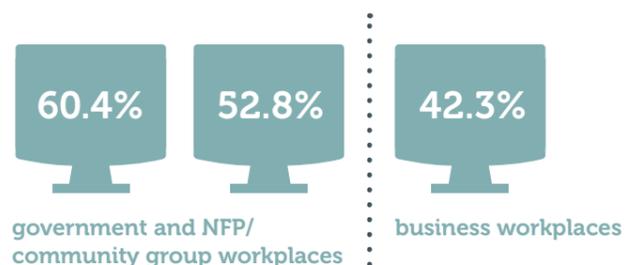
Respondents in the DWAT Survey were asked if their workplace used technology to identify new markets, services or products. Overall, about two-thirds (66.9%) answered Yes. There were only slight differences between workplace types, while workplace size, connectivity type and remoteness did not appear to be factors. While the latter may seem surprising, it is less so when considered within the context of a digital economy in which traditional market and geographic barriers may be of less importance. An Australian innovation survey undertaken by Vitartas *et al* also found minimal significant differences between respondents from regional and urban areas.²⁴

“We are innovative and open to new ideas and creative ways that include other organisations, partnerships and collaborations”
– Very remote user, Ali Curung.

Developed new online services



Developed new online services



The DWAT Survey found that government and NFP/community group workplaces were more likely to develop new services that could be delivered online (60.4% and 52.8% respectively), compared to business workplaces (42.3%).

Location (remoteness) does not appear to be a factor regarding whether or not a participant's workplace actively looked to develop new services that could be delivered online, nor whether the workplace provided services to rural and remote areas with limited/no telecommunications.

Of the top five industries in the DWAT Survey, workplaces in the Other Services sector (68.7%) were most likely to actively develop new services for online delivery, followed by Public Administration (60%), and Arts and Recreation (57.1%). In contrast, less than half of workplaces in Health (46.1%) and Education and Training (36.8%) undertook this activity.

In Territory workplaces it appears that there is a strong relationship between the use of ICT to identify new markets, services or products and actively developing new services to be delivered online. However, while business and government workplaces were more likely to use technology to identify new markets, services or products than NFP/community groups, businesses were less likely to look to develop new services that could be delivered online. These results are consistent with a market-driven profit imperative for business organisations, while the emphasis on developing new online services by NFP/community group workplaces is consistent with their service provision role and/or a desire to provide improved services at lower cost.

The DWAT Survey innovation assessment found that of the top five industries in our survey, the Other Services sector were the most innovative, followed by Arts and Recreation, and Public Administration and Safety, with Education and Training, and Health and Social Services the least innovative. Small sample sizes precluded the ranking of other industries.

Cost Benefits

Previous research identified cost as both a driver and a barrier to Internet adoption, and use of ICT to reduce costs as a potential digital transformation strategy²⁵. There is also a widely held belief that the Internet can mitigate or overcome some of the challenges faced in regional areas, including high operational and travel costs.²⁶ The DWAT Survey aimed to gauge the extent to which Territory workplaces' use of technology had allowed them to reduce their operational costs and if their workplace used applications such as web or videoconferencing, to reduce travel.

Use of ICT to reduce operational costs

When asked if their workplace use of technology had reduced their operational costs, 55% answered Yes, 35.8% said No and the remainder were Unsure or left blank. Estimates of the cost reduction (as a percentage of savings) ranged from 2% up to 80% with the median around 15%.

“Virtual based admin reduces costs by 50 percent.”
– Remote user, Wagait Beach

Of Outer Regional respondents, just under 72% said technology had reduced operational costs, compared to 46.7% in Remote and 53.8% in Very remote workplaces. Except for those users reliant on satellite, the majority of users of all other types of Internet connectivity said that use of technology in their workplace had reduced their operational costs.

The overwhelming majority (66.7%) of satellite users said that use of technology in their workplace had not reduced their operational costs. Given the majority of satellite users are situated outside of the four main urban areas, it is likely that costs such as transport, power and water are sufficiently high that technology alone cannot offset operational costs. The high cost of satellite services compared to other types of connectivity is also likely to be a factor.

66.7% of satellite users did not reduce operational costs from the use of technology



Use of ICT to reduce travel

In the DWAT survey 55% of participants said Yes, 35.8% said No, and the remainder were unsure/did not answer when asked if their workplace used applications such as web or videoconferencing to reduce travel.

While no substantial differences were apparent between workplace types or remoteness locations, significant differences emerged between user groups in urban and non-urban locations. While the majority of respondents in urban areas (63.6%) said that they used applications to reduce their travel, the majority of respondents in non-urban areas (59.6%) said they did not. The majority of respondents in non-urban areas (57.7%) cited lack of reliable connectivity as the reason they did not use applications to reduce travel costs. In contrast, most respondents in urban areas that did not use applications to reduce their travel (41.2%) said there was no need.

Use of applications to reduce travel time



All participants who answered No to the travel question were asked why they did not use applications to reduce their travel, regardless of their workplace location. These combined results indicated that the most commonly cited reason was lack of reliable connectivity (41.9%), followed by no need or lack of applicability (23.2%) and slow service (speed) (9.3%). Apart from one participant who identified cost as a factor, another who referred to a "lack of policies, procedures and resources", and another who said it was "not advanced", all the others identified a lack of appropriate infrastructure/technology.

When responses to this question were compared with the users' connectivity types, it reinforced the notion that connectivity was a major issue. 88% of respondents reliant on satellite said they did not use applications such as the web and video conferencing to reduce their travel, compared to 58.8% of those on ADSL2/2+ and 54% using wireless who said they did.

Research elsewhere has shown that mobile technologies may increase travel or "digital nomadism" by providing people with new reasons to travel.²⁷ Although our survey did not specifically investigate the relationship between travel frequency and mobile use, 52% of respondents who used applications to reduce travel also used mobile technologies to access and transfer data. Given the high use of mobile technology in Territory workplaces (around 86%) and increasing demand for mobile coverage, this is an area worthy of further investigation.

ICT Management

A series of questions were asked around the management of ICT in Territory workplaces, including the internal ability to manage digital aspects of the business, existence of policies and procedures for staff working online, compliance with legislation and data standards, and cyber-security.

Regular updating of online resources

Participants were asked whether online resources, such as their website or Facebook page, were regularly updated. Overall, 68.9% said Yes and 25.8% said No, with the rest Not sure or left blank. In terms of workplace type, 81.4% of respondents from NFP/community group workplaces and 73.1% of respondents from business workplaces said they regularly updated their online resources, compared to around half of government.

Internal capacity to manage the digital aspects of the business

Most respondents (74.2%) said that they had the internal resources to manage the digital aspects of their business however this did not mean that most respondents actually managed these aspects themselves. It should be noted that some workplaces outsourced these activities. One Remote participant wrote that "We have the ability to internally manage all IT and social media but we choose to contract out some aspects of it."

Policies and procedures for people working on line

Just under 75% of respondents said their workplace had internal policies and procedures for people working online. Not surprisingly, respondents in government workplaces (90.6%) were more likely to have internal policies and procedures in place, compared to business (69.2%) or NFP/community groups (65.7%). A higher proportion of non-urban respondents (86.5%) had policies and procedures in place than those in urban areas (69.7%).

Compliance with data protection, spam and privacy legislation

Around 88% of all respondents believed their workplace to be compliant with data protection, spam and privacy legislation, 8.6% answered No and the remainder did not answer. Notably, all government users (except two who did not answer) felt they were compliant. Just over 84% of respondents from business and NFP/community groups felt they were compliant.

Cyber-security

Previous research in the business and NFP sectors identified concerns around cyber-security as a potential barrier to the adoption and/or greater use of online services.²⁸ Participants in the DWAT Survey were asked whether there were procedures in place to protect their workplaces, such as regular backing up of files or maintenance of an alternative power supply. Just over 86% of respondents said they had procedures in place, 8.6% said No and the rest left it blank. Respondents with procedures in place included 100% of government organisations, 92.8% from business and 78.6% NFP/community groups.

It was clear from some participant's comments, however, that there was a gap between policy and practice. For example, two respondents commented that while their workplace had procedures in place they weren't always implemented.

Another commented that their organisation did not have any policies in place regarding data backup on personal PCs used for work.

.....
Our workplace "has procedures but in remote areas backing up of personal computers is up to individuals.

Access to external hard drives is not always possible."

– Very remote user, Nhulunbuy



52.3% had strategy to enhance their digital presence

Digital Strategies

Just over half (52.3%) of the DWAT Survey respondents indicated that their workplace had a strategy to enhance their digital presence. Of business sector respondents 50% had a strategy, which is significantly higher than that previously recorded for SMEs nationally (19%) and in the NT (14%).²⁹

DWAT Survey results suggest that industry sector may be a factor in terms of developing digital strategies, with Other Services and Healthcare and Social Services the most proactive, and the Education and Training sector the least proactive. The data also suggests that workplace size (number of employees) may be a factor, although the nature of these relationships requires further research. As previously noted, there also appears to be a strong association between having a digital strategy and undertaking digital training, although this too requires further investigation.

Potential Drivers and Barriers

Previous research amongst SMEs suggests that attitudes towards the Internet may either be a driver or barrier to the adoption and use of ICT.³⁰ In the DWAT Survey, the overwhelming majority of respondents (93%) believed that reliable Internet access was essential to their workplace, indicating that negative attitudes are not likely to be a significant barrier in the NT. Our survey results suggest that the perceived suitability of business activities to a digital environment is more likely to have an impact. For example, one Remote participant expressed the view that "We are a location-based, site-specific experience with limited opportunities to increase technological assistance in daily operations."



93% believed reliable Internet access was essential

In addition, the DWAT Survey asked several questions to assess the level of perceived benefit of using the Internet amongst participants. Around 83% of respondents' workplaces used technology to benefit their clients and just under 71% had staff who teleworked suggesting that these may be important drivers in terms of Internet adoption.

As discussed earlier, DWAT Survey results suggest that the potential to reduce operational costs is not a substantial driver of ICT adoption and Internet usage, particularly in Remote and Very Remote areas. Overall, only 55% believed that technology had reduced their operational costs while just over one-third said it had not. Virtually identical results were obtained regarding the use of applications such as web or videoconferencing to reduce travel. However, at a finer-grained level, the survey found that while the potential to reduce travel may be a driver for those workplaces situated in urban areas, this is clearly not the case for those in non-urban areas.

Overall, the results of the DWAT Survey suggest that Internet speed and reliability are significant barriers to greater Internet usage in Outer Regional, Remote and Very Remote area of the NT, particularly those that rely on satellite connections. Satellite connectivity emerged as a clear barrier, particularly for workplaces in Very Remote areas. Throughout the survey, satellite connectivity was highlighted as being costly, slow and unreliable. The extent to which the launch of the NBN's Skymuster Service will ameliorate some of these issues is currently unknown. Meanwhile, the 'single solution' policy approach of the Australian government and the NBN, which essentially locks Very Remote respondents into a satellite solution, is clearly problematic. It is also at odds with the NT Government aim to work towards terrestrial-based connections wherever possible. Unless respondents in Remote and Very Remote areas are given access to connectivity solutions other than satellite, the cost benefits associated with ITC and Internet use are unlikely to materialise.

Key findings

The DWAT Survey has quantified aspects of the digital capacity and capability of workplaces in Outer Regional, Remote and Very Remote areas of the NT and provided an evidence base for policy development, rather than relying on common assumptions, or broad state or national research. Most importantly, the survey results have implications for policy development and program delivery in the Territory, most notably that a 'one size fits all' approach is not appropriate and is unlikely to be effective in supporting the growth of a digital economy. Instead, policies need to address the specific strengths and weaknesses of workplaces based on type (i.e. government, nfp/community group or business) location (remoteness) and industry sector.

Impact of location (remoteness)

Highly significant differences emerged between Outer Regional, Remote and Very Remote workplaces regarding Internet access, reliance on government websites for information, and frequency of updating online resources. Of these, the most notable was adequacy of Internet services. Over 80% of respondents in Outer Regional areas said their level of Internet access enabled them to adequately utilise their workplace applications, compared with only 63% in Very Remote areas.

It was anticipated that a greater proportion of Remote and Very Remote workplaces would use technology to reduce their operational costs, but this was not the

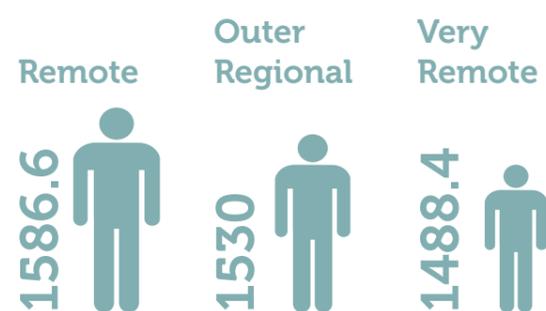
case. When compared with their type of connectivity, it became apparent that, with the exception of those using satellite connectivity, most had used technology to reduce operational costs. In contrast, the overwhelming majority of satellite respondents (66.7%) said that this was not the case. The differences between workplaces in urban and non-urban locations regarding the use of applications to reduce travel were also highly significant.

There is also a clear link between level of remoteness and reliance on government websites for information. Research suggests this may be due to the predominance of government workplaces and lack of ready access to business or industry networks as alternative sources of information in Very Remote areas.

There were no significant differences between workplaces based on location (remoteness) in relation to innovation, level of internal resources to manage the digital aspects of the business, development of strategies to enhance their digital presence, or whether or not respondents undertook online training or digital training. Similarly, there were no significant differences between workplaces in relation to use of the Internet as part of the recruitment process. With regard to Remote and Very Remote respondents, this was initially surprising but is likely to reflect the tendency for recruitment to be handled by head offices in Darwin or other larger service centres.

When the overall digital capacity and capability of Internet users in the DWAT Survey was considered, Remote users scored higher (1586.6) compared to Outer Regional (1530) and Very Remote (1488.4) workplaces. This challenges perceptions that people in rural areas are behind the times.³¹ Our survey results suggests that the low overall score for Very Remote users reflects the predominance of satellite technology and the nature of workplaces in these areas, rather than a lack of skill or innovation on the part of these users.

Workplace Digital Capacity



Impact of workplace type

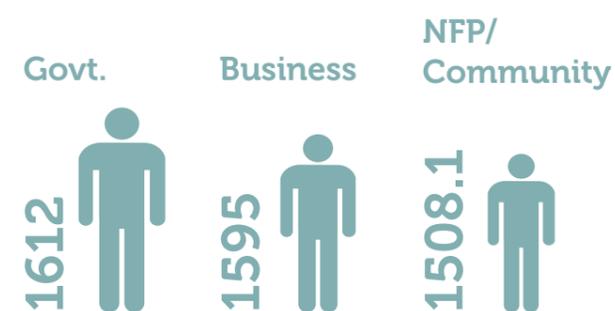
Significant differences were observed between government, business and NFP/community group workplaces regarding the proportions who undertook online training, regular updating of online resources, had policies and procedures for people working online, had adequate Internet access, used the Internet for recruitment and relied on government websites.

Government workplaces were more likely to use online training and have policies and procedures in place. This is not surprising given the resources available to this sector. What was surprising was that government workplaces were less likely to regularly update their online resources compared to respondents from business and NFP/community group workplaces. This may be because in government most ICT, media and marketing functions are managed at head offices in Darwin or larger service centres. One Remote user commented that "Everything is updated by head office."

Participants from government agencies were less likely to have adequate Internet access for the applications they used compared to other workplace types. This was not surprising given the majority of government respondents in our survey were located in Very Remote areas, which tend to have poor telecommunications and internet connectivity compared to their Outer Regional counterparts. Despite this, a greater proportion of Government workplaces used the Internet as part of the recruitment process and relied on government websites for information, compared to the NFP/community group and business sectors.

When the overall digital capacity and capability of Internet users in the DWAT Survey was considered, users from government workplaces scored highest (1612), followed by business (1595) and NFP/community group (1508.1) workplaces.

Workplace Digital Capacity



Other research also noted that the Australian NFP sector was less confident in ICT use than any other sector and a relatively high proportion rated themselves as 'lagging behind' (29%) or 'in trouble' (5%).³² In the DWAT Survey, poor performance of the NFP sector was associated with specific ITC management issues such as policies and procedures governing online use, cyber-security and compliance with relevant legislation. This could be addressed through targeted professional information and training sessions.

Relationship between digital training, strategies and innovation

In the DWAT Survey, regardless of location or workplace type, less than 50% of workplaces engaged in digital training and less than 53% of respondents had a strategy to enhance their digital presence.

Our survey also found that workplaces undertaking digital training tended to have a digital strategy in place and make innovative use of the Internet. Given this apparent relationship the low percentage of business workplaces (34.6%) undertaking digital training is a particular cause for concern. While it is not clear whether digital training is the driver for the development of a digital strategy or vice versa, other research has found that low levels of digital literacy and lack of confidence were significant barriers to digital transformation.³³ However, given that over 74% of DWAT Survey respondents indicated that their workplace had the internal resources to manage the digital aspects of their business, it cannot be assumed that lack of digital training equates to poor digital literacy. Reasons for the low levels of digital training were not explored as part of the DWAT Survey but should be further investigated prior to the development of new programs to increase digital capabilities in the NT.

It should be noted that elsewhere SMEs have indicated they would welcome opportunities to improve digital literacy, if training was tailored to their needs. Kimber and Mason found that the free NBN Digital Workshops "were not effective in addressing the critical ICT skills gap"³⁴ citing low awareness, lack of time and lack of relevance as factors contributing to poor results. Most businesses would like hands-on opportunities to try new technologies in their own workplace.³⁵ A 2013 Paypal survey found that SMEs would prefer a fully-funded digital training course, followed by access to a website with advice for small business.³⁶ These examples highlight the importance of designing and delivering training programs that meet the needs of the learner group, rather than what is convenient for the trainer.

Potential for ICT to reduce operational costs and travel

The potential for ICT to reduce costs in regional and remote areas is often cited as a key driver for Internet adoption and greater usage. However, DWAT Survey results indicate this driver should not be overestimated, particularly in Remote and Very Remote areas. In these locations, it may be that other costs associated with working (and living) in these areas such as transport, power and water, are sufficiently high that they are unlikely to be substantially mitigated by Internet use alone.

Additionally, the type and nature of Internet connectivity in many Remote and Very remote areas appears to be a clear barrier towards achieving a reduction in operational and travel costs. In contrast, the greater use of applications by workplaces in urban areas to reduce travel is argued to reflect their access to superior connectivity (in terms of speed and reliability) compared to those in non-urban areas. Clearly, the capacity of satellite connectivity to reduce operational costs and travel is limited. Unless workplaces in Remote and Very Remote areas are given access to connectivity solutions other than satellite, the potential cost benefits associated with ICT and Internet use are unlikely to materialise.

Other factors, including Internet affordability, digital literacy and motivation for travel, also play a role in determining the extent to which workplaces use ICT to reduce travel. As an example, for people in small communities or isolated pastoral stations with access to only a limited range of goods and services, travel outside of these areas (for whatever reason) presents an opportunity to access goods and services not usually available, catch up with friends and relatives, and so on. In these circumstances the motivation for travel by people living and working in non-urban areas of the Territory is unlikely to be entirely offset by the availability of superior internet connectivity, such as that expected to be delivered by the NBN's Skymuster (satellite) service from around mid-2016. Recent research in Central Australia tends to support this view.³⁷ Accordingly, viewing travel as primarily influenced by cost or availability of technological alternatives would appear to be too narrow a perspective. Clearly the relationship between ICT and travel is not simply one of substitution, but complementarity.³⁸ Organisations that provide services to Remote and Very Remote areas should be aware of this and structure their service delivery models accordingly.

Implications for the Digital Transformation Plan

The DWAT Survey found that a significantly higher percentage of workplaces in Very Remote areas relied on government websites as sources of information, compared to those in Remote and Outer Regional locations, yet only 51% of participants from government workplaces said their workplace regularly updated their online resources. Although functions such as updating websites are more likely to be carried out by head offices in Darwin rather than government agencies based in Very Remote areas, this finding suggests that content may need to be updated more frequently. The Survey also found that while nearly 87% of Government workplaces relied on government websites, NFP/community groups and business workplaces appeared less likely to rely on this source of information. Research undertaken elsewhere suggests lack of relevance may be the issue. According to Digital Business Insights, business and NFP sectors rated government websites poorly in terms of providing relevant information, preferring to access ICT information via email news, hands-on opportunities and workshops.³⁹

In light of these findings, the Australian Government's Digital Transformation Plan is of concern, especially when combined with poor Internet connectivity in Very Remote areas. Indeed, it appears that there may be an emerging policy disconnect between the government's move to online service delivery and some end-users. Designers of government websites and apps should be aware that not all of the end-users have access to superior broadband. Online service delivery should be designed using asynchronous technology and websites, portals and apps should include 'cut-down' versions, with minimal graphics and other bandwidth-intensive elements, so that they work for respondents reliant on satellite, rather than time out before a transaction can be completed. While online service delivery may be cost effective for government,⁴⁰ it is not necessarily effective for the end-user.⁴¹

Industry sectors

Commentators suggest that in regional and remote areas the Internet can provide significant benefits to the Education and Health sectors, particularly regarding service delivery.⁴² Despite this, in the DWAT Survey only 46.1% of workplaces in Health and 36.8% in Education and Training developed services for online delivery.

When the top five industries were ranked for innovation, the Other Services sector were the most innovative, followed by Arts and Recreation services and Public Administration and Safety, with Education and Training, and Health and Social Services the least innovative. A slightly different pattern emerged when the overall digital capacity and capability of the top five sectors were considered, although once again, Other Services scored highest, followed by Public Administration and Safety, Health, Arts and Recreation, and Education.

These results clearly indicate that sector-specific strategies are required. For example, while the Arts and Recreation services sector ranked highly regarding innovation, it performed poorly in areas such as having a digital strategy, online training, digital training and cloud computing. For the Health and Education sectors, strategies to improve online service delivery should be a priority.

Recommendations

As the global digital economy continues to grow, it is critical that Outer Regional, Remote and Very Remote workplaces in the NT, are in a position to manage their digital transformation. While DWAT Survey results suggest that in general Territory workplaces have a reasonable level of digital capability and capacity, there are clearly areas that need to be addressed. Given the economic and social importance of workplaces outside the larger Darwin-Palmerston region, it is imperative that efforts to improve digital participation include businesses, NFP/community groups and government agencies in Remote and Very Remote areas.

Development of digital strategies, policies and programs in the NT should consider the strengths and weaknesses of workplaces by type, location (remoteness), connectivity levels and industry sector. For example, a strategy for the business sector might focus on innovation and developing online services, whereas a strategy designed for NFP/community groups might focus on cloud computing and online training. For the government sector, a strategy might focus on addressing inadequate Internet access, lack of regular updating of websites and Internet use to reduce operational costs.

At a broader level, the results of the DWAT Survey indicate that workplaces in Outer Regional, Remote and Very Remote areas of the NT face the following barriers to digital transformation, which should be addressed in any digital strategy for the Territory:

1. Inadequate access, speed and reliability provided by satellite connectivity;
2. Cost (affordability) of telecommunications, particularly mobile and satellite;
3. Lack of strategies to enhance the digital presence of workplaces; and
4. Lack of digital training programs designed and delivered to meet the needs and aspirations of the learner group.

The strategy should be underpinned by a perspective which views digital solutions (e.g. Telehealth and other online service delivery programs) as complementary to existing practices, rather than as simple substitutions.

Additionally, the strategy should also provide for further research to underpin policy and program development, including:

- Drivers and barriers for teleworking;
- Drivers and barriers for cloud computing;
- The relationships between digital training, having a digital strategy, innovation, workplace size (number of employees), and industry sector; and
- How digital literacy can be improved alongside improving basic literacy and numeracy skills.

Without a digital strategy for the NT, infrastructure and skills gaps will continue to be addressed on an ad hoc basis with the very real risk that Territorians will end up on the wrong side of the digital divide. NT workplaces will struggle to bridge this gap in order to survive and thrive in the global digital economy.

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