



Digital New Zealanders:  
**The Pulse of our Nation**

A REPORT TO MBIE AND DIA **MAY 2017**

**digital**  
inclusion research group

Digital technologies have spread rapidly in much of the world. Digital dividends—that is, the broader development benefits from using these technologies—have lagged behind. In many instances, digital technologies have boosted growth, expanded opportunities, and improved service delivery. Yet their aggregate impact has fallen short and is unevenly distributed. For digital technologies to benefit everyone everywhere requires closing the remaining digital divide, especially in internet access. But greater digital adoption will not be enough. To get the most out of the digital revolution, countries also need to work on the “analog complements”—by strengthening regulations that ensure competition among businesses, by adapting workers’ skills to the demands of the new economy, and by ensuring that institutions are accountable.

*World Development Report 2016: Digital Dividends (World Bank, 2016)*

# digital

inclusion research group

The Digital Inclusion Research Group is a consortium of researchers and consultants with experience in implementing and researching digital inclusion initiatives. The group includes Laurence Zwimpfer, Prof Charles Crothers, Dr Philippa Smith, Barbara Craig, Catherine Cotter, Dr Maurice Alford, Chris Nixon and Stanley Yeung.

## *Disclaimer*

*The views, opinions, findings and conclusions or recommendations expressed in this report are strictly those of the authors(s). They do not necessarily reflect the views of the Ministry of Business, Innovation and Employment or the Department of Internal Affairs. The Ministry and the Department take no responsibility for any errors or omissions in, or for the correctness of, the information contained in this report. The report is presented not as policy, but with a view to inform and stimulate wider debate.*

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# About this report

The Government's cross-agency Digital Economy Work Programme aims to support all New Zealanders to fully participate in the fast moving digital economy. The Ministry of Business Innovation and Employment (MBIE) and the Department of Internal Affairs (DIA) commissioned research in late 2016 from a consortium engaged in digital inclusion initiatives (the Digital Inclusion Research Group) to better understand the ways in which digital capabilities and digital inclusion affect New Zealanders' social and economic outcomes.

We were asked to look at four main areas to help inform MBIE and DIA's next steps with the Digital New Zealanders part of the Digital Economy Work Programme:

- Defining what digital inclusion means and those who appears most at risk of digital 'exclusion'
- The role of digital capabilities or skills, are there particular capabilities that appear most valuable to have, and do these capabilities appear to have any impact on economic and social wellbeing?
- What research and interventions have been undertaken by other countries into the value of trying to increase digital inclusion in their populations, the results these have had and what interventions have also been undertaken in New Zealand to lift digital inclusion and what results these are achieving?
- Whether any of these interventions could be suited to New Zealand's specific circumstances and populations.
- Suggestions for next steps New Zealand could take to address any identified issues and opportunities.

The research covered developments in a number of countries and unions, including the United Kingdom, European Union, United States of America, Finland, Estonia, Singapore, South Korea and Australia. It also included consultations with representatives from stakeholder groups in New Zealand who face the greatest risk of being excluded, whether during their years at school or in securing jobs or simply in engaging with their communities, whānau and friends.

This research complements research undertaken by the Innovation Partnership that considers the approaches taken in a number of countries - Finland, United Kingdom, Australia and Singapore – to address digital inequalities (Soper, 2017).

## Pulse of our Nation

Our symbol represents people in a digital world. The coloured 'pulses' represent the three areas where digital technologies are having an impact – in life, for learning and in the workplace. Brief case studies are used in the report to illustrate these impacts; the colour bands highlight the impact area – life (red), learning (green) and the workplace (blue).



# Executive Summary



The journey to raise New Zealanders' digital capabilities and progress towards a digitally included society started two decades ago. For many aspects of the digital world, especially in terms of digital infrastructure, New Zealand now ranks among the best in the world. However, a small percentage of New Zealanders have never engaged with the digital world and others have had only intermittent contact.

They may struggle to learn, to excel at work, to develop nourishing social networks – because they feel they cannot use a computer or afford access to the internet. This is digital exclusion. If this situation could be overturned, and we could ensure every New Zealander had the skills to use the internet, the motivation to use it, affordable access to a computer, and trust in the online environment, we would have achieved digital inclusion.

A wide range of terms are being used to describe digital skills and digital divides. 'Digital capability' refers to the skills required by New Zealanders for living and working in a digital economy. 'Digital inclusion' refers to an outcome in which all New Zealanders have equitable opportunities to participate in society using digital technologies. There is little New Zealand-based research from which to draw definitive conclusions about the state of digital inclusion in this country. However there are overseas surveys from similar populations. When married with the modest New Zealand-based research undertaken over the years, these reports offer a general picture of where we likely sit in terms of barriers to digital inclusion and possible solutions.

The New Zealand Government's investment in ultrafast fibre broadband (UFB) networks means we are ranked among world leaders in terms of digital infrastructure. However, affordability of access remains an issue for some and our lead on digital infrastructure does not seem to have translated to world-leading rates of digital inclusion.

While the focus for much of the last 20 years has been on ensuring people have access to digital technologies such as computers, and digital services such as the internet, it is now recognised that the benefits of the digital world can only be realised if all four dimensions of digital inclusion are addressed - access, motivation, skills and trust. Overseas studies suggest digital exclusion leads to diminished wellbeing and opportunity, and other forms of deprivation. Digital inclusion offers economic benefits to individuals – research shows people who shop and bank online can save nearly \$1000 each year – as well as businesses and the economy which would enjoy improved workplace productivity. Our initial calculations suggest achieving universal digital inclusion could deliver economic benefit to New Zealand of over \$1 billion per annum.

New Zealand, like many other countries that have invested in internet infrastructure, still has groups that are digitally disadvantaged. This includes some school-aged children who do not have internet access in their homes, people with disabilities, older age groups and those living in low socio-economic communities.

In order to prioritise the most effective initiatives, we must be able to quantify the benefits of digital inclusion programmes, and build a better evidence base on digital inclusion to inform policy development. The Government's social investment approach provides a good starting point here.

In reviewing a number of overseas digital inclusion initiatives, this report highlights important areas worthy of further consideration for deployment in New Zealand. This includes programmes using existing education or social sector intermediaries to reach and support digitally disadvantaged groups (such as the United Kingdom's OneDigital programme). These are seen to be effective in accessing and upskilling those most in need.

Our research suggests the nature of work is likely to change. This suggests the focus on access must now shift to building digital capability. We have defined a core set of digital capabilities, drawing on international research. The UK Digital Capabilities Framework provides a good starting point should New Zealand want to pursue a focus on testing and building particular capabilities. For those that have never used the internet or are lapsed users, awareness of benefits of online participation should be a starting point.

We also recognise the ongoing role of an evolving education system to build the skills base needed for New Zealand to continue to develop as an effective and productive digital nation. Schools as a community resource, upskilled teachers to confidently operate in changing technology-rich environments to enhance learning outcomes and investigating the value of digital initiatives that span the education system, from early childhood through to tertiary, are some things we think are worthy of a closer look. There are a small number of communities where the school's fibre has been leveraged to reach out to students' homes and the local community. These initiatives make use of

low cost wireless infrastructure and companies providing subsidised wireless internet packages for students. We believe the true benefits of future-focused learning will be realised if all students have equitable access to the internet from their homes as well as their schools. Free digital skills training for all adults who need it has also been introduced with the private sector in places like the UK and Australia. A similar approach for New Zealanders could be investigated to enhance future prospects for New Zealand students and job-seekers.

This report focuses on what it means to be a digital New Zealander. It identifies numerous initiatives in New Zealand, some of which have been operating for nearly 20 years. Most are managed by not-for-profit organisations that rely on short-term government, business or philanthropic funding. None are operating within a coordinated policy framework, most do not have the resources to scale and sustain their operations, and there appears to be a lack of convincing evidence based research supporting most of them. Governments in other countries, faced with similar scenarios, have identified a need for national policy development to expand and sustain successful pilot projects.

The research gathered here suggests New Zealand may also benefit from taking this step. A nationally coordinated approach, bolstered by stakeholder and funder governance, is key for addressing issues of digital disadvantage, while retaining strong community-based delivery models. This will enable New Zealand to evaluate the impact of initiatives, and move from the 'project' focus of the past to a 'programme' approach for the future.

We suggest New Zealand could start to address this through a national digital inclusion agenda. A unifying framework is necessary to align the efforts of investors in digital inclusion initiatives and avoid duplication. This framework needs to be led by Government in consultation with the digitally disadvantaged, and should prioritise the establishment of an evidence base for digital inclusion in New Zealand, as well as funding models and effective measurement of economic or social impacts. Overseas, these national strategies and policies also recognise the value of partnerships between government, businesses, philanthropists and the community sector in delivering digital inclusion programmes. In New Zealand, philanthropists and businesses have demonstrated a willingness to engage with and support digital inclusion initiatives, but they have clearly signalled that they are seeking a more 'connected' investment approach. They want to see successful pilot programmes scaled and embedded into Government policies.

Achieving a truly digitally-included New Zealand is not just a job for central government and its agencies. Local authorities clearly have an important role in supporting their citizens to go online. Libraries are increasingly re-inventing themselves for the digital world by establishing community digital hubs to provide stimulating technology workshops for children as well as core digital skills training programmes for adults. Every local authority should develop a digital inclusion plan as part of their regular planning activities.

In summary, the key findings that have informed the recommendations in this report are:

- New Zealand is facing the same digital challenges as other comparable countries.
- There is widespread agreement about the groups who are digitally disadvantaged.
- New Zealand is ranked amongst the world leaders in terms of digital infrastructure, but is behind in terms of internet affordability.
- Consistent with the experience of other countries, the digital agenda now needs to widen to include motivation, trust and skills.
- A priority is to support intermediaries who are already delivering educational or social services to digitally excluded people.
- A unifying framework is necessary to align the efforts of investors in digital inclusion initiatives and avoid duplication.
- This framework needs to be developed in consultation with the digitally disadvantaged.
- The framework must prioritise the establishment of an evidence base for digital inclusion in New Zealand as well as funding models.
- The Government's social investment approach provides a mechanism for engaging government agencies and achieving social change.
- Positive economic, social and educational outcomes can be expected from such an approach.

# What is digital inclusion and why is it important?



Within contemporary societies, digital technologies - specifically the internet - have been embedded into nearly every fabric of life. These range from social interactions to shopping, entertainment, employment, and education. The utilisation of the internet has allowed many conveniences, better connectivity between people, and improved access to public services. Studies have found that digital technologies improve the livelihoods of traditionally disadvantaged groups. For example, digital technologies enable the elderly to perform an array of tasks (particularly if they lack help from others), which can improve their social connectedness and allow them to learn and engage with information related to health, education and other activities (Choi, N. G., & DiNitto, D. M., 2013). However, there is a growing inequality whereby people are digitally excluded due to issues such as access and proficiency with digital devices. This leads to diminished wellbeing and opportunity, and other forms of deprivation.

Overseas research and digital inclusion developments in the UK, Europe and Australia have been considered to inform this report. A summary of this is included in Appendix 5. Our research suggests:

- Digital inclusion can result in improved social outcomes for disadvantaged groups.
- Digital inclusion is not just about physical access to digital technologies and services. People must also have the digital skills to obtain the benefits.
- People with lower education levels and lower socio-economic status are more likely to use the internet for recreational purposes only. People with higher education levels and higher socio-economic status are more likely to use the internet for enhancing their economic position.
- Recent reports from the UK suggest 21% of the UK adult population (11.5 million people) lack basic digital skills (Lloyds Bank, 2017).
- While indicators are suggesting progress towards a more digital society, there is little reported evidence of widespread social and economic impact.

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There is a growing inequality whereby people are digitally excluded due to issues such as access and proficiency with digital devices.

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Research overseas suggests that lifting digital capabilities will improve social and economic outcomes for New Zealanders, but having the skills to engage in a digital world is just one dimension (Soper, 2017). There is compelling evidence that the benefits to individuals and to societies will only be realised if other digital dimensions, such as motivation, access and trust, are satisfied at the same time. The term most frequently used to encompass all these dimensions is 'digital inclusion'.

## Defining digital inclusion

There has been some debate about the value of 'digital inclusion' as a concept. Some argue that the desired outcome is "social inclusion", i.e. in a digital world to be socially included requires a basic level of digital competency (Futurelab, 2007). Others refer to 'digitally included' people as being digital citizens.

Netsafe uses the term digital citizen to refer to:

*"someone who can fluently combine digital skills, knowledge and attitudes in order to participate in society as an active, connected, lifelong learner" (Netsafe, 2016)*

Netsafe also uses the term 'digital citizenship' to refer to the attitudes and behaviours of people in an online environment. However, 'digital inclusion' is a term that is increasingly being recognised and monitored by governments and communities in countries such as the UK, Singapore and Australia. It also helps to focus on the people and communities at risk of being excluded. For these reasons it is recommended that New Zealand use the term 'digital inclusion'.

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It is recommended that New Zealand uses the term 'digital inclusion', as this is now increasingly recognised and monitored by governments and communities in countries such as the UK, Singapore and Australia.

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The proposed definition of digital inclusion is:

*“A digitally included person is someone who has access to affordable and accessible digital devices and services at a time and place convenient to them, as well as the motivation, skills, and trust to use the internet to pursue and realise meaningful social and economic outcomes.”*

To be ‘digitally included’, people must meet all four of the following criteria:

1. **Motivation to use the internet** – this means they have a meaningful purpose or some specific reason to use the internet. Examples might include staying in touch with family and friends, studying online, or using the internet for banking. The test is whether people perceive some benefit in using the internet.
2. **Access to the internet** – this means they have access to an internet-enabled device such as a computer, tablet or smartphone, as well as access to a quality internet service with affordable data allowances. This raises the question of possible benchmarks for ‘quality internet’, ‘affordable data allowances’ and ‘time and place convenient’. The needs of every user vary widely; the guideline could be that internet performance and pricing should not be a barrier to use. For household internet connections, the recommended ‘access’ benchmark is a fixed or wireless internet connection with download speeds of at least 15Mbps and a monthly data allowance of at least 100GB. Access at times and places that are ‘convenient’ also need benchmarking – for example many would consider it inconvenient to have to drive to the nearest public library during opening hours to use free WiFi. The concept of ‘access’ also relates to the nature of internet content. Content must be ‘accessible’ to users; this means it must be relevant and formatted for users with different abilities, including those with disabilities and limited language skills.
3. **Core digital skills** – this means they have all seven digital capabilities: getting connected; managing information; communicating; transacting; creating; problem-solving; and, staying safe. Within each of these capabilities, there will be a spectrum of skill levels. Students, for instance, are likely to require a higher level of digital skills to engage in new future-focused learning environments (21st Century Learning Reference Group, 2014).
4. **Trust in online services** – this means they have the confidence and online literacy to distinguish between information that is right and information that is misleading or wrong. They also understand about harmful digital communications and know how to protect personal and private information.

## Why does digital inclusion present an opportunity for New Zealand?

Unlike other countries, New Zealand does not have a digital inclusion framework or a digital inclusion index to assess the extent to which its citizens are engaged online. However, there is strong evidence from a number of research initiatives that New Zealand faces the same challenges as other countries (e.g. barriers around skills, motivation and trust) in ensuring that everyone has the skills and confidence to go online.

Digital inclusion has been on the agenda in New Zealand for 20 years and, like the UK, numerous efforts have been made to ‘close digital divides’ and ‘bridge digital gaps’ (NZ Government, 2002), (Barbara Craig, Bill Dashfield and Ian Thomson, 2003), (NZ Government, 2005), (MED, 2008). The initiative for much of this effort has come from the community sector. For example, in 1996, Wellington City Council set up the 20/20 Communications Trust (now known as the 20/20 Trust) specifically to raise the digital capability of its citizens (Zwimpfer, 2010).

In recent years, political and business leaders have started to acknowledge the importance of developing digital capability:

- *“digital literacy is becoming increasingly recognised as an essential foundation skill worldwide... we need to ensure that no New Zealanders miss out either”* Hon Steven Joyce, Minister of Economic Development (Joyce, 2012)
- *“young New Zealanders must not be left behind in acquiring digital literacy skills”* Phil O’Reilly, CEO Business NZ (O’Reilly, 2012)
- *“digital literacy is now an essential skill-set, and we need to ensure that we have government policy that enables all New Zealanders to compete in a modern economy”* Hon Nikki Kaye, Associate Minister of Education (Kaye, 2013)

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While government agencies have generally been supportive and have often funded specific initiatives, there have been no nation-wide ‘outcome driven’ strategies or policies.

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Digital literacy is increasingly being recognised as a funding priority (Lottery, 2017). However, high level support and strategies from government have not generally translated into sustainable, coordinated national programmes.

The inclusion of a 'Digital New Zealanders' dimension in the Government's Digital Economy Work Programme recognises the importance of a digitally-capable population (MBIE, 2016a). Equally New Zealand's ratification of the 2006 United Nations Convention on the Rights of Persons with Disabilities included articles on the importance of inclusiveness surrounding the internet and information and communication technology (ICT) relating to access and design (UN, 2006).

Our research suggests that access to the internet in New Zealand is uneven. Twenty three percent of New Zealand households reported that they didn't have access to the internet in the 2013 Census (Statistics NZ, 2013).

The New Zealand Government's significant UFB and Rural Broadband Initiative (RBI) investment means that the lack of reliable access to the internet now only effects a minority of New Zealanders. However, there are still many geographic areas without access and it could be a further 10 years before equitable access is achieved for all New Zealanders. Affordability remains a problem for some groups, who cannot afford the average \$60- \$100 per month to sustain a quality internet connection. Some do have the choice to connect, but don't see the value. People on low incomes are less likely to have an internet connection, and depend more on internet connections outside the home.

Analysis by the 20/20 Trust in 2014, identified 15% of households with school-aged children (62,000) did not have access to the internet at home, affecting some 20% of all students (150,000). Further analysis by territorial local authority (TLA), and Local Board Area (LBA), revealed a wide gap between geographic jurisdictions. In the most disconnected TLAs - in Kawerau, Opotiki and Wairoa - over 40% of households with school-aged children did not have access to the internet. Within Auckland, the contrast was almost as great. Over 30% of households with school-aged children in the four south Auckland TBAs that make up The Southern Initiative (TSI) area did not have access to the internet, compared to families living on the North Shore of Auckland where only 4% did not have access. Some research we uncovered suggested these geographical differences in home internet access for students may impact on their learning. Research by Massey University (Hartnett, 2016) showed that young people predominantly learn and develop their digital skills away from the school environment and, therefore, students with limited or no digital access at home or near their homes are disadvantaged versus those that do. Students from low decile schools would be most impacted - 28% of these students did not have access to the internet at home compared to 1% in high decile schools.

This geographic digital divide is also an ethnic and income divide. The 2013 Census revealed that 33% Māori did not have access to the internet, 10% more than the national average (Statistics NZ, 2013). Our research also suggested that Pasifika people are more likely to access the internet at their educational institution or workplace, reinforcing the point that affordability at home could be the barrier.

We know, as in other countries, particular groups face extra challenges in accessing and using digital tools. For example, 30-40% of people with disabilities are not connected to the internet, compared to a national average of 15%. Barriers such as the cost of special software and hardware, and the accessibility of content limit these potential users. Māori and Pasifika disabled people are the least likely amongst all people with disabilities to be digitally connected.

Internet access is only one indicator of digital inclusion. As well as access, people must also have the motivation, skills, and confidence to go online. People, especially those older than 50, have an interest in digitally up-skilling. The 2015 WIPNZ survey reported 27% of people wanted further training to improve their internet ability, suggesting a potential skills deficit (Crothers, C., Smith, P., Urale, P.W.B., Bell, A., 2015). This suggests that the digital divide between older and younger people is reducing, but still remains an issue. 68% of the 20/20 Trust's Stepping UP digital skills programme participants had an internet connection in their homes but signed up for Stepping UP because they had neither the skills nor the confidence to use it (20/20 Trust, 2016a).

There is also some evidence of a possible digital skills deficit in the workforce. A 2014 survey of school leavers by the Auckland Chamber of Commerce showed only 6% had any evidence of being digitally job-ready (Barnett, 2015). 50% of New Zealand workers believe they need to acquire more digital skills to guarantee their future employment (Randstad, 2016). This contrasted with Singapore (ranked first amongst OECD countries for workplace skills) where 86% workers believe they need to acquire more digital skills. This suggests that

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**Around a quarter of all New Zealanders have not yet identified any function of the internet of sufficient value to make it really matter to them.**

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New Zealand will not only experience a growing demand for digital skills, but will also face an education challenge in raising the awareness of workers and their employers to the changing nature of skills needed for future work.

The 2015 WIPNZ survey highlighted another digital inclusion challenge – only 76% of respondents felt the internet was ‘very important’ or ‘important’ in their lives. This suggests that around a quarter of all New Zealanders have not yet identified any function of the internet of sufficient value to make it really matter to them. The same survey reported that 42% of consumers have concerns about online intrusions into their privacy by companies and corporates. Non-users and ex-users of the internet need to be persuaded of the benefits of connecting.

These findings reinforce the importance of including motivation and trust in New Zealand’s digital inclusion agenda. While digital inclusion data in New Zealand is not that robust, there is sufficient evidence to suggest digital inclusion should be a priority in shaping New Zealand’s digital economy.

# What groups appear to be most at risk of digital exclusion?



Digital disadvantage exists in all the countries reviewed for this study and although the research data in New Zealand is somewhat limited, there is enough evidence to indicate that the situation in New Zealand is similar. There is also a high degree of commonality in terms of the groups identified as the ones most likely to be disadvantaged. The challenge is that there are people at all stages of their lives, and in all walks of life, who are digitally disadvantaged and require some form of assistance.

However, there is no robust data about the numbers of people who are actually digitally excluded in any particular disadvantaged group; all that is known is that the proportion of digitally excluded people in each group is likely to be somewhat higher than the national average. One of our recommendations is to specifically address this by collecting base data on the numbers in each group who do not have core digital skills.

It is also important to understand that the classification of disadvantaged stakeholder groups is not as simple as putting people into different 'disadvantaged' boxes. Many fall into more than one disadvantaged group, creating extra challenges.

Research shows there were continuing divides between 'digital-rich' and 'digital-poor' people in New Zealand society (Lips, 2015). The most digitally-excluded groups are identified as adults with disabilities, children with special needs, Pasifika, Māori, senior citizens, people from low socio-economic backgrounds and those living in regions or communities with low internet uptake rates. Furthermore, she identified the main reasons why people are digitally excluded as cost, lack of knowledge or skills (leading to lack of confidence and lower trust in internet use), non-use of the internet (even when people might have access), and people being unwilling to provide personal details via online channels.

Taking into account this New Zealand research, alongside overseas research, the following groups are most at risk of digital exclusion and, as a result, should be prioritised in terms of targeted support:

- Families with children in low socio-economic communities
- People living in rural communities
- People with disabilities
- Migrants and refugees with English as a second language
- Māori & Pasifika Youth
- Offenders and ex-offenders
- Seniors

It is also recognised that there are groups of people in both the education system and the workplace that would benefit from better digital skills, such as the following groups:

- Students without access to digital technologies in their homes
- Teachers without access to professional learning and development for teaching with digital technologies
- School leavers without a digital technology qualification
- Tertiary students without the advanced digital skills required for study
- People without core digital skills seeking to enter the workforce or already in the workforce
- Managers of small businesses and not-for-profit organisations

The needs and challenges for all these groups have been addressed as part of this report. The second group of people are not normally considered to be disadvantaged or 'at-risk', but enhancing their digital capability will enable them to participate more fully in the digital economy, benefitting themselves, their organisations and the New Zealand economy.

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For most of the disadvantaged groups, there is no robust data about the numbers of people who are actually digitally excluded; all that is known is that the proportion of digitally excluded people in each of these groups is likely to be somewhat higher than the national average.

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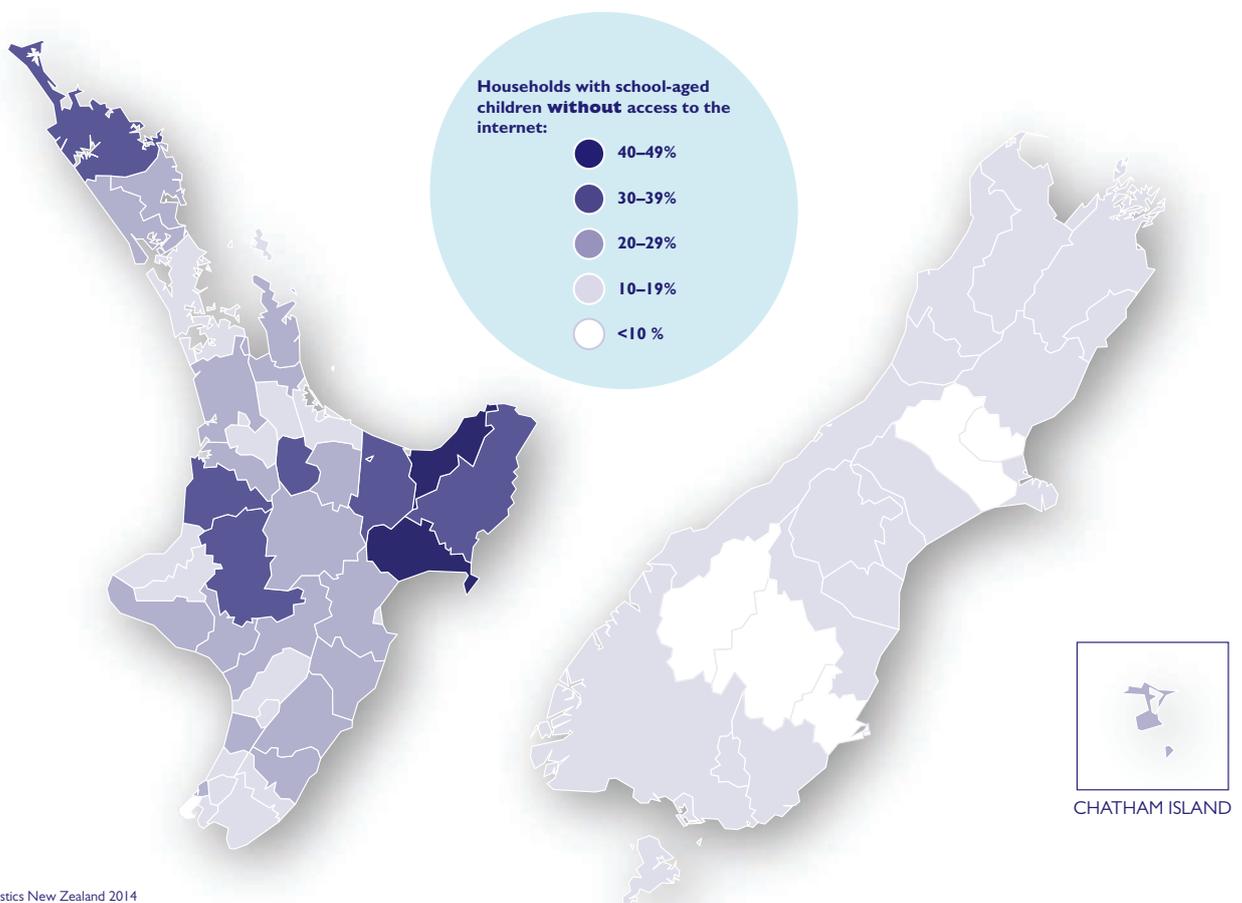
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The main reasons people are digitally excluded are cost, lack of knowledge or skills (leading to lack of confidence and lower trust in internet use), non-use of the internet (even when people might have access), and people being unwilling to provide personal details via online channels.

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## Families with children in low socio-economic communities

The 2013 Census identified 404,000 households with school-aged children. Children living in 62,000 of these households (estimated at around 150,000 children) did not have access to the internet in their homes. Most of these live in low socio-economic areas. More recent modelling has concluded that at the end of 2016 around 35,000 of these households still remain without an internet connection, representing around 100,000 school-aged children (Millar, 2017). While the national average for the percentage of families without access to the internet is 15%, the actual percentage varies from nearly 50% in some Territorial Local Authorities and Auckland Local Board Areas to as low as 4% in others (see infographics below). Research by Auckland University of Technology has also confirmed that internet use increases with household income, from 68% for households with incomes below \$35,000 to 99% for incomes over \$100,000 (Smith, P., Bell, A., Miller, M & Crothers, C. , 2016), so it is more likely that people in lower socio-economic areas will not have an internet connection.

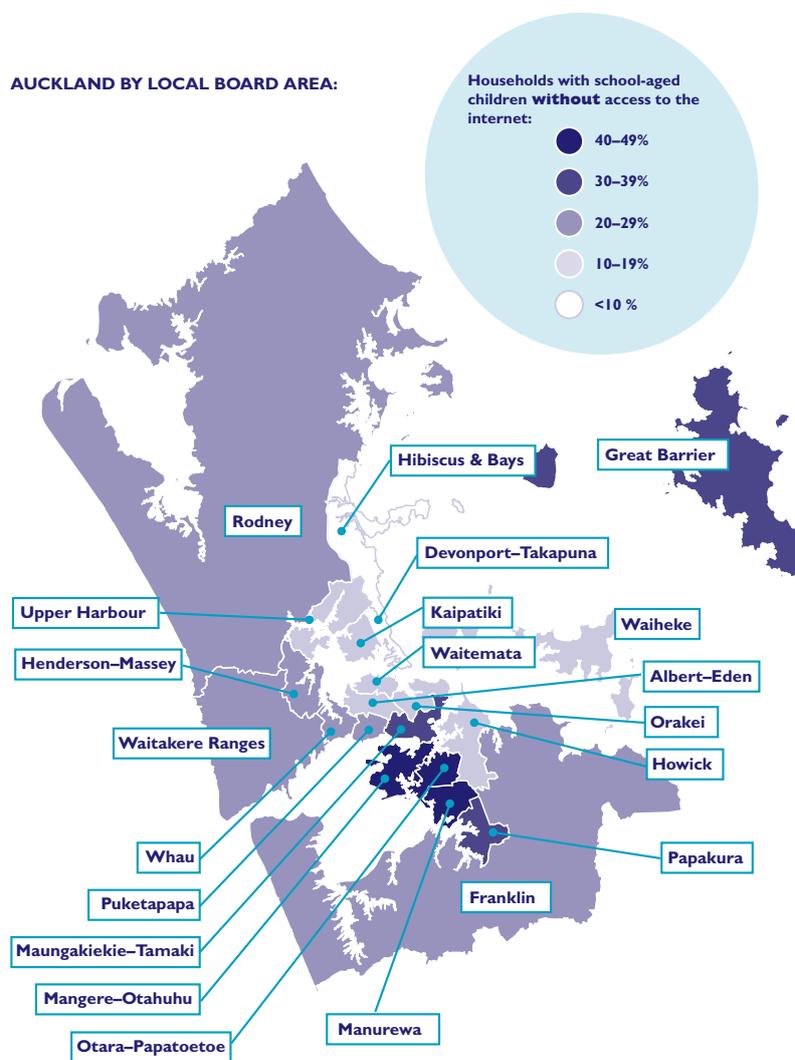


Source: Statistics New Zealand 2014

Source: 20/20 Trust Infographic (20/20 Trust, 2016)

School children are increasingly expected to have access to and use digital technologies for learning, at school and at home. Many schools have already implemented BYOD (Bring Your Own Device) policies, expecting students to bring a digital device such as a Chromebook or laptop to school each day. Many families simply cannot afford to purchase a digital device for their children and this can result in a new learning divide (between students who have unfettered access to the internet and those who are restricted to school hours).

Closely coupled with this divide is the digital competency of parents; children miss out on support from their caregivers if the adults in their homes are not confident users of technologies.



Source: Statistics New Zealand 2014

Source: 20/20 Trust Infographic (20/20 Trust, 2016)

Parents of pre-school children (especially first-time parents) require support from friends, family, other new parents with children of a similar age and health professionals during the early childhood years. The value of having internet access at home was highlighted in research by Maggie Hartnett from Massey University in 2016. Her research compared the use of digital technologies by young people from different socioeconomic backgrounds (Hartnett, 2016). Her findings “highlighted how young people (ie, senior school students) from lower socioeconomic groups prioritised their schoolwork when online [at home] because of the need to share access among family members”, as opposed to “other research that found less focus on educational activities among young people from low socioeconomic groups”. When 16 and 17 year olds were asked whether they had a computer at home, the internet at home or a mobile phone, those from low decile schools most often answered no to each or all of these questions; of these technologies, they were more likely to say yes with respect to owning a mobile phone.

New Zealand is not alone in identifying low income families with school-aged children being at risk of digital exclusion. A report produced for the UK Department for Communities and Local Government in 2008 established that the key digitally excluded groups are typically those who are also socially disadvantaged (Helsper, 2008). A report by PricewaterhouseCoopers in 2009 specifically identified households with school-aged children as being among the most disadvantaged (PwC, 2009). In 2014, the UK Government’s Digital Inclusion Strategy identified families in social housing as being at-risk; this research indicated that 37% of those who are digitally excluded are social housing tenants (GDS, 2014). The same report highlighted that families on lower wages or unemployed were more likely to be digitally excluded; 17% of people earning less than £20,000 had never used the internet compared to 2% of people earning more than £40,000. Singapore recognises ‘needy students’ among its digitally excluded (Saad, 2015).

Some of the main challenges faced by families with children in low socio-economic areas, classified in terms of the four dimensions of digital inclusion, are:

Digital Inclusion Dimension	Challenges for low-income families
<b>Motivation</b>	<ul style="list-style-type: none"> <li>• Support for children’s learning</li> <li>• Health of children</li> <li>• Improvement of economic position</li> <li>• Independent living</li> <li>• Increasing confidence to engage with others</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>• Digital devices</li> <li>• Affordable internet</li> <li>• Technology support</li> <li>• Awareness of opportunities</li> <li>• High level of mobility and temporary accommodation</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Core digital skills</li> <li>• Information about skills development opportunities</li> <li>• Literacy</li> <li>• Access to government services</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>• Keeping children safe online</li> <li>• Support from trusted intermediaries</li> </ul>

## People living in rural communities

Census 2013 indicated that 586,000 New Zealanders lived in rural communities (14% of the total population). Primary industry exports are critical to New Zealand’s economy; the New Zealand Government has set a target of doubling primary industry exports from \$32 billion in 2012 to \$64 billion by 2025 (MPI, 2017). Digital technologies have been recognised as being vital to achieving this result (NZIER, 2016a). Increasing use of digital technologies in rural communities will necessitate focus on all dimensions of digital inclusion, especially access and skills. People living in rural communities expect equitable access to the internet and opportunities to develop their digital skills.

Digital Inclusion Dimension	Challenges for people in rural communities
<b>Motivation</b>	<ul style="list-style-type: none"> <li>• Connecting with friends and family</li> <li>• Access to online entertainment services</li> <li>• Managing rural businesses</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>• Affordable access to the internet</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Opportunities to develop digital skills</li> </ul>

Research has shown that when a community is “fibred up”, evidence of economic growth can be measured within two years (Mitimiti, 2017). This is due to:

- an increase in the number of small online businesses
- growth of existing small businesses
- the fact SMEs that had been considering relocating instead stay on
- growth in the hospitality and tourism sector

Other benefits to a rural community include:

- access to remote health services
- access to online education and training
- connection to other communities and families globally
- disaster recovery and emergency support
- environmental monitoring.

## People with disabilities

People with vision and/or hearing impairments and those with motor neurone or cerebral palsy require assistive technologies to maintain their independence and communicate with friends, family and peers with similar disabilities. There are numerous areas where focus can be applied in order to achieve greater digital inclusion of people with disabilities. These include: encouraging the developers of digital devices, websites and apps to build in certain features that enable accessibility for people with disabilities, such as screen reading technology; ensuring pdf documents, web pages and CAPTCHA systems meet common accessibility standards; and, providing sufficient training to ensure that a person's digital skills keep pace with technology development (Smith, 2016).

The 2013 Census estimated that 24% of all New Zealanders had some disability (StatisticsNZ, 2014); however, this does not mean 1:4 New Zealanders are unable to access the internet. The 2015 round of WIPNZ included a set of items concerning internet use by people with disabilities. Some 14% answered that they had some impairment (Crothers, C., Smith, P., Urale, P.W.B., Bell, A., 2015). Impairments included those relating to sight (45%), hearing (29%), learning/thinking/remembering (25%), using hands (23%) and communicating (21%).

All that can really be inferred from this research is that a significant percentage of New Zealanders could face additional challenges in going online (on top of those experienced by others), especially if they are elderly, low income earners or living in a remote location.

People with disabilities are often doubly disadvantaged; not only are they over-represented in other disadvantaged groups, they also have to overcome the conservative views of many employers in terms of engaging people with disabilities. Employers are consistently calling for new recruits to be more job-ready, including having core digital skills. Yet, some disabled people who do have the digital skills still struggle to secure employment.

Examples of the extra challenges faced by the deaf community include:

- A large number live in areas such as south Auckland where internet access is low
- A large percentage of deaf people spend time in correctional facilities
- Many deaf people are Māori or Pasifika
- Some deaf people have other disabilities/impairments
- Deaf people are over-represented within the NEET classification
- Many are on low incomes (even if they are employed)

Some do not have digital devices or access to the internet in their homes; instead they rely on access at public libraries and other community facilities. However to a degree, this is balanced by the high levels of motivation among people with disabilities to engage in society on an equal footing with everyone else and, to the extent that technology can help, they are more than willing to give it a go. The barrier then becomes one of cost.

A report by the Low Incomes Tax Reform Group (LITRG, 2012) identified people with disabilities as one of the key digitally excluded groups in the UK. In 2014, the UK Government's Digital Inclusion Strategy (GDS, 2014) reached the same conclusion, noting that 33% of people with registered disabilities had never used the internet. Singapore has also identified people with disabilities as one of four 'at risk' groups (Saad, 2015). A 2016 Auckland University of Technology study of internet use by New Zealanders with disabilities acknowledged that the internet had resulted in greater independence and less reliance on others for assistance but a disability digital divide still existed due to factors such as a failure to ensure that devices, websites and software were designed to be accessible by everyone (Smith, 2016).

The New Zealand Government's web standards authority has included people with disabilities as one of its target groups in its objective to make the websites of all government organisations accessible to the widest range of New Zealanders (NZ Government, 2014). The elimination of barriers to technology is also part of the revised 2016-2026 New Zealand Disability Strategy (ODI, 2016), and it is expected that an emphasis on digital and assistive technologies will become part of this.

In 2013, the Blind Foundation carried out a large-scale 'Client Needs' survey of 1012 of its members (Blind Foundation, 2014). They discovered that about 41% of those surveyed had internet access and about 35% of those used data enabled mobile devices. This meant only about 14% of blind people had access to accessible mobile technologies. The Foundation has raised concerns about the accessibility of touch screen devices such as smartphones and the increasing use of touch screen computers as public access terminals (Blind Foundation,

2016). They point out that most of these do not allow for audio conversion. They have also pointed out that the personal income for 67% of people with visual disabilities in 2013 was less than \$40,000 per year. Furthermore, 41% had incomes less than \$20,000. They concluded that these low incomes were a factor limiting the uptake of new technologies.

Digital Inclusion Dimension	Challenges for people with disabilities
<b>Motivation</b>	<ul style="list-style-type: none"> <li>• For the deaf community, increased access to their first language (NZSign Language)</li> <li>• Communicating with friends</li> <li>• Transacting with businesses</li> <li>• Managing health</li> <li>• Becoming more independent and less reliant on others for help</li> <li>• Seeing themselves as more employable</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>• Knowledge of appropriate digital devices and applications, e.g. for deaf people, access to affordable video calling and video messaging</li> <li>• Technology support</li> <li>• Difficulty in integrating digital tools and software used by people with disabilities with workplace-based systems</li> <li>• Universal design - encouraging designers and developers of websites to incorporate features that enable usability for all people</li> <li>• Affordable access to technologies, especially video technologies for deaf people</li> <li>• Equal access to emergency information, e.g. sign interpreters for TV and internet streaming</li> <li>• Equitable access to mobile plans (e.g. free minutes for phone calls of no value)</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Core digital skills, particularly those that relate to assistive technologies</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>• Having confidence that the digital technologies and applications are ones that meet the specific needs of the person with disabilities</li> </ul>

## Refugees and migrants with English as a second language

New Zealand has an annual refugee quota of 750, and since the Second World War, has resettled over 33,000 refugees (INZ, 2015). In 2015, the Government announced an additional 600 refugees over three years in response to the ongoing conflict in Syria. English Language Partners (ELP) provides English language skills and social support to assist with the resettlement of refugees and migrants in New Zealand. In 2016, ELP supported 6,609 learners.

The social inclusion of newly resettled refugees and other migrants, especially those with English as a second language, is a significant issue confronting refugees, migrants and their host societies. Digital technologies are increasingly viewed as a useful resource in programmes that provide settlement services or promote participation in society. Dr Antonio Andrade Diaz from Auckland University of Technology has researched 50 resettled refugees to develop an explanation of the process by which the use of digital technologies contributes to their social inclusion. He concluded that digital technologies constitute a resource from which a set of five valuable capabilities is derived: to participate in an information society, to communicate effectively, to understand a new society, to be socially connected, and to express a cultural identity. In realising these capabilities through ICT use, refugees exercise their agency and enhance their well-being in ways that assist them to function effectively in a new society and regain control over their disrupted lives (Diaz Andrade, A., & Doolin, B., 2016).

## Māori & Pasifika Youth

The 2013 Census identified 130,000 Māori and 57,000 Pasifika youth (15-24 year olds). Māori and Pasifika in New Zealand are over-represented among the digitally excluded. A report from the Māori Economic Development Advisory Board in 2015 highlighted the extent of exclusion among Māori – in 2012, 68% Māori households had internet access compared to 86% of all households (Figuracion, 2015). In terms of broadband access, 73% of Māori internet users had access to broadband, which was the same as for Pasifika people, but this compared with 89% for European/Pākehā. The World Internet Project (WIPNZ) survey in 2015 revealed a similar gap for Māori and Pasifika, in terms of internet use; 87% and 80% respectively, compared to 92% for European/Pākehā (Smith, P., Bell, A., Miller, M &

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**Māori and Pasifika in New Zealand are over-represented amongst the digitally excluded.**

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Crothers, C., 2016). The same survey observed that Pasifika tend to be low-level users, but some 76% consider the internet to be important compared to 60% Māori who consider the internet to be important.

More than half of Pacific people live in the most deprived areas of New Zealand (deprivation index of 9 and 10). Pacific people have the smallest proportion with a tertiary degree and the largest proportion with no education qualification at all. Research shows 51% of Pacific children aged 0-17 live in families experiencing material hardship, compared to 15% of European children (Sorensen, D., Jensen, S., Rigamoto, M., and Pritchard, M., 2015).

Other research has identified that Māori and Pasifika are also over-represented amongst the 75,000 youth who are not in employment, education or training (NEET) (MBIE, 2016b).

Digital Inclusion Dimension	Challenges for Māori and Pasifika Youth
<b>Motivation</b>	<ul style="list-style-type: none"> <li>Identifying relevant applications</li> <li>Securing a job</li> <li>Engaging with government, e.g. MyMSD</li> <li>Job-seeker websites, e.g. SEEK</li> <li>High value technology jobs</li> <li>Digital apprenticeships</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>Digital devices</li> <li>Affordable internet</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Core digital skills, especially work-ready skills</li> </ul>

Our research did not uncover many New Zealand initiatives directly addressing the digital inclusion needs of Māori and Pasifika youth. But this doesn't indicate a lack of ideas. The first round of the Ka Hao Māori Digital Technology Development Fund, launched in 2016, attracted 170 applications, (TPK, 2016). The first round of funding is specifically targeted at improving digital skills and pathways for Māori into digital technologies. The objective is to grow the number of Māori in high-value jobs by improving and promoting pathways for Māori to enter the digital technologies sector, and by supporting the development of skills necessary to participate in sectors deploying digital technologies.

## Offenders and ex-offenders

Around 10,000 New Zealanders are in prison; a disproportionate number are young Māori men. Roughly 90% of prisoners have trouble reading and writing and 60% were unemployed before they were arrested (NZIER, 2016). A further 30,000 were on probation or serving community sentences; 60% of these had substance abuse problems.

The UK Government's Digital Inclusion Strategy (GDS, 2014) identified offenders and ex-offenders among the digitally disadvantaged. It was noted that the risk of reoffending drops significantly when digital skills training and support is used to complement existing approaches (PET, 2015). As a result, the Department of Corrections in New Zealand set a 5-year target for education and training with the aim of achieving a 25% reduction in re-offending by 2017. The Department also noted that many prisoners lack the necessary literacy and numeracy skills, qualifications, and work experience to gain and sustain employment post-release (Corrections NZ, 2017). People on probation are also encouraged to participate in structured training with a certain number of hours being credited towards community sentences.

Digital Inclusion Dimension	Challenges for Prisoners and People on Probation
<b>Motivation</b>	<ul style="list-style-type: none"> <li>Engaging with family and friends</li> <li>Securing a job</li> <li>Online learning</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>Digital devices</li> <li>Affordable internet</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Literacy &amp; numeracy</li> <li>Core digital skills</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>Keeping victims and others safe</li> </ul>

## Seniors

Seniors are consistently among the most digitally disadvantaged; they are not only facing reducing 'over-the-counter' services but also the need to acquire new technology and learn new skills just to stay in touch with their families. They are also facing increasing costs with fixed incomes and are high incentivised to find less costly ways to live. But perhaps of greatest importance to seniors is the desire to maintain their dignity and independence. The 2013 Census identified 607,000 New Zealanders aged 65 and above.

In 2014, a team of researchers from Waikato University produced a substantive report on maximising participation and contribution by older people (Koopman-Boyden, P., et. al., 2014). One chapter of this report, prepared by Dr Margaret Richardson, dealt explicitly with the participation of older people in the digital age. Her research included interviews with 50 older people as well as organisations providing support to older people. She discovered that:

- Long-term internet users had mainly acquired their digital skills before reaching the age of 65, and had continued to use it in retirement; "overall their use of the internet enhanced their participation with families and friends, enabled their productive engagement in leisure interests and community groups, and facilitated access to goods, services and information"
- Recent adopters used the internet less, suggesting that the 'habit of internet use' might take some time to develop
- Non-users reported no personal need or desire to use the internet and often associated it with negative impacts at the individual and social level. Their participation in the marketplace was not hindered, provided viable alternatives were available, such as a digital intermediary
- Non-users demonstrated a clear preference for traditional methods and the status quo, although some reported feeling stigmatised, side-lined and penalised by not being online
- Factors that enabled use of the internet included:
  - Awareness of the internet's relevance for and usefulness to them personally
  - Determination to learn to use it and keep that learning up to date
  - Access to trusted others able to provide technical, financial and moral support
- Constraints in using the internet were identified as:
  - Perceived lack of relevance, usefulness or interest in the technology
  - Unwillingness to commit resources to acquiring or learning how to use the technology
  - Risks and complexities associated with the internet, including safety, scams and viruses.

Dr Richardson concluded that three groups of people have the most impact on older people's digital engagement – the older people themselves, their families and the organisations they interact with regularly. Her study confirmed that the actions of "encouraging, enabling and engaging" can be effective in increasing older people's digital participation, including one-on-one information sessions, collaborations with government agencies and other organisations such as SeniorNet, the use of digital assistants or mentors and awareness-raising campaigns. The Westpac-SeniorNet financial literacy workshops were cited as an example of a successful collaboration in offering training for specific online services.

Since the introduction of the internet to New Zealand in the early 1990's, many seniors have responded positively to opportunities to upskill and engage online. Often driven by the desire to engage with their grandchildren by email or Skype, or to search out their family genealogy, many seniors have been quick to join organisations like SeniorNet to get the skills and support they need. Seniors are also driven by a desire to reduce their isolation and maintain their independence. Having digital skills can certainly help.

However, not all seniors have wanted to join a club to develop their digital skills. The Stepping UP programme being delivered mainly through public libraries is providing an alternative. Stepping UP provides a range of 2-hour tutored modules (called Digital Steps). Participants can choose the digital step classes best suited to their needs. While these classes are open to the general public, seniors do make up the largest group of participants. In 2016, 67% of all participants were aged over 50.

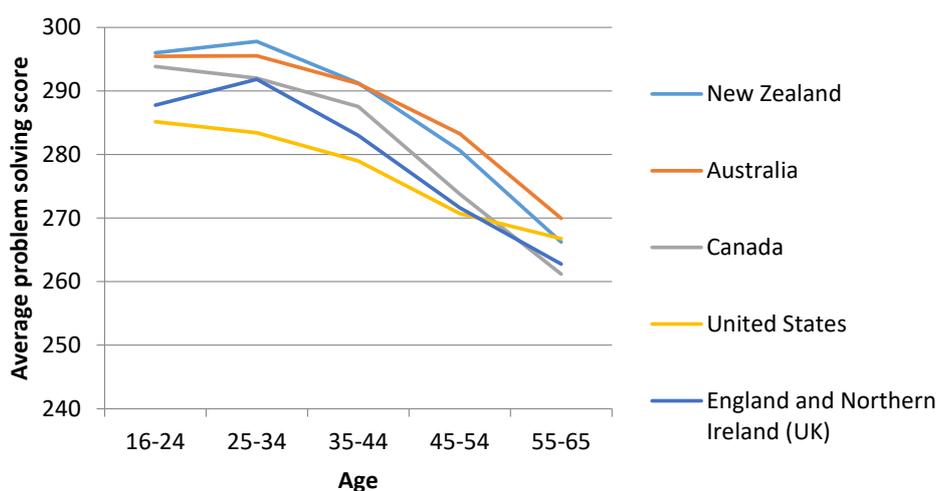
But some seniors continue to be digitally excluded. Research in the UK, Australia, Singapore and New Zealand has identified that older citizens (aged 65 and over) are over-represented among the digitally disadvantaged (PwC, 2009), (LITRG, 2012), (GDS, 2014), (Go Digi, 2017), (Saad, 2015), (Lips, 2015). The WIPNZ team at Auckland University of Technology has also discovered that internet use decreases as age increases, from 98% for those under 40 to 70% for 65+ (Smith, P., Bell, A., Miller, M & Crothers, C., 2016).

Digital Inclusion Dimension	Challenges for Seniors
<b>Motivation</b>	<ul style="list-style-type: none"> <li>• Communicating with family and friends</li> <li>• Engaging with government, e.g. MyMSD</li> <li>• Transacting with businesses, e.g. bill payments</li> <li>• Managing health, e.g. ManagemyHealth</li> <li>• Buying and selling goods, e.g. TradeMe</li> <li>• Saving money</li> <li>• Not being left behind - sense of pride</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>• Choosing appropriate technologies</li> <li>• Technology support</li> <li>• Knowing where to get independent advice, e.g. SeniorNet</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Core digital skills</li> <li>• Staying safe online</li> <li>• Online financial skills</li> <li>• Fixing basic technology problems</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>• Confidence to avoid malicious websites, scams and pop-up windows</li> <li>• Build trust through positive experiences</li> <li>• Having a reliable network of friends to help you</li> </ul>

## School Students

“Digital natives” - defined by Prensky as those generations who grow up with digital technologies and are “‘native speakers’ of the language of computers, video games and internet” (Prensky M. , 2005b) - might be very competent with social media, but our research suggests they may not have practical work-ready or tertiary-ready digital skills, such as word processing and spreadsheets. We suggest all school leavers should have some evidence of their digital capability.

A recent UK report by Barclays identified a new emerging divide; new workplace entrants (aged 16-24) appear less skilled than their older but less ‘digitally native’ counterparts (aged 25-34). By way of explanation, Barclays suggested this could be because the younger generation of workers knew how to consume digital content, but had not yet learned how to create it (Barclays, 2016). The 2016 PIAAC report revealed a similar trend for New Zealand, although not as pronounced as the UK – refer to the graph below.



Source: Skills in New Zealand and around the world: Survey of Adult Skills (PIAAC) (MoE, 2016b)

The UK Children’s Commissioner’s 2017 report *Growing Up Digital* raises further concerns about children in the 4-14 age group who are spending an increasing amount of time online but without the skills or the support from adults to act responsibly in the online environment (UK Children’s Commissioner, 2017). The report calls for a compulsory digital citizenship programme for all students aged 4 – 14, with a voluntary programme for older children who want to become digital leaders or champions.

The Ministry of Education in New Zealand has recognised the importance of digital technologies for most of the last two decades and has invested heavily in digital infrastructure in schools, teacher professional development and, most recently, curriculum development for digital technologies. Around 96% of all New Zealand schools now have access to a government-funded high speed managed internet connection, teacher professional development programmes focus on digital fluency and a new digital technologies curriculum is to be introduced from 2018 (Parata, 2016).

The New Zealand Qualifications Authority (NZQA) is pursuing a digital transformation journey that involves computer-based methods of assessment; its goal is to have all examinations (where appropriate) online by the year 2020 (NZQA, 2017). It has implemented some innovative tools that enable schools to assess readiness for online exams. One of these is a fairly comprehensive survey of digital technologies in schools as well as learner and pedagogical readiness. Schools can also test the robustness of their internet infrastructure by encouraging class groups of students to complete a general knowledge quiz.

Some of the people consulted during the preparation of this report felt strongly that the focus should just be on students, their families and the education sector. Their argument was that if everyone develops the motivation, access, skills and trust as part of their schooling then they will be set for life. This argument has merit, and most people would probably agree that every student should be digitally included before leaving school. To this end, it would be helpful if all schools and school communities of learning (COLs) had a digital learning plan, covering the acquisition of student digital devices, curriculum development and teacher professional learning and development programmes, as well as specific digital skills expected of students. But the digital agenda must go beyond the education sector.

**It would be helpful if all schools and school communities of learning (COLs) had a digital learning plan, covering the acquisition of student digital devices, curriculum development and teacher professional learning and development programmes.**

Digital Inclusion Dimension	Challenges for Students
<b>Motivation</b>	• Developing practical digital skills for life and work
<b>Access</b>	• Digital devices (BYOD) • Home internet access
<b>Skills</b>	• Digital citizenship • Digital skills certification, e.g. ICDL, MOS
<b>Trust</b>	• Avoiding cyberbullying, online grooming, illegal content, cyber-stalking, online addictions, privacy and identity theft, inappropriate behaviours

## Teachers without access to PLD for teaching with digital technologies

With the rollout of ultra-fast broadband to schools across New Zealand, the School Network Update Project, and increasing numbers of BYOD programmes and other classroom technology schemes, digital tools are becoming prevalent in the classroom. However, technology alone does not mean better teaching and learning. Teacher education, or Professional Learning and Development (PLD) is critical in making the most of technology in schools. A 2015 OECD report stated: ‘The key elements for success are the teachers, school leaders and other decision makers who have the vision, and the ability, to make the connection between students, computers and learning.’ (OECD, 2015). The Mind Lab team have developed a postgraduate certificate programme in association with Unitec, covering the three complementary themes of digital tools, collaboration and leadership (UNITEC, 2017). With the support of the NEXT Foundation (NEXT, 2017), Unitec hopes to support at least 10,000 teachers in the coming years.

**Teacher education is critical in making the most of technology in schools.**

The need for equitable access to digital devices for learning and access to the internet in all students' homes was highlighted in a report prepared by the 21st Century Learning Reference Group and published in May 2014:

*"Today, there are new challenges in ensuring that all students have equitable access to modern learning tools. New Zealand needs a concerted effort to ensure equitable outcomes for all young people, to improve their life chances and help break the cycle of poverty and underachievement that affects a significant proportion of the population."*  
(21st Century Learning Reference Group, 2014)

Access to mobile digital devices for students is just part of the story. Benefits in terms of learning outcomes are only likely to be achieved if changes are also made in learning environments – schools and homes. Research by Massey University highlighted the need for a range of supporting policies, including teacher training with mobile technologies, educational resources available through mobile devices, incentives to develop learning content, gender equality, connectivity and equity, equal access strategies, safe, responsible and healthy use of mobile technologies, mobile communication and management, and advocacy, leadership and dialogue (Parsons, 2014).

In 2015, the Ministry of Education adopted 'digital fluency' as a desired outcome for all students and as a priority for teacher professional learning and development programmes (MoE, 2015). This is expected to help address the concerns raised by Parsons. The formal integration of digital technology into the New Zealand Curriculum from 2018 will also result in an increased focus on digital capabilities in both teachers and students.

## School leavers

Every year around 60,000 students leave school. Most (74%) continue with tertiary studies. The remainder either enter the workforce or join the youth NEET (not in employment, education or training) group. The NEETs have typically left school without any qualifications and, like their peers going into jobs or tertiary study, do not have practical digital skills. Having left school, the real challenge is to create engaging opportunities that will stimulate their interest and motivate them to pursue a meaningful career.

Result 5 of Better Public Services seeks to increase the proportion of 18-year olds achieving a level 2 NCEA qualification or equivalent (SSC, 2017). The target was 85% for 2017 and provisional data from the Ministry of Education indicated that this target had already been exceeded in 2016 (85.2%). But this still leaves around 9000 young people without a basic qualification on leaving school.

There is widespread support from political and business leaders for school leavers to be "job-ready" and this includes a basic level of digital capability. Programmes such as the International Computer Driving Licence (ICDL) and Microsoft Office Specialist (MOS) provide some opportunities; students can participate in these from almost any internet-connected computer and on successful completion (with online testing) will receive certification that has international recognition. Some programmes such as ICDL and MOS have also been granted credit recognition for NCEA, helping students achieve another qualification at the same time (NZQA, 2017).

## Digital challenges for tertiary students

Digital skills are essential for students during all their years of tertiary study. Our preliminary discussions as part of this research suggests that many students may be arriving at tertiary institutions without core digital skills and as a result may struggle to complete assignments and use digital tools to analyse data.

What are the required digital capabilities for students entering tertiary study? A literature search and discussion with academics from a number of tertiary institutions has suggested a set of capabilities that could become a pre-requisite for all tertiary education programmes. Students arriving without these competencies should be offered support by the tertiary provider to enhance their skills in the same way that others are offered English language support.

Tertiary providers expect students to have the skills to consult authoritative online resources as well as use specialised software tools to analyse and synthesise information. They should also have the confidence to present information in multiple formats, e.g. document, spreadsheet, audio-visual. Tertiary providers also recognise the lack of these digital skills among many academic staff.

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**There is no well-defined general baseline for digital literacy for students entering tertiary education within New Zealand.**

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With the advances in technologies, ICT is an integral part of education, especially at the tertiary level. As the services and resources available to students move towards a digital form, such as Blackboard and E-libraries, digital literacy is not just essential for a student's educational success, but often it is expected as a pre-requisite by lecturers and Universities. However, there is no well-defined general baseline for digital literacy for students entering tertiary education within New Zealand. In addition to the standard digital fluency (mentioned elsewhere in the report), the literature highlights two types of digital literacy that are essential for tertiary education – digital information literacy and software literacy.

Digital information literacy (DIL) is the ability to access, create, and critically evaluate the quality and credibility of information, as well as the relevance and usefulness of the information (Hegarty, B. et al, 2010). Additionally, DIL also refers to the confidence needed to effectively use, manage, create, quote and share digital information and sources, with a clear understanding and acknowledgement of the information's ethical, cultural, economic, legal and social characteristics. Critical thinking is also essential to DIL, whereby the user will exhibit an openness to question, reflect and work to substantiate their beliefs and discover their underlying assumptions.

Software literacy is the ability to not only use a particular software, but also be able to independently troubleshoot and problem solve any software issues encountered (Khoo, E., et al., 2014). The digitally literate possess the critical thinking skills to evaluate the software and those of a similar purpose, to create understandings that could aid in the learning of new software.

Knowledge on copyright and plagiarism was also raised as an issue, whereby students may not understand the implications of using online information (Shep, Sheehan, & McKinley, 2013; White, 2013). A recent survey in the US showed that while 31% of students consider themselves as knowledgeable about copyright and fair use policies in US, only 5% of staff perceived their students as knowledgeable. In fact, 23% rated their students as completely non-knowledgeable (VideoBlocks EDU, 2016).

## People entering, or already in, the workforce

New Zealand has a poor record in terms of workplace productivity. The Productivity Commission has discovered that New Zealanders work about 15% longer than the OECD average to produce about 20% less output per person (Paul Conway and Lisa Meehan, 2013). The Commission attributes this, at least in part, to the low use of digital technologies, particularly in the services sector (Productivity Commission, 2014). The challenge is to ensure all school-leavers have digital competency certification. Research in 2014 revealed that only 6% of school leavers in 58 Auckland schools had a qualification that demonstrated they were job-ready and equipped with the ICT skills suitable for taking up a job (Barnett, 2015).

It is not uncommon for women to exit the workforce while their children are young, but later in life they choose to re-enter the workforce. The same is true for people who are made redundant because of organisation changes. What digital skills do these people need to re-enter the workforce at a level that is commensurate with their experience and competency?

Most countries use the term digital inclusion or exclusion to help focus resources on the people who cannot afford access to the internet or do not have the skills or interest in going online. But there is another area of exclusion affecting workplace productivity and inhibiting the establishment of new businesses. Research in Europe and the UK suggests that 90% of all new jobs require digital skills (EC, 2016) and nearly three-quarters of employers say they would be unlikely to even interview a candidate without basic digital skills (ICM, 2012).

Over 1 million New Zealanders are employed in the workforce, but 50% have concerns about their digital capabilities. A report released in February 2017 claims that "half of Kiwis in the workforce admit they need to acquire more digital skills in order to guarantee their future employability" (Randstad, 2016).

Interestingly this contrasts with Singapore, which is consistently ranked number one in the world for 'digital', where 83% of the workforce believe they need to acquire more digital skills. This suggests a level of complacency among New Zealand workers, who do not yet fully appreciate the impact of changes happening in the workplace despite 86% claiming that every company should have a digital strategy.

While much of the discussion around digital literacy, fluency and citizenship focuses on the education sector, it is becoming increasingly accepted that these concepts apply equally to the workplace and to living in digitally-enabled communities (White, 2013).

In terms of earning power, people who are digitally literate have substantially higher wages than those who don't. The Māori ICT Report 2015 discovered that, in 2013, on average Māori ICT professionals earned almost double the median income of a Māori worker (Figuracion, 2015).

This has serious implications for school leavers seeking to enter the workforce and for people wishing to return to the workforce after being made redundant or having been away from work for a number of years. New Zealand has a large number of young people aged 15-24 who are not in education, employment or training (NEETs). In 2016, the number of long-term NEETs (more than 6 months) in New Zealand was estimated at 75,000 (Corlett, 2016). In 2013, the cost of each NEET was estimated at \$26,847 over a three year period, or a total short-term cost of approximately NZ\$2 billion (Dye, 2013).

The Productivity Commission has also raised concerns about New Zealand's sliding productivity, especially in the services sector (Productivity Commission, 2014). The Commission suggested that the lack of use of digital technologies by businesses was a significant contributing factor.

A comprehensive plan should be developed to address workplace skills for:

- Youth who are not in education, employment or training (NEETs)
- People in the workforce or re-entering the workforce
- People managing small businesses (less than 10 employees)

## Managers of small businesses and NFPs

Small and Medium Sized Enterprises (SMEs) face the same productivity challenges as those identified by the Productivity Commission above. The owners of these businesses are often older people who have not grown up in the digital age. Around 33% of small business owners are aged over 55 (Kirkwood,J., & Viitanen,T., 2015). Computers were not part of their schooling and they have had little opportunity to develop any digital skills.

The Low Incomes Tax Reform Group in the UK (LITRG, 2012) listed microbusinesses (those with less than 10 employees) among the digitally excluded. Australia has reached the same conclusion and lists 'small businesses' among its digitally excluded (Go Digi, 2017).

The same is true for small businesses and not-for-profit (NFP) organisations in New Zealand. New Zealand has 450,000 small businesses, each employing less than five people and 114,110 not-for-profits (NFP, 2016). Digital tools have the potential to increase workplace productivity and improve the efficiency of business operations.

Digital Inclusion Dimension	Challenges for boards and managers
<b>Motivation</b>	<ul style="list-style-type: none"> <li>• Workplace productivity</li> <li>• Disruptive change</li> <li>• Understanding of costs and benefits</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>• Choosing appropriate technologies</li> <li>• Technology support</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Workplace digital skills</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>• Concerns about the unknown and how to fix things that might go wrong</li> <li>• Protecting business from cyber attacks</li> </ul>

Directors of companies and other organisations are increasingly being challenged by the lack of digital capability and leadership on their boards. The Director Sentiment Survey carried out by the Institute of Directors in 2016 discovered that 47% of directors expected their organisations to be impacted by major or disruptive change within the next two years (Caird, 2017). But only 35% of boards believed they had the right capability (skills and experience) to lead their organisation's digital future. Caird says directors need sufficient digital literacy so they can hold management to account – to ask the right questions, and to understand and probe the answers. She suggested digital leadership expected from boards could include:

- developing digital capability to meet business needs and support sustainable success
- understanding the key disruptive innovations in the organisation's industry/sector
- exploiting opportunities and value from big data analysis
- putting digital issues on the board agenda.

# How important is digital capability and how do we build it?



## The rise of digital

International research shows almost all children have accessed the internet by the time they are 12 (94%), and 20% have accessed the internet by the age of 6. Most 15 year-olds (96%) are extremely comfortable using and managing digital technologies (PISA, 2016). Recently, adult New Zealanders topped all OECD nations for their problem-solving abilities in technology-rich environments (but score less well for literacy and numeracy) (OECD, 2017). However, we also know that not all millennials are 'digital natives'. While most are confident using digital technologies for social purposes, overseas research shows some do not appear to have the skills necessary for productive work in digital economies.

With the rise of digital, questions have been asked about what new skills and competencies do people need? This has resulted in an evolving plethora of terms, including digital awareness, digital literacy, digital fluency, digital equality, digital empowerment, and digital engagement<sup>1</sup>. All these terms are attempting to convey a different aspect of what is required to live in a digital society, but they are frequently used interchangeably. This can be confusing and it is perhaps not surprising that countries struggle to develop national strategies for addressing the people dimension of "digital"; the net result is that programmes addressing digital competencies typically receive much less investment and, as a result, lag behind more concrete infrastructure components. Measuring progress in overcoming digital exclusion is even harder; it is now recognised that simple infrastructure measures, such as the number of internet connections, are not adequate in monitoring progress towards digital nationhood.

During the last decade, some nations have started to tackle this challenge by developing frameworks for assessing the digital skills of their people. They implement regular monitoring to evaluate the effectiveness of government and community interventions. In this report, developments in the USA, Europe, the United Kingdom, Singapore, South Korea, Estonia, Finland and Australia have been reviewed.

## Defining digital capabilities

The European and United Kingdom (UK) digital capability frameworks provide a useful starting point for New Zealand, alongside work by Netsafe and the 20/20 Trust. New Zealand does not have access to the same robust statistics as Europe, but there is some merit in aligning with other digitally developed nations as much as possible. The digital technologies used in New Zealand are essentially the same as those used in other countries; competitive advantage will come through the ways in which these technologies are used and the skilfulness of the people shaping digital economies.

The core digital capabilities framework for citizens builds on the United Kingdom's Basic Digital Skills framework (Doteveryone, 2017). There is also a core capability that underlies the UK's five Basic Digital Skills - "Getting Connected". With any digital device there are some skills needed to just get connected and start using the device. Many people rely on their suppliers (or their children) to do this for them, but ideally digital citizens would have the confidence to tackle basic setup and maintenance tasks themselves.

Digital Capability	Representative Digital Tasks
Getting Connected	<ul style="list-style-type: none"><li>• Understand computer and internet terminology, set up digital devices and basic troubleshooting, e.g.</li><li>• Navigate around a computer desktop</li><li>• Launch a browser</li><li>• Connect a computer to a wireless network</li></ul>
Managing Information	<ul style="list-style-type: none"><li>• Find, manage and store digital information and content; understand copyright; evaluate reliability of information, e.g.</li><li>• Use a search engine to look for information online</li><li>• Find a website visited before</li><li>• Download/save a photo found online</li></ul>

<sup>1</sup> We provide an explanation of these 'digital' terms in the Glossary.

Communicating	<ul style="list-style-type: none"> <li>• Communicate, interact, collaborate, share, and connect with others, e.g.</li> <li>• Send a personal message via email or online messaging service</li> <li>• Carefully make comments and share information online</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Purchase and sell goods and services, manage finances, use government digital services, e.g.</li> <li>• Buy items or services from a website</li> <li>• Buy and install apps on a device</li> </ul>
Creating	<ul style="list-style-type: none"> <li>• Engage with communities and create basic digital content, e.g.</li> <li>• Complete online application forms which include personal details</li> <li>• Create something new from existing online images, music or video</li> </ul>
Problem solving	<ul style="list-style-type: none"> <li>• Increase independence and confidence by solving problems using digital tools and finding solutions, e.g.</li> <li>• Verify sources of information found online</li> <li>• Solve a problem with a device/digital service using online help</li> </ul>
Staying safe	<ul style="list-style-type: none"> <li>• Have the skills and strategies to minimise and manage online risks, e.g.</li> <li>• Update and run virus-checking software</li> <li>• Recognise a scam or phishing attack</li> <li>• Protect personal information</li> </ul>

This framework has been used to develop suggested core digital capabilities for every New Zealander (Appendix 1). Some examples of what this means for selected groups are included in Appendix 2.

# What can New Zealand learn from overseas and from existing New Zealand initiatives?



An effort has been made to identify research in other countries, as well as in New Zealand, that indicates:

- a) how different population cohorts have been targeted and whether positive social outcomes were evident; and
- b) whether initiatives have delivered an economic return on investment.

## United Kingdom

In Europe, much of the leadership in digital inclusion has come from the United Kingdom.

During the last decade, numerous research reports and economic analyses have been produced in the United Kingdom; recent reports suggest 20% of the adult population (10 million people) lack basic digital skills.

The UK Government leads the nation's digital inclusion agenda. The UK's initial focus was to get everyone connected to the internet, but this has been more recently broadened to a focus on basic digital skills for everyone, in order to concentrate efforts.

The UK Government published its Digital Inclusion Strategy in 2014 (GOV.UK, 2014). The Strategy set out ten actions to reduce digital exclusion. They were:

1. Make digital inclusion part of wider government policy, programmes and digital services
2. Establish a quality cross-government digital capability programme
3. Give all civil servants the digital capabilities to use and improve government services
4. Agree a common definition of digital skills and capabilities
5. Boost Go ON UK's Partnership Programme across the country
6. Improve and extend partnership working
7. Create a shared language for digital inclusion
8. Bring digital capability support into one place
9. Deliver a digital inclusion programme to support small and medium enterprises (SMEs) and voluntary, community and social enterprises (VCSEs)
10. Use data to measure performance and improve what we do.

This could provide a roadmap for New Zealand.

In January 2016, a new report on digital skills for the UK economy recognised a need to define digital skills for the workplace and the individual (ECORYS UK, 2016). The report suggested a need to further distinguish the skills required by ICT professionals. The classification was as follows:

- **Basic digital literacy skills for individuals:** skills needed, by every citizen, to carry out basic online functions such as communicating with others and searching for information.
- **Digital Skills for the workforce:** in addition to the above, workers should have the skills to use common digital applications such as word processing, spreadsheets and presentation software.
- **Digital Skills for ICT professionals:** in addition to the above, people wishing to pursue a career in ICT industries would require skills linked to new digital technologies, products and services. Examples might include computer coding skills, digital marketing and web design.

The OECD has adopted a similar framework.

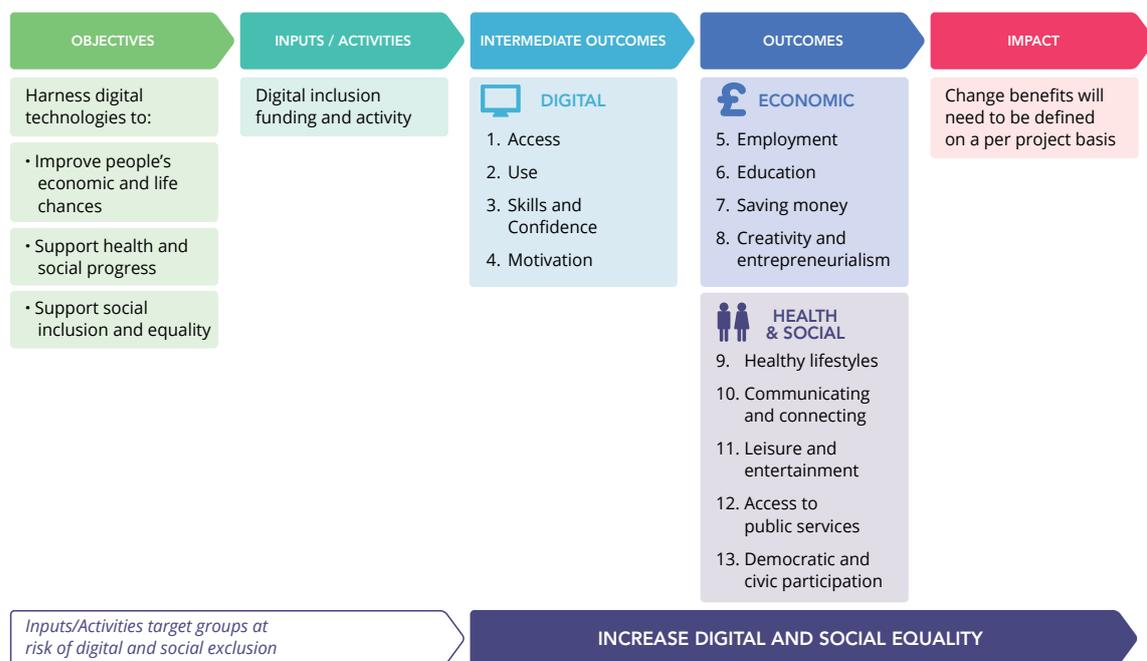
On 1 April 2016, Go ON UK merged with Doteveryone to further extend their programmes. The new organisation's first project was Digital MPs; this involved embedding digital mentors with a number of MPs for two months to explore how increased digital understanding could create a better democracy (Doteveryone, 2016). The UK's digital focus has evolved to be "one of the most digitally-skilled nations" (GOV.UK, 2016) and "the best place in the world to start and grow a digital business" (GOV.UK, 2017). A basic digital skills benchmark has been agreed, enabling regular reporting on areas and communities that are missing out. The UK Government's plan relies on ongoing partnerships with businesses, charities and voluntary organisations to ensure people have the right skills for jobs in their areas and are aware of digital training opportunities.

UK Government policies advocate public private partnerships, resulting in a large number of groups and agencies involved with digital inclusion initiatives across the UK. Because of this, there are large inconsistencies in measuring how progress is being evaluated, making it hard to compare and share learnings meaningfully or assess impacts on UK society. Despite nearly ten years of effort to address digital exclusion, recent reports suggest that there are still more than 10 million adults in England who lack basic digital skills (GOV.UK, 2016). The Digital Inclusion Outcomes Framework was designed specifically to address this challenge, by helping to evidence the wider economic, health and social benefits of digital inclusion (GDS, 2015).

There are three elements to the Framework

1. Outcomes - how digital technology improves people’s lives; the framework’s starting point is that getting people online and engaged in digital technology leads to improved outcomes in many aspects of people’s lives.
2. Indicators – ways of measuring whether an outcome is being achieved: progress towards each of the outcomes is tracked by a set of multiple, relevant indicators, which are specific, measurable ways of assessing whether a change is happening, or whether an outcome is being achieved.
3. Data - sources of evidence on whether change is happening: while there are many possible indicators for each outcome, the UK Government has identified a selection that are reliable, collected through national surveys and make clear links between outcomes and the use of digital technology.

This Digital Inclusion Outcomes Framework is reflected in the Digital Inclusion Benefits Roadmap, illustrated below:



Source: UK GDS Outcomes Framework, 2015

The digital inclusion benefits roadmap, and the resources developed to support this, help to align efforts in achieving an agreed outcome – “every individual and every business should have skills and confidence to make the most of digital technology and have easy access to high-quality internet wherever they live, work, travel or learn” (GOV.UK, 2017). While indicators are suggesting progress towards a more digital society, there is little reported evidence of widespread social and economic impact. The outcomes reported include:

- People gaining access to the internet
- People making regular use of the internet
- People gaining the skills and confidence to use the internet
- People motivated to use the internet
- Improving employment prospects
- Improving level of educational attainment
- Helping people to manage and save money

- Unlocking people's creativity and entrepreneurialism
- Supporting health and social progress
- Enabling people to communicate and connect with others
- Enabling people to pursue leisure and entertainment interests
- Making it easier to access public services online
- Supporting greater democratic and civic participation

All of these indicators report upward trends over the last eight years, except for three:

- Saving money (economic)
- Making life easier (motivation)
- Basic digital skills (skills)

At the end of 2015, the UK Government decided to reframe 'digital inclusion' to 'digital engagement', specifically to address one of the greatest barriers preventing digitally excluded people from going online: that of motivation. The new approach aims to encourage people with basic digital skills to 'engage' in supporting their family, friends, colleagues and customers to help everyone realise the benefits that the internet offers.

In 2014, the UK Government's Digital Service Team published a checklist for "doing digital inclusion" (GDS, 2014). It stated "if you do these things, you're doing digital inclusion".

- Start with user needs
- Improve access
- Motivate people
- Keep it safe
- Work with others
- Focus on wider outcomes (measure performance)

Improving 'access' typically involves access to affordable digital equipment and services, as well as access for people to relevant digital skills. It is helpful to separate the two elements of infrastructure and skills; many countries, including New Zealand, have addressed the infrastructure component with vigour and substantial investments. However, in other countries, it is hard to identify similar levels of investment in developing people's skills to make effective use of this digital infrastructure, especially for the groups who are at most risk of being digitally excluded.

Greater priority needs to be given to the 'motivation' dimension of digital inclusion. While 'access' is still a challenge for some communities, most surveys confirm that it is not one of the main reasons certain New Zealanders are not online.

## Start with User Needs

People living in digital economies face increasing pressure to 'move with the times' and use digital technologies for education, work and life. Initially, consumers have a choice about whether to engage digitally or to continue doing things the way they always have. But financial incentives are often applied either in the form of a discount to encourage online participation or as a financial penalty if traditional methods continue to be used. Goods can frequently be procured at a fraction of the normal retail price when shipped directly from an overseas factory, thereby avoiding wholesale and retail handling margins.

Consumers who are not online incur higher costs, whether they are posting a letter, purchasing goods or engaging with a government agency. In 2009, PricewaterhouseCoopers estimated the average annual cost to UK consumers of not being able to shop and pay bills online at £560 (PwC, 2009). In 2015, a new report for the Tinder Foundation and GO ON UK estimated productivity savings of £601 as well as direct cost savings each year of £143 per person (Cebr, 2015).

This suggests one motivating factor that can encourage users to go online – cost savings. This is closely linked to time savings and convenience for consumers.

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**Digitally disadvantaged groups, especially those in low income communities, are doubly disadvantaged as they are already facing financial challenges, and they are not in a position to benefit from the cost savings available online.**

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## Motivate people

In 2011, the Scottish Government published Scotland's Digital Future: A Strategy for Scotland (Scottish Government, 2011). The strategy focused on four key areas: public service delivery, digital economy, digital participation and broadband connectivity. While this seems to cover the same sort of areas as other national strategies, what stands out is the focus on people and a clear understanding of the challenges people face in 'going digital':

"The biggest challenge in encouraging people to go online is likely to be persuading them that it is worth their while to do so, and that the benefits to their quality of life will significantly outweigh the cost (either in time or money) of using digital technology."

The Scottish strategy suggested that people would be much more likely to engage online if they could see how technology directly related to their own interests, whether they were family history, sports information, online shopping or keeping in touch with distant friends and relatives. It was also suggested that people would respond positively if they were encouraged by people they already knew and trusted. So it would not be enough to just run national awareness campaigns; individuals and organisations would need to engage at the local community level to encourage the use of technology.

This has certainly been a factor in the 20/20 Trust's Computers in Homes programme, which is delivered by local partners through familiar community venues, such as schools, community centres and churches. Trusted trainers and technicians are recruited from within each community; the relationship between the trainer and the programme participants has been recognised as perhaps the most successful component of the programme.

### Computers in Homes



Computers in Homes provides digital skills training, technical support, computers and subsidised home internet to students' families in low-decile schools and, since 2004, to refugee families. Families receive 20 – 30 hours of free training, a refurbished computer or other digital device, 12 months' subsidised internet and technical support. Having a computer and the internet at home means students are not disadvantaged when it comes to doing homework or accessing learning resources.

The programme commenced in the year 2000 at Cannons Creek School in Porirua. Since then, it has supported over 17,500 families. Research shows that Computers in Homes has helped:

- increase students' educational attainment
- build valuable computer and online skills for students and their families
- get parents more involved in supporting their children's learning
- strengthen links and communication between families and schools
- give parents new confidence in learning
- family members find work

Source: (CIH, 2017)

In 2014, The Royal Society of Edinburgh published the results of its Digital Participation Survey, revealing that 24% of Scotland's 5.3 million population were still disconnected (RSE, 2014). The report raised concerns about a growing societal gap; in some areas 90% of households were connected to the internet but in other areas 50% were offline. But an even greater concern were the 30% of Scots who didn't have basic digital skills, a figure that increased to 50% of people with disabilities and 60% where the individual had no qualifications (McCulloch, 2014).

In Scotland, as in other parts of the UK, the Race Online 2012 team relied on local digital champions within organisations as part of its approach to encouraging digital participation.

In 2014, the Scottish Government followed up its 2011 strategy to expand on ideas for addressing digital participation (Scottish Government, 2014). Using a common promotional message of "Let's get on", the action plan addressed the following areas:

- Training and education – starting with the Basic Digital Skills framework
- Communities – starting with a desire to find information or content of a personal nature, and confidence to use digital tools for communicating with family and friends

- Work – helping businesses understand the importance of digital technologies and the possible threat that falling behind represented to their businesses, and encouraging businesses to support digital training for staff
- Homes – starting with social housing and tenants
- Connectivity – support for rural communities to develop their own broadband solutions
- Digital Public Services – respond to the UK Government “Digital by Default” strategy by providing training, assistance and support to people receiving government services, e.g. benefit payments

Another interesting development in the UK has been the concept of volunteer ‘digital champions’. People with digital skills are invited to volunteer as digital champions, receive some training and then support and inspire others to go online. OneDigital is a collaborative digital skills programme involving the use of digital champions, who offer to spend up to one day a week helping people in their community go online (One Digital, 2017). The programme is based around the assumption that empowering, supporting and inspiring trusted intermediaries to be Digital Champions is a highly effective and sustainable way of delivering digital skills. In 2016, One Digital received a £2 million grant from Big Lottery to support 9,500 people with basic digital skills training during the year. By the end of 2016, they had recruited, trained and supported more than 1,100 Digital Champions to engage over 11,000 people across the UK. The programme helped a cross-section of society, including those with disability and accessibility needs, young adults looking for work, over 65s, and those in community and voluntary organisations. The digital champions themselves received a benefit in terms of being able to add new digital skills and experience to their CVs, with 20% reporting they had gained employment after volunteering.

An evaluation of the One Digital programme in Scotland in 2016 concluded that the programme had been successful in creating strong peer support networks for digital skills development, but it recognised the need for ongoing support to make these successes sustainable (McGillivray, D., Jenkins, N., & Mamattah, S., 2016).

Some examples of digital inclusion initiatives addressing the motivation dimension of digital inclusion are:

- iPads for visually impaired people, using the features of digital devices to increase the size of fonts, and matching applications to the interests and needs of people with visual impairments
- We Visit, a social enterprise providing work opportunities for students and others to support older people
- Summer Learning Journey, an innovative initiative using online blogs to encourage students to continue reading and writing during school holiday periods

### iPads for Visually Impaired



This pilot programme in Dunedin was initiated by Otago Polytechnic School of Occupational Therapy graduate students and supported by VICTA (visual Impairment Charitable Trust Aotearoa). It was aimed at people who were not legally blind but had some degree of visual impairment. Approximately 168,000 New Zealanders have a visual impairment that cannot be corrected by glasses or contact lenses, but only 7% of New Zealanders with incurable vision loss are eligible for membership of, and support from, the Blind Foundation. The pilot programme involved one-on-one training support twice a week. Some of the benefits identified during the pilot were:

- Reduced social isolation
- Ability to communicate with family by email and Skype
- Ability to read small print in newspapers
- Use of iPad as a magnifier
- Maintaining independence
- Reduced costs of everyday banking transactions

Source: (VICTA, 2017)

## WeVisit



New Zealand has a long history of volunteering. Some technology companies encourage their staff to utilise their technical skills in volunteering, rather than engaging in the more manual tasks often associated with Volunteer Days. Christchurch social entrepreneur, Sam Johnson, has set up an innovative new service supporting elderly people in the community. Following his success in marshalling 11,000 Canterbury students (the student army) to assist with post-earthquake recovery work in Christchurch, Sam has created a new social enterprise called WeVisit. This involves young people supporting elderly people in their homes on a funded basis. This could involve helping with household chores like gardening or shopping or just companionship for people who are separated from their families. The families are usually happy to pay for this service, especially when they are living in another town and can only visit every now and again. Where families cannot afford the service, Sam is seeking corporate and philanthropic support. This service could extend to include digital skills support. This has the potential to bring individual digital support to some of the most digitally disadvantaged in our communities. The commercial element could also help to address the sustainability concerns that have emerged in the UK with similar schemes when there is a dependence on Lottery or other grant funding and volunteers.

Source: (WeVisit, 2017).

## Summer Learning Journey



During the summer holiday break in 2015/16 Rachel Williams, a teacher at the Woolf Fisher Centre at the University of Auckland, created a digital blogging programme for students at three Manaiaikalani cluster schools. The purpose of the programme was to provide students with an opportunity to practise their reading and writing over the holiday period. Research shows students often don't practise reading or writing over the summer holiday. To avoid the resultant 'summer slide' or 'slump' in learning, Rachel designed a fun and educational digital blogging programme called a Summer Learning Journey. The theme of the programme was travel and adventure. Students from Pt England, Tamaki Primary and Panmure Bridge schools logged onto the Summer Learning Journey site, learned about the people, customs and cultures in other countries, created learning outputs and then shared them on their blogs.

At the end of the summer holiday, Rachel evaluated the quality and accuracy of all of the posts and explored the impact that participating in the Summer Learning Journey programme had on the writing ability of the students. Not only did the students produce posts that had a high degree of fluency and accuracy (i.e. correct spelling, punctuation and grammar), they also reported significantly higher scores on their standardised (e-asTTle) writing tests in Term I of 2016.

Source: (Williams, 2017)

There are some good examples of programmes available to help people entering the workforce, or already in the workforce, upskill their digital capabilities. These programmes are often online and allow participants to engage at a time and place that suits them. Furthermore, they provide internationally benchmarked certification, so candidates who successfully complete the programme receive a certificate detailing the modules completed.

- KiwiSkills uses the internationally recognised ICDL platform to deliver and test practical digital application skills

## KiwiSkills



*KiwiSkills* provides free online digital skills training to help people get jobs. The programme uses the internationally recognised ICDL (International Computer Driving Licence) curriculum and online testing. This includes four basic ICDL modules covering key computer skills needed in today's workplace – computer essentials, online essentials, word processing and spreadsheets. Other modules are also available to cover specific skills.

4000 people participated in the programme during 2015 and 2016; a further 3500 people are expected to participate in 2017.

*KiwiSkills* is managed by the 20/20 Trust, as the New Zealand licensee for the ICDL programme, and funded for three years by the Lottery Grants Board. The programme is delivered through over 80 schools (for school leavers) and community-based training providers.

Source: (20/20 Trust, 2017b)

## Improve access

Overseas research suggests that access to broadband internet has been a priority investment for governments and infrastructure providers. New Zealand ranks amongst world leaders in terms of the 2016 World Economic Forum Network Readiness infrastructure and content rating (WEF, 2016). New Zealand was rated 6.8 – behind Australia, South Korea and the USA, which each scored 7.0, but ahead of Singapore (6.6) and the UK (6.3). However, despite the USA receiving such a high score, the Federal Communications Commission has reported that 10% of all Americans (34 million people) lacked access to an internet service that met the FCC standard in 2016 and 41% of schools, representing 47% of the nation's students, lacked the connectivity to meet the Commission's short-term goal of 100Mbps per 1,000 students/staff. By contrast in New Zealand, over 2,400 schools (96% of all schools) have now been connected to the Network for Learning (N4L) and schools with 1,000 students receive a 500Mbps service (N4L, 2016).

In the United Kingdom, 90% of all households and businesses had access to superfast broadband (defined as download speeds greater than 24Mbps) with a 27% take-up rate by April 2016 (Rathbone, 2016). In New Zealand, the Ministry of Business, Innovation and Employment reported Ultrafast Broadband (UFB) availability of 73.8% in urban areas in March 2017, with a 33.3% uptake. In rural New Zealand, there has been a 39.9% uptake of the Rural Broadband Initiative (RBI) (MBIE, 2016). The Government's target is for 97.8% of New Zealanders to have access to a faster broadband service by the end of 2019 under phase 1 of UFB and RBI.

Access to high speed internet infrastructure and services is one critical element of the 'access' dimension of digital inclusion. The other critical dimension of 'access' is affordability. While New Zealand compares favourably in terms of the roll-out of underlying digital infrastructure, the affordability score is much lower. In terms of affordability, the Network Readiness Index scores New Zealand with 4.6, well below Singapore 5.3, Australia 5.6, the United Kingdom 5.7, South Korea 5.8, and the USA 6.4 (WEF, 2016). While the reasons for this can be explained in terms of New Zealand's small and widespread population base, and geographic remoteness from the rest of the world, it nevertheless has serious implications for creating a digitally included nation, especially for low income communities.

At the start of 2017, retail internet packages in New Zealand ranged from around \$50 to \$150 per month, depending on the size of the data cap. For many low income families, this is beyond their means. Even the 20/20 Trust's subsidised internet connection package for Computers in Homes families - \$10 per week - is a challenge for many families; up to 15% of families default on their payments and face the risk of disconnection. Another 17% refuse to take a connection because of concerns about affordability (20/20 Trust, 2016a).

Examples of New Zealand initiatives addressing the 'access' challenge are:

- Spark Jump, a Spark Foundation initiative to bring affordable internet connectivity to low-income families with school-aged children.
- Mitimiti on the Grid, leveraging on the Government's Rural Broadband Initiative to connect a remote marae, and nearby homes and businesses.
- School Digital Community Hubs, leveraging on school broadband infrastructure to extend wireless internet connections to rural communities.

- Digital Wings, a corporate initiative to help low income communities to access free refurbished computer equipment.
- Tech Soup, a low-cost way for not-for-profit organisations to procure commercial software

## Spark Jump



Spark Jump is a new pre-pay internet service for families with school-aged children. The objective is to provide an affordable internet connection. The new service, subsidised by the Spark Foundation, was launched on 22 September 2016. Spark Jump differs from a standard monthly on-account services in various ways:

1. it is a pre-pay service, so families have control over their payments;
2. there are no set up costs, term contracts or monthly bills;
3. families are provided with a 4G wireless modem on loan; they are expected to return this if they stop using the service;
4. the service costs \$15 for a 30 GB data pack (which expires after 30 days, so it must be topped up monthly);
5. top ups can be made using Skinny vouchers (available at thousands of retailers), or using a debit or credit card;
6. it uses the 4G and 4G 700 wireless network; there is no need for copper or fibre infrastructure;
7. it can be set up in 10 minutes from any internet-connected computer.

Spark Jump is not a replacement for fixed line services (DSL or UFB) which offer 'on account' packages of around 100GB/ month (the average monthly usage in a New Zealand home) or unlimited data. But it is a great fit for families who cannot afford fixed monthly charges.

Public libraries that offer Stepping UP classes may also offer a Spark Jump class so families can go through the set-up process under the guidance of a tutor. The class also covers the basics of internet safety.

The first families to take up this service have been impressed the ease of the set up and the high connection speeds. One family reported a download speed of 38Mbps and an upload speed of 18Mbps, the sort of performance people can expect from a fibre connection.

Source: (Spark , 2017)

The Spark pre-pay approach, and the elimination of fixed-term contracts, could be a digital access game changer for New Zealanders on low incomes. Today, just under two-thirds of the six million mobile phones in New Zealand are pre-pay (Parker, 2016).

## Mitimiti on the Grid



Mitimiti is a rural community on the northern side of the Hokianga Harbour in the Far North. Until 2014, there appeared to be little interest from commercial internet providers in deploying services to this remote community "black spot".

Two events changed this. The first was the arrival of fibre to the local school in 2014. The second event was an agreement by TV3 that Matihetihe marae would be included in the 2015 television series "DIY Marae". The convergence of fibre, people, companies and sponsors, and a willingness by the community, meant that Mitimiti on the Grid became viable.

Mitimiti presented some technical challenges - its isolation, challenging terrain, frequent power outages and harsh coastal conditions. Technicians from various sponsors worked together to find and deploy robust technical solutions. They were also on hand to get Mitimiti "on the grid" by the "reveal" day in late February 2015.

Mitimiti on the Grid deploys fibre, cell phone coverage, internet and wifi as part of the Government's RBI (Rural Broadband Initiative). It features some important "firsts":

- first marae in the country to be included in the Government's RBI roll out

- first deployment of the 2km range femtocell, a localised cell phone coverage device. The cell phone signal can be accessed in any unobscured direction for up to 2 kms..
- first marae to pilot remote internet and wifi management with a view to building a remote management system for other marae in future

Matihetihe marae and the Mitimiti surrounding area now have fibre and fast speed internet, cell phone coverage, and wifi for the marae buildings, outside areas and the beach. Standard cell phone plans are offered and the wifi is free to all who are within the proximity of the marae.

Source: (Mitimiti, 2017)

## School Digital Community Hubs



For the people living in the village of Minginui in Te Uruwera, accessing affordable internet was difficult. Satellite services were available at \$150 per month - well beyond what most whanau in this low-income village could afford, let alone the large installation cost. The situation was similar in the neighbouring communities of Te Whaiti and Ngaputahi.

Ngati Whare was building a new native nursery and the Tauhara North Farming & Company Ltd Partnership had a new dairy farm. Both businesses needed internet access.

But the community had two local digital taonga - Chris Eketone, Chair of Board for Te Kura Toitu o Te Whaiti Nui a Toi and Principal, Jose Gage. Chris had been involved in an earlier – ultimately unsuccessful - internet project, Tuhoe on Line. The kura was scheduled to get an optical fibre connection as part of the Government's Rural Broadband Initiative (RBI); Chris and Jose started to explore how this opportunity could be extended to others in their community.

Chris made contact with WifiConnect Ltd, a small start-up internet service provider that had used a school's fibre connection to provide internet to households in Tolaga Bay on the East Coast. WifiConnect agreed to build a similar network in Minginui, with part funding from Te Runanga o Ngati Whare and Tauhara North Farming & Company Ltd Partnership.

Chris understood that success required the community to assist WifiConnect where possible, and identify a local person to offer ongoing technical support to whanau.

Building a WiFi network in Te Uruwera was more challenging than in Tolaga Bay. Five repeaters had to be built; three of them solar-powered. The build commenced with help from landowners and locals.

The service was launched in 2016 with households receiving an uncapped broadband connection for \$40 per month.

Source: (Lomax, 2017)

## Digital Wings



Wellington-based computer recycler, Remarkit, is establishing a charitable trust called Digital Wings to help disadvantaged communities get access to digital technologies. The programme works with large corporate businesses and government agencies to channel their 'retired' computer equipment through Remarkit's computer refurbishing process to extend the life of the equipment and make a proportion of the refurbished equipment available to community groups at no cost.

The programme commenced in 2012 working with Transpower, New Zealand's state-owned operator of the national electricity grid. The agreement between Transpower and Remarkit required that a proportion of the equipment be made available for community groups, and the remainder be used by Remarkit to on-sell or recycle. The profits from this equipment were then used to fund the community donation programme.

During the last five years, hundreds of computers have been distributed to a wide variety of community organisations, valued at over \$150,000. One recipient was Te Manu Toroa Mental

Health Services in Tauranga. Te Manu Toroa youth gained their own space to access the online support programme: Beating the Blues. The six computers donated by Transpower were used to establish a computer hub to offer a number of programmes:

- Computer-based training programmes to help youth deal with low mood and depression;
- Homework initiatives, encouraging persistence with education;
- Group music therapy, including compiling and recording music;
- Logo design by a Brazilian Jiu-jitsu group
- Development of CVs to create employment opportunities
- Creation of safe social media campaigns and workshops

The new Digital Wings trust is set to fly and build relationships with other corporate organisations to create an ongoing and sustainable supply of refurbished equipment for communities. Digital Wings will also be directing recipient communities to free education packages and seek corporate sponsorship for effective career direction programmes.

Source: (Remarkit Solutions LTD, 2017)

## TechSoup



TechSoup New Zealand provides donated & discounted technology, plus resources & training for New Zealand not-for-profit organisations. TechSoup includes technology donation & discount programmes of companies such as Microsoft, Symantec, SAP and many more; the programme is managed by Connecting Up, Inc.

TechSoup's vision for New Zealand is to "connect the charitable sector to the right tools and capabilities they need to fulfil their mission". This service removes one of the major barriers encountered by not-for-profits – the cost of software to run their activities.

Source: (TechSoup, 2017)

## Build skills and confidence

New Zealand scores 6.2 on the Network Readiness Index for skills. This compares favourably with South Korea at 5.6, the USA and the UK both at 5.8, Australia at 6.0 and Singapore at 6.5. But while this index is useful for international comparisons, it is not helpful in understanding the digital skill gap within countries and which particular groups or communities might need additional support.

The UK has led the way in tackling the digital skills divide. The Government Digital Inclusion Strategy published in 2014 recognised that *"being able to go online does not mean that people have the basic digital capability to use the internet to do things that benefit them day to day"* (GDS, 2014). According to a BBC Media Literacy study in 2013, 21% of people couldn't use the web - 14% of people didn't have internet access at all, so that meant 7% did have internet access but didn't use it in ways that benefitted them day to day (Ipsos MORI, 2013). In New Zealand, we have discovered a similar situation. In 2016, 65% of the 2500 people attending a Stepping UP digital literacy class had a broadband internet connection at home (20/20 Trust, 2016a). While some people were seeking to upskill in their current job or work towards a new job, over 80% attended simply for general up-skilling. Around 72% of participants were women and 67% were aged over 50. The high percentage of women attending seems to suggest a digital divide within households, where some members have digital skills but others miss out.

In 2015, the UK adopted a new definition for digital capability, including five competencies: Managing Information; Communicating; Transacting; Problem-solving; and, Creating (Ipsos MORI, 2015). This is referred to as Basic Digital Skills. This new definition provides a richer understanding of the multiple competencies required to be able to participate and engage in a digital world; it goes much further than simply counting the number of people who have used the internet. Not surprisingly, the 2015 Ipsos MORI research reported a higher percentage of people (23% or 12.6 million adults) below the Basic Digital Skills benchmark. The research also showed an increasing number of people aged over 45 without digital skills, with the 65+ age group showing the lowest level of ability across all skill dimensions (57% below the benchmark). A similar trend was evident when tracking digital skills against income levels. Only 69% of people in the lowest income bracket (under £10,000) achieved the Basic Digital Skills benchmark

compared to 96% of those earning over £75,000. The research revealed a smaller gender divide with 80% males achieving the benchmark compared to 74% females.

Singapore is the only country that we have reviewed to score higher than New Zealand in the skills component of the 2016 Network Readiness Index. So it is interesting to understand what specific initiatives and programmes have led to this result.

Singaporean Prime Minister Lee Hsien Loong launched *Smart Nation* in 2014 (Smart Nation, 2017). The Government aimed to “put in place the necessary infrastructure and policies to build capabilities and a supportive ecosystem, so that people and companies can take full advantage of the digital revolution”. In 2016, Singapore was ranked No 1 in the world on the Network Readiness Index.

Singapore’s talent strategy is a critical dimension with initiatives including all age-groups from pre-schoolers to seniors. In September 2015, the Infocomm Development Authority (IDA) launched the Playmaker curriculum for pre-schoolers. It helps children to be comfortable creating with technology, and to have fun experimenting and solving problems together (IDA, 2015). In 2014, the Code@SG movement was launched, to teach coding and computational thinking in a fun way to all primary and secondary students (IMDA, 2017). In April 2016, Yaacob Ibrahim, Minister for Communications and Information, announced a S\$120 million investment to support training for current and future technology professionals (CNA, 2016). Since 2001, the Agency for Science, Technology and Research (A\*STAR) has provided 1400 scholarships and fellowships from undergraduate to post-doctoral levels, “helping to attract a steady flow of capable and committed early-career talent to public research institutes, industry and universities” (May, 2016). Singapore also recognises the contribution that seniors can make both in the workforce and later in life. They refer to their older people as “silver talent” and the Government has programmes to help with digital up-skilling (IMDA, 2016).

Starting in January 2016, the Singapore Government offered a S\$500 Skills Future credit to every Singaporean aged over 25 to contribute towards the cost of approved upskilling courses (Skillsfuture, 2017). One year later, over 126,000 people had used some or all of their credit to up-skill or re-skill. The number of approved training courses had also risen from 10,000 in January 2016 to over 18,000 by December 2016. The most popular area of training across all age groups was Information and Communications Technology (ICT). Younger Singaporeans enrolled in courses on emerging ICT skills such as data analytics, while older people sought to acquire basic digital skills.

One of the programmes that has received special attention and support from Singapore skills development agencies is the International Computer Driving Licence (ICDL). In 2013, an evaluation of ICDL Digital Literacy Training by the Institute for Adult Learning concluded that the training did produce a significant increase in trainees’ level of computer application specific competence. There were indications of direct time savings, estimated at 26 minutes a week, equivalent to S\$400 per year (IAL, 2013).

Similar productivity research carried out by KnowledgeWeaversNZ in 2010 for the New Zealand Computer Society concluded that if New Zealanders were more confident in using ICT, they could save as much as 38 minutes a day in time saved, with an estimated Return on Investment of 162% (Bunker, 2010).

What is particularly interesting about Singapore is that despite being ranked as the No 1 technology nation in the world, the Government continues to invest heavily in digital infrastructure and skills. In 2016, the Government allocated S\$19 billion to support Singapore’s R&D efforts over the next five years, with the Digital Economy as a priority area (Lim, 2016). While it is difficult to assess the direct impact of this ongoing investment in the Singapore economy, Singapore’s growth in GDP per capita has increased by a factor of nearly four (3.85) since the start of the digital age in 1990, compared to New Zealand’s increase of 2.53 (World Bank, 2015). In 2015, Singapore had a per capita GDP of \$85,382<sup>2</sup>, the highest amongst OECD countries, compared to New Zealand’s \$37,576.

Driving Singapore’s digital skill programmes is research from Canvas Asia that reported only 9.5% of current and former students in Singapore are equipped with the skills needed for their workplace (Shukla, 2016). Only 7% reported that they were provided with career-relevant experience at the tertiary level. This suggests that Singapore is not being complacent about its apparent global success as measured by the Network Readiness Index and the World Bank’s comparative GDP data. Instead, it has an eye to the future and sees value in constant change in terms of work skills preparedness for the digital economy.

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2 This World Bank data is reported as purchasing power parity (PPP) international dollars, which seeks to provide more meaningful comparative data. An international dollar can buy a comparable amount of goods and services in a country that a US dollar can buy in the United States.

The gap between perception and reality was also highlighted in European research by the ECDL Foundation. Five ECDL<sup>3</sup> National Operators carried out digital literacy studies in their countries: Austria, Denmark, Finland, Germany and Switzerland (ECDL Foundation, 2016). The studies consisted of two key parts: self-assessment and practical assessment of digital skills. The findings revealed that people tend to over-estimate their skills and that significant skill gaps exist even in the analysed countries, which are usually considered to be digitally advanced. Moreover, young people have digital skills gaps that are as wide as in the rest of society. In the study, 94% of participants described their skills as “average” to “very good”, but only 39% of them achieved a corresponding test result in the practical test.

Australia scored just below New Zealand (6.0 compared to 6.2) for digital skills in the Network Readiness Index. In 2012, Australia’s Department of Industry published a National Foundation Skills Strategy for Adults (SCOTSE, 2012). The report pointed out that “7.5 million Australian adults do not have the literacy and numeracy skills needed to participate fully in today’s workforce”. The report defined Foundation Skills, which included “employability skills, such as collaboration, problem solving, self-management, learning and information and communication technology (ICT) skills required for participation in modern workplaces and contemporary life”.

In 2013, the Federal Government published an update of its 2011 National Digital Economy Strategy – Advancing Australia as a Digital Economy (Australian Government, 2013). The strategy recognised that “ICT and the skills to exploit them are fundamental to the growth and competitiveness of the economy” and proposed three specific strategies:

- Complete development of the Australian curriculum: Technologies
- Work with the ICT industry to fund and develop programs that cultivate student interest in ICT and digital technologies
- Establish an ICT industry working group to promote and broaden the attractiveness of ICT as a career of choice

There is no denying the need for strategies to encourage young people into ICT careers; New Zealand has a similar interest. But no attempt appears to have been made in Australia to further develop the need for digital literacy skills as originally signalled in the Foundation Skills strategy. Furthermore, in terms of developing the people and skills dimension of a digital economy this appears to fall well short of efforts in other countries such as the UK and Singapore.

It is not surprising that a year later, calls were still being made for government interventions to support Australian householders and businesses increase their levels of digital literacy so that they could operate effectively in a digital economy and society (Mason, 2014). The concern expressed was that it was not enough for people to just have the skills to do things online, they also needed to understand the benefits of being online. Practical steps suggested included a national digital awareness campaign as well as education and training programmes to build digital capability.

In March 2015, the Go Digi national digital literacy programme was launched in Canberra by Infoxchange in partnership with Australia Post (Go Digi, 2017). Go Digi is a four year digital literacy programme that aims to support more than 300,000 Australians improve their digital skills. “The major barrier restricting people from getting online is confidence, which is why Go Digi is focussed on building skills through face-to-face learning, community mentoring and leveraging network partners already established within their communities.”

Go Digi has developed a digital inclusion map to help people find training opportunities in their communities as well as a mentoring programme similar to the UK digital champions. Go Digi declared 2016 the National Year of Digital Inclusion to raise awareness of the importance of digital inclusion and build momentum for the Go Digi programme. No results appear to have been published yet about how successful the year was.

Like Australia, New Zealand is also planning to boost the place of digital technologies in the school curriculum from 2018 with a view to encouraging more students into ICT careers (Parata, 2016). A working group, jointly convened by the NZ Qualifications Authority (NZQA) and the IT Professionals New Zealand (ITP) has also developed a new framework for computer qualifications (NZQA, 2015). In April 2015, 14 new qualifications were approved. While most of these are directed at people wishing to pursue a career in the IT industry, the entry level qualification – NZ Certificate in Computing (User Fundamentals) – has similarities with the UK digital skills framework for the workplace.

New Zealand also participates in the Programme for the International Assessment of Adult Competencies (PIAAC).

3 ECDL: European Computer Driving Licence

This involves a survey of at least 5000 adults aged 16-65 in each participating country. The latest survey was carried out in New Zealand from 1 April 2014 to 31 March 2015 and, for the first time, an assessment of skills for information processing in technology-rich environments was included. This was an attempt by the OECD to recognise the global shift into digital environments and the need for different skill-sets than those traditionally monitored in literacy and numeracy surveys. The survey is recognised as the most comprehensive international survey of adult skills that has ever been undertaken. Of the 34 countries in the survey, New Zealand had the largest percentage of adults who were proficient at Level 2 and 3<sup>4</sup> (42% compared to an OECD average of 25%). While this measure lacks the specificity needed to assess proficiency for education, the workplace or for digital citizens, it does provide valuable international comparison. Furthermore, the assessment tool is available online for countries or individual communities to self-assess on an ongoing basis (OECD, 2017).

The OECD has also published a useful guide on skills for a digital world (OECD, 2016).

Some examples of New Zealand digital inclusion initiatives addressing the skills dimension:

- Secure online learning, allowing online access for prisoners to selected (white-listed) educational websites
- Stepping UP, short (2-hour) tutor-led digital skills classes, normally held in public libraries
- SeniorNet, a nationwide network of digital learning centres, supported by voluntary tutors
- Code Club Aotearoa, leading the way in providing opportunities for school students to develop coding skills
- Digital Journey, an online tool that aims to help New Zealand business owners and employers self-assess their organisation's use of digital technologies and provide suggestions about useful online resources for improving business performance.

## Secure Online Learning



In 2015, the Minister of Corrections launched the Secure Online Learning for Prisoners Project at Rimutaka Prison near Wellington. The project allows carefully selected prisoners to have restricted access to 12 educational websites. The computers use a secure IT solution that means prisoners cannot navigate away from the pre-approved websites, and cannot use email or contact other internet users in any way. The 12 approved websites include those that improve literacy, numeracy and digital skills, Te Reo Māori, drivers' licence theory, careers guidance and job search skills. The ICDL programme that uses online training materials and testing is being used for digital skills.

One of the priorities set for the Department is 'better use of technology.' Benefits have been identified as:

- It gives prisoners secure access to quality, nationally available websites.
- Prisoners can easily continue their study when they leave prison.
- The interactive aspect appeals to younger prisoners and encourages them to engage in education (this group can be hard to engage in traditional classroom learning methods).
- Many employers now expect employees to have basic IT skills, so it helps to give prisoners digital literacy skills that will give them a better chance of getting a job after release.
- Online education is a more efficient way of facilitating learning, which allows tutors more time to spend helping students.
- Secure Online Learning gives prisoners greater access to industry recognised education options, leading to a greater range of accreditations, which in turn increases their job prospects and reduces the likelihood of re-offending.
- Improving the literacy and numeracy of offenders increases their chances of completing qualifications. This improves their prospects of finding and keeping jobs, while reducing the likelihood of re-offending.

Source: (Corrections NZ, 2015)

4 PIAAC Survey proficiency in problem solving in technology-rich environments. Level 2 and 3 tasks typically require the use of both generic and more specific technology applications (OECD, 2016).

## Stepping UP



Stepping UP provides free, community-based computer and internet training for adults. The programme modules (called digital steps) focus on practical ways in which digital tools can be used by people to enhance their lives. Each digital step is designed to be completed in two hours.

Over 40 libraries and 15 community centres offer the programme to their communities; in 2016, a total of 3741 digital steps were completed. Participants register for the modules of greatest interest and then join a small group training class with typically 6-8 people, led by a digitally-skilled librarian or an externally funded tutor.

Over 30 different modules are available. Computer basics has consistently been the most popular; this helps people to understand what a computer can do, explains commonly used computer terms and provides basic navigation skills. Other popular classes have been word processing (text formatting and editing documents), Google and the internet, managing digital photos and setting up and managing email accounts.

Source: (Stepping UP, 2017)

## SeniorNet



SeniorNet was first established in Wellington in 1992 and since then has been bringing older adults and technology together in a friendly, fun and stress-free way. The concept of SeniorNet emerged in the USA from a research project at the University of San Francisco. The project's aim was to determine if computers and telecommunications could enhance the lives of older adults. Small, well organised classes, with volunteer tutors, about the same age as their students, run the courses.

SeniorNet is open to anyone over the age of 50 who'd like to learn more about technology and what it can do for them, although most New Zealand members are over 65. There are currently 80 learning centres and around 70,000 members in New Zealand; it is estimated that some 250,000 – 300,000 have participated in SeniorNet during the last 25 years.

In 2016, Westpac supported internet banking courses for 5800 SeniorNet members.

Source: (SeniorNet, 2017)

## Code Club Aotearoa



Code Club Aotearoa is a nationwide network of 256 volunteer led after-school coding clubs for kiwi kids. Code Club's mission is to give every 9-12 year old the chance to learn to code. Children are encouraged to combine their imaginations with an understanding of programming.

Code Club connects volunteers with schools. The organisation creates projects for volunteers to teach at club sessions. The projects teach students how to program by showing them how to make computer games, animations and websites. Volunteers go to a community venue, such as a school or library, for an hour a week.

Each term, students progress and learn. Terms 1 & 2 use Scratch to teach the basics of programming. Term 3 teaches the basics of web development using HTML and CSS. Term 4 teaches Python. Further resources are being developed so that children will be able to build their own Internet of Things projects.

Source: (Code Club, 2017)

## Digital Journey



Digital Journey is a social enterprise that delivers digital projects and initiatives to support the goal of creating an environment where everyone has the opportunity to use, understand and benefit from digital services.

Online assessment tools have been developed for businesses, individuals and local government as well as digital resources with how-to-guides and tips on how to make the most of online technology and services.

The interactive online assessments help users determine their current use of online technology, and build a custom action plan. The action plan provides recommendations for improving their online presence as well as advice on the advantages and opportunities that digital technologies offer.

The assessment is divided into four sections, which can be completed individually. For businesses, these sections are Tools, Website, People and Marketing. Once all four sections are complete, the personalised action plan becomes available.

Source: (Digital Journey, 2017)

## Keep it safe

A recent report by Norton reveals that despite the growing threat and awareness of cyber-crime, consumers remain complacent about protecting their personal information (Norton, 2017). The report claims that 76% of consumers know they must actively protect their information online, but they still share passwords and engage in other risky online behaviours, such as entering financial information online when connected to public Wi-Fi networks. In the Norton survey, 51% of consumers believed it was becoming harder to stay safe and secure online than in the real world and 48% of parents believed their children were more likely to be bullied online than on a playground.

In a recent report, Netsafe in New Zealand highlighted the need for parents to understand the relationship between risk and harm (Netsafe, 2016). Netsafe points out that exposure to risk does not necessarily lead to harm and while there may be good reasons to reduce risk (e.g. by restricting access to devices or online environments), there are also good reasons not to reduce access, as this restricts children's online opportunities to grow and learn. Netsafe promotes the concept of digital citizenship where children are taught safe and responsible behaviours, and encouraged to alert their parents or another adult whenever they encounter anything (or anyone) that seems dodgy.

Ongoing research amongst Computers in Homes families carried out by the 20/20 Trust supports the findings from other countries (20/20 Trust, 2016a). Concerns about online safety were not raised by a single participant either at the time of signing up to the internet or at any time during the first 12 months. This contrasted with other concerns, the most significant of which was affordability.

However, this could be expected to change over time. Only 20% of the families surveyed in the Pennsylvania study felt their children knew more about digital technologies than they did, and consequently most parents were confident that they could manage their child's technology use. The families surveyed by the 20/20 Trust were all relatively new users and had not yet faced any cyber-safety challenges. The research by Norton also recognises the gap between people knowing what they should do in terms of cyber-safety and what they actually do.

An example of a New Zealand digital inclusion initiative addressing 'trust' is NetSafe.

## NetSafe



In 2016, NetSafe was appointed as the approved agency under the Harmful Digital Communications Act to manage and assist internet users with cases of online harassment. There are more and more reports about New Zealanders being affected by online theft and fraud, scams, malware, hacking and other mobile, computer and internet attacks. The techniques used to do this are increasingly sophisticated. Despite this, New Zealanders have often not have taken the most basic steps to protect themselves online, nor do they know how to respond to harmful digital communications.

Netsafe's role is to:

- advise people on steps they can take to resolve a problem;
- investigate complaints where harm has been caused and attempt to reach settlements between the complainant and the person responsible;
- liaise with website hosts, ISPs and other internet intermediaries (both here and overseas) and request them to takedown or moderate posts that are clearly offensive; and
- inform people about their legal options and the possible outcome if they wish to proceed to the district court.
- provide education and advice on online safety and conduct.

Source: (Netsafe, 2016)

## Work with others

A strong message that consistently appears in digital inclusion strategies and initiatives around the world is the need for a whole of community collaborative approach, especially when it comes to the people dimension.

In the UK, all the major digital inclusion initiatives during the last decade have been led by NGOs, with the support of central and local governments, corporate businesses and philanthropists. Government support has been provided to help with the development of plans and strategies but much of the cost of delivering digital inclusion programmes has come from major UK corporates and philanthropic organisations.

In October 2016, the UK Government announced that it would be offering basic digital skills training “free of charge to adults in England who need it” (GOV.UK, 2016). While the new policy was welcomed, as groups like Doteveryone and its predecessors had been campaigning for years for a universal basic digital skills programme, some felt that “the proof of the pudding will be in its implementation” (Neaman, 2016). Neaman pointed out that there is no shortcut to getting people online; there is no ‘one-size-fits all’ way of doing it. A range of approaches tailored to the individual learner and their circumstances would be required.

Libraries in the UK and New Zealand are playing an important role in addressing digital inclusion challenges in their communities. In the UK, the Tinder Foundation has supported thousands of libraries every year to help people in their communities develop the digital skills (Tinder, 2016). In September 2014, the Tinder Foundation established a £100,000 fund for libraries to help them engage hard-to-reach library users who were socially and digitally excluded, and to deliver basic digital skills training. The average cost per head to deliver the programme was £40 but this ranged from £25 for group sessions in libraries to £125 per head for one-on-one training in outreach locations. The return on investment was calculated at £492 per person, based on cost savings in moving services online. If similar programmes were extended across all 151 library services in England, over £7.5 million in cost savings could be achieved.

The UK library digital skills programme has a number of similarities with the New Zealand Stepping UP programme, developed by the 20/20 Trust in 2009 (20/20 Trust, 2017c)

## Focus on wider outcomes (including economic impacts)

There have been numerous studies attempting to quantify the economic benefits of ‘going digital’.

The 2009 PricewaterhouseCoopers study in the UK estimated the economic benefits of digital inclusion at £22.5B. These benefits came from home access to the internet for children, improved ICT skills for the employed, improved access to employment for the unemployed, government efficiencies and online shopping.

A 2012 report by Booz & Company took a broader view of the opportunities for the UK in achieving global leadership in digitisation; they estimated the impact on the annual 2011 GDP would have been £63 billion (Strategy&, 2012).

In 2013 a report commissioned by the Tinder Foundation and Go ON UK estimated the cost of equipping 100% of the UK adult population with basic digital skills at £875 million (McDonald, 2014). At the time 78% of the adult population were already online and it was projected that, based on trends at the time, up to 89% would be online by the year 2020 without needing any additional support from Government. However the remaining 11%, representing some 6.2 million people, would need additional support to get online by the year 2020.

In 2014, a report for the BT Get IT Together project estimated an annual value to individuals of digital inclusion, depending on the category of user (Lawlor, 2014). For new users, the value was estimated at £1,064 per annum, resulting from more confidence, financial savings online, less boredom, opportunities to pursue hobbies, new jobseeking skills, and a reduction in social isolation. The value for advanced users, i.e. those who are online, but who are not using their digital skills in their job, was estimated at £1,756. The value for professional users who already use IT at work, but could benefit from up-skilling was estimated at £3,568.

In 2015, a report by the Centre for Economics and Business Research (CEBR) carried out a further study on the costs and associated benefits of equipping 100% of the UK population with Basic Digital Skills (Cebr, 2015). The underlying assumption was based on the 2013 Ipsos MORI report that had estimated 23% of the UK population (12.6 million people) lacked at least one Basic Digital Skill (Ipsos MORI, 2013). Taking into account the people who will naturally acquire digital skills in the course of their everyday working lives, CEBR projected that 7.9 million people will still remain without digital skills by the year 2025. CEBR estimated the annual benefits to the UK economy by 2025 as:

- A rise in earnings of between 3% and 10% (£358 million for individuals and £243 million for the government in terms of higher income tax and national insurance receipts);
- Reduced unemployment (£204 million in net earnings for individuals and £79 million savings for government in the form of reduced costs for Jobseekers Allowance and increased tax income and national insurance receipts);
- Retail transaction benefits saving individuals an average of 13% by shopping online (£796 million)
- Communication benefits resulting in 14% more frequent communications with community, family and friends, resulting in increased expenditure on recreation and cultural activities (£415 million)
- Time savings - accessing government services and conducting banking transactions online can save an average of 30 minutes per transaction (£1.5 billion)
- National Health Service cost savings as a result of fewer visits to the doctor – evidence suggests around one third of the people with Basic Digital Skills make fewer visits to their GP (£121 million)

Over a 10-year timeframe the Net Present Value of these benefits was calculated at £14.3 billion.

A 2010 report in the USA investigated the economic impact of digital exclusion (Digital Impact, 2010). At the time 100 million Americans in 40 million households did not have access to broadband internet, either because they couldn't access it, couldn't afford it, didn't know how to use it, or were not aware of its benefits. The cost to the US economy, assessed over 11 economic impact categories such as health care, education, energy, transportation as well as personal benefits, was estimated at US\$55 billion per year.

Research by the Council of Economic Advisers in the USA in March 2016 concluded that broadband provides numerous socio-economic benefits to communities and households, including improving labour market outcomes, increasing economic growth, providing access to better health care and enhancing civic participation (CoEA, 2016). The report focused in particular on employment benefits citing online job searching as an example; unemployed workers in households with access to the internet were 4% more likely to be employed one month in the future than those in households without the internet.

A 2016 World Bank report "Digital Dividends" examined the potential global and national rewards from modern digital technologies for economic development (World Bank, 2016). These digital dividends come in the form of "faster growth, more jobs, and better services". Greater inclusion means "people get access to services that previously were out of reach". Inequality is one of a number of new risks that could erode attainment of so-called digital dividends. The report highlights the huge digital inclusion challenge facing some nations such as the USA - "more than 120 million people are still offline in North America". It also notes the difficulties in adequately representing the value of the internet in traditional economic measures such as GDP.

“Countries compute GDP based on activities measured in monetary terms and exclude activities that do not generate monetary transactions. But many online activities generate substantial benefits for the individual, such as time saved, consumer convenience, expanded choice, better quality leisure time, and access to more knowledge. These benefits can be understood as the consumer surplus: the difference between the price individuals are willing to pay and the actual price for the product or service, which is often free on the internet.”

A 2014 report produced by the Sapere Research Group in New Zealand concluded that firms that make more extensive use of internet services are 6% more productive than average firms in their industry (Sapere, 2014). They explained that this meant these firms were four years ahead of the average in their industry in terms of business competitiveness. The benefits identified through use of the internet included:

- Direct cost savings from a replacement process, e.g. online bookings, online document storage
- Savings from a more efficient use of resources, e.g. professional staff doing their own typing and emailing
- New business opportunities, e.g. retailers without physical stores
- Change in the nature of costs, e.g. use of cloud infrastructure instead of internal servers

In many policy debates there is no agreed framework. This means there is a lack of a ready-made solution for estimating the size of the problem, which produces disputes over the strength of the impacts. This would certainly seem to apply in the case of digital inclusion in New Zealand. While there are overseas studies on the economic impacts of digital inclusion, there is nothing similar in New Zealand.

In the absence of New Zealand specific data, the size of the problem has been inferred from overseas data (through benefit transfer<sup>5</sup>). The following table summarises the overseas studies and the evidence that has been produced.

Study date	Name	Average savings per year	Total
2009	PriceWaterhouseCoopers	£560 per person	£22.5 Billion
2010	Digital Impact		\$US 55 Billion
2012	Booz & Company		£63.0 Billion
2013	Tinder Foundation		Cost of equipping 100% of adults with basic skills: £875 million
2014	BT Get it together	New users £1,064 Advanced users: £1,756, professionals: £3,568	
2015	CEBR	Various benefits associated with reduced unemployment, income rises, national health service costs etc,	10 year net present value of £14.3
2016	Council of Economic Advisors		Numerous socio – economic benefits. Those unemployed who had access were likely to have a 4% better chance of employment relative to those who lacked internet access

To illustrate the likely impact for New Zealand, the direct benefit estimates put forward by PwC in 2009 have been used (PwC, 2009). The British Telecom study is also included to show the potentially large impact on individuals (Lawlor, 2014). This suggests that the total value to New Zealand of total digital inclusion is around \$NZ 1.5 billion per annum for households. If you made a further assumption that 10% of the households/population are currently not connected or lack the motivation to be connected, then the cost to New Zealand is at least \$NZ 150 million per annum.

5 Benefit transfer is the application of monetary values obtained from a particular nonmarket goods analysis to an alternative or secondary policy decision setting (Brookshire, DS & HR Neill, 1992).

Study	Estimated impact in study area	Implication for New Zealand per person	Implication for New Zealand (Total)
2009 PwC	£560	\$NZ 974 <sup>1</sup>	\$NZ 1.53 Billion <sup>2,3</sup>
2014 BT	New users £1,064, Advanced users: £1,756 Professionals: £3,568	New users \$NZ 1,851 Advanced users: \$NZ 3,055 Professionals: \$NZ 6,082	NA

Notes:

- (1) £1 = NZ \$ 1.74
- (2) The number of households in New Zealand is approximately 1,570,693.
- (3) These are based on direct benefits only.

It must be stressed that there are limitations in the analysis due to the information available. These calculations assume:

- That the assumptions in the original studies stand
- That taking them away from their original context is legitimate.

The robustness of the analysis is influenced by the potential bias in the information provided in these studies. The figures should be regarded as an order of magnitude calculation rather than a definitive measure and the analysis can use improved information if it becomes available i.e. if New Zealand specific studies were commissioned.



## A Digital Economy

The need for enhancing the nation's digital skills in New Zealand has been signalled for over 20 years. Wellington City Council recognised this in 1996 and at the same time as it established CityLink to start installing optical fibre cabling, it established the 20/20 Communications Trust to address the digital capability of its citizens (Zwimpfer, 2010). In the mid 1990's, the Minister for Communications established an Information Technology Advisory Group (ITAG) with business and technology leaders. The Group published two reports calling for digital upskilling for New Zealand to progress towards what was then referred to as a "knowledge society"<sup>6</sup> (Butler, 1996), (Butler,G., and Zwimpfer, L, 1997).

The next decade saw a flurry of reports and strategies, all aimed at addressing the emerging digital economy. This included a number of reports specifically addressing challenges in schools and tertiary institutions, as well as in communities and business:

- Interactive Education: An ICT Strategy for Schools (1998)
- Digital Horizons: Learning Through ICT (2002)
- Connecting Communities (2002)
- Highways and Pathways: Exploring New Zealand's E-Learning Opportunities (2002)
- Breaking through the Barriers: ICT Taskforce (2002)
- Community ICT Research Project (2003)
- Taking the Next Step: The Interim Tertiary e-Learning Framework (2004)
- The Digital Strategy: Creating our Digital Future (2005)
- The Digital Strategy: Report on Progress (2007)
- The Digital Strategy 2.0 (2008)

In 2014, Dr Jocelyn Williams from Unitec published an essay *New Zealand Online: What's happened to our Digital Strategy?* (Williams, J., 2014). Williams pointed out that despite all the strategies of the last two decades, digital inclusion remains an issue for New Zealand, especially for school-aged children in poorer communities.

In 2015, Hon Steven Joyce announced the establishment of a digital economy work programme (MBIE, 2015) to:

*"support the development of the ICT sector and the use of digital technologies to drive productivity growth in businesses both small and large, and create valuable new economic opportunities for all New Zealanders."*

The Digital Economy Work Programme has eight interconnected areas, as outlined in the *Building a Digital Nation Action Plan* (MBIE, 2017):

- Digital sector
- Digital business
- Digital New Zealanders
- Digital government
- Digital skills
- Connectivity
- Privacy and security
- Regulation

The Digital New Zealanders workstream aims to ensure that people are confident and able to function safely in the

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**Williams pointed out that despite all the strategies of the last two decades, digital inclusion remains an issue for New Zealand, especially for school-aged children in poorer communities.**

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<sup>6</sup> Knowledge society: this was defined as one where the workforce is largely composed of a wide variety of "knowledge" workers, i.e. workers using their minds and IT tools to convert information into useful products and services. Today, this is simply referred to as the digital economy.

global digital world and can access the social, cultural, and economic benefits of being a Digital New Zealander. Examples of initiatives that contribute on this outcome are:

- **Rural Broadband Initiative (RBI) phase two and the Mobile Black Spots Fund (MBSF):** The Government is investing \$100 million in phase two of the RBI and is also establishing a Mobile Black Spot Fund, with a \$50 million budget, to increase mobile service coverage targeting State Highways and key tourist destinations where no operator currently provides coverage.
- **Video Interpreting Service:** the government's Video Interpreting Service helps reduce communication barriers for Deaf people making it easier for them to interact with their friends and family and take part in parent teacher interviews, medical appointments, and meetings with businesses and government agencies.
- **Ka Hao Māori Digital Technology Development Fund:** a \$30m fund to support Māori economic development, language and culture through ICT. The objective is to grow the number of Māori in high-value jobs by improving and promoting pathways for Māori to enter the digital technologies sector, and by supporting the development of skills necessary to participate in sectors deploying digital technologies.
- **RealMe:** RealMe is a voluntary, consent-based identity and login service that enables services to be offered securely online. There are currently 84 services across 33 organisations using RealMe as their login, and ten services across seven organisations are now using the verified information provided by the RealMe service.

We have also investigated the activities of a number of key government agencies and their current programmes to determine any particular digital inclusion initiatives or other activities related to digital inclusion outcomes.

## Review of the Telecommunications Act 2001 [MBIE]

As part of its review of telecommunications legislation, the Government is changing the regulation of fixed line communications services to a utility-like regime, akin to that for electricity and gas companies.

The new regime recognises consumer access to “fibre anchor products” of a basic “100/20Mbps UFB broadband product” and a “voice-only UFB product” (New Zealand Cabinet, 2016). This is in line with the Government's objective for 99% of the New Zealand population to have access to a 50Mbps download service by the year 2025; the remaining 1% should have at least 10Mbps (Adams, A., 2016).

The Government has noted that achieving these targets will require joint efforts from the Government, industry and stakeholders, including private investment. The implications of these developments for the existing copper line networks is currently under review, but provided all New Zealanders have equitable and affordable access to the new fibre infrastructure, there should be no negative impact for people who are currently digitally excluded. Some agencies might need to reflect any price changes in subsidies that they currently provide for people with disabilities, for example.

## Government ICT strategy

The Government ICT strategy focuses on “transforming” public services (New Zealand Cabinet, 2015b) . It acknowledges the disruptive nature of new technologies, and the changing needs and expectations of citizens.

## Tertiary education strategy

New Zealand's tertiary education strategy (2014-2019) provides a good framework for building the digital skills of the nation (MBIE & Ministry of Education, 2014). Three of the six strategic priorities could potentially help people in digitally disadvantaged groups:

- Getting at-risk young people into a career
- Boosting achievement of Māori and Pasifika
- Improving adult literacy and numeracy

While there is no direct link made between tertiary education, ICTs, and digital divides or those living in hardship, the above priorities provide a platform for developing strategies and plans targeting the digitally disadvantaged.

## New Zealand Health Strategy

The New Zealand Health Strategy promotes citizen use of ICTs to navigate the health system, and states that for “groups that may struggle to gain access to traditional services ... electronic access to information can help provide

alternatives” and “it will be important to make sure all groups gain equitable benefits” (Ministry of Health, 2016a).

The New Zealand Health Strategy’s roadmap of actions (Ministry of Health, 2016b) identifies 27 areas for implementation over five years, including:

- citizens “self-managing” their health by using ICTs and accessing their health records online
- the health system using “social media to support healthy living” and running public e-forums on health and social issues.

There is evidence that some health providers already recognise the importance of digital inclusion for the communities they serve, for example Hauora Tairāwhiti is supporting a digital literacy initiative for young mothers (DigiMamas) to help break down communication barriers and increase digital confidence and engagement (Gisborne Herald, 2017).

The challenge for health providers will be to ensure that the use of digital technologies in delivering health services does not amplify inequities, a concern that has been raised by some (Ministry of Health, 2016c).

## Engaging with Government Online

In 2012, New Zealand’s Prime Minister announced ten goals for ‘better public services’ (NZ Government, 2012). Result 10 called for New Zealanders to be able to complete their transactions with Government easily in a digital environment. An average of 58% of all transactions with the eight participating agencies is now conducted online (DIA, 2017). The Government’s target is 70% by the end of 2017, and given current trends this appears achievable. Research in 2012 by the WIPNZ team at Auckland University of Technology revealed that two thirds of respondents acknowledged that the internet could provide a quick and convenient way to carry out a range of day-to-day tasks in relation to government online services. However, just under one third (30%) had actually used the internet to provide some information to government (Gibson, A., Crothers, C., Smith, P., Aguirre, A., Bell, A., 2012). Tackling the skills deficit could assist the Government to achieve, or even exceed, the 70% target.

## Social Development

The New Zealand Government has adopted a social investment approach in targeting people and families who are perceived to be socially disadvantaged, vulnerable or at risk of not being able to fully participate in society: “*Social Investment is about improving the lives of New Zealanders by applying rigorous and evidence-based investment practices to social services*” (Treasury, 2017). The challenge for agencies seeking to prioritise digital inclusion programmes to support the delivery of social services will be to obtain sufficiently robust impact data. However, there are some practical steps agencies could take to help their clients be more digitally included, by reviewing current practices.

## Work and Income

Work and Income pays household ICT costs in certain circumstances for some allowances (MSD, 2017):

- essential costs almost always extend to landline telephones only, and exclude toll call, mobile phone, internet, and pay television costs
- in the event of disability, under exceptional circumstances and if a mobile phone is more cost-effective, it can be used instead of a landline telephone (but only if there was not a landline phone to begin with)
- suggestions for containing household costs in the event of hardship include reverting to dialup internet from broadband
- study assistance for sole parents attending an extramural or correspondence course (the only MSD allowance or benefit to recognise internet expenses for education)

Any Work and Income client with a smartphone or digital device that can access the internet on certain mobile networks, can also use MSD online services at little or no cost.

## Office for Disability Issues

The Ministry of Social Development administers the Office for Disability Issues (ODI), which has responsibility for cross-government actions to implement and monitor progress against the Convention on the Rights of Persons with Disabilities and the New Zealand Disability Strategy. Included in its functions

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**The ODI has a clear government mandate to address digital inclusion issues for people with disabilities.**

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are “to assess, monitor and report on the overall progress and wellbeing of disabled persons in New Zealand” and “to promote and support direct engagement between government agencies and disabled people” (MSD, 2014). The ODI has a clear government mandate to address digital inclusion issues for people with disabilities.

## Office for Seniors

The Office for Seniors acts as a focal point within government for information and advice on issues affecting older people and their wellbeing. According to the 2014 Briefing for Incoming Ministers, approximately 10% of older people lack important social connections or relationships with others (MSD, 2014). Digital technologies can help address this problem.

## Ministry of Youth Development

The Ministry of Youth Development, “encourages and supports young people, aged between 12 and 24 years old, to develop and use knowledge, skills and experiences to participate confidently in their communities” (MYD, 2017). Areas of special focus for MYD include youth living in areas of high deprivation, and Māori and Pasifika youth. Specific challenges that have been identified are the consistently high number of 16 to 21 year-olds not in employment, education or training (NEETs), the high number of young people reporting their families often or always worry about having enough money for food, and the high level of depression, anxiety and suicidal ideation among these young people. Given that all of today’s youth have grown up in a digital society, motivation to use digital technologies is unlikely to be a barrier. Access will be a challenge for those facing poverty but work-ready skills are likely to be the biggest barrier.

## Digital Technologies for Learning

It is well understood amongst educators that the use of digital technologies on their own does not automatically lead to better learning outcomes. A report from the OECD in 2015 revealed just how little impact digital technologies were having on education achievement (OECD, 2015). The report’s authors concluded that:

*“Schools have yet to take advantage of the potential of technology in the classroom to tackle the digital divide and give every student the skills they need in today’s connected world”.*

The OECD Director for Education and Skills commented that school systems need to find more effective ways to integrate technology into teaching and learning to provide educators with learning environments that support 21st century pedagogies and provide children with the 21st century skills they need to succeed in tomorrow’s world. He acknowledged that technology was the only way to dramatically expand access to knowledge. To deliver on the promises that technology holds, he encouraged countries to invest more effectively and ensure that teachers were at the forefront of designing and implementing this change.

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**Teachers should be at the forefront of designing and implementing this change in digital education.**

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New Zealand was identified as one of the countries that had invested heavily in computers for schools, with a ranking of number 2 (out of the 64 countries surveyed in 2012) in terms of the highest number of computers for students (just behind Australia). But in terms of performance in mathematics, for example, New Zealand was only ranked 21st.

It is clear from the OECD survey that New Zealand is not alone in turning its investment in educational technologies into learning achievements. And the solution most people seem to think lies in the hands of our teachers. Teachers must know how to teach in digital learning environments and it cannot be assumed that they were taught how to do this as part of their initial teacher education (ITE). The Manaiakalani Digital Teaching Academy is an excellent example of how new teachers can gain practical experience in digital classrooms (MDTA, 2017). An evaluation of the initial pilot declared the programme a success, despite some initial teething problems (Rosemary Hipkins, Jenny Whatman and Jo MacDonald, 2015)”

The Mind Lab by UNITEC also offers a professional development programme for teachers wishing to upskill with digital technologies (Mind Lab, 2017). All sessions use digital technologies or science/technology-based practices, including robotics, electronics, animation, coding, augmented reality and 3D printing.

The challenge will be to extend this to other school clusters. Research carried out by ResearchNZ in 2014 revealed that the teacher digital confidence index, based on principals’ perception of where most teachers in their schools were at in terms of integrating digital technologies into their teaching practices, had dropped for the first time in

over twenty years (ResearchNZ, 2014). A possible explanation was that the rapid deployment of digital technologies, especially BYOD (Bring Your Own Device) programmes, was outstripping the capabilities of teachers to adapt their teaching and learning pedagogies.

This presents a huge challenge – and opportunity – for New Zealand. We can develop a world-leading position by leveraging our technology-rich education environment to raise educational achievement.

The Manaikalani initiative was one of the first school clusters to develop a comprehensive approach to digital learning.

### Manaikalani Digital Teacher Academy



The Manaikalani Education Trust in Auckland has led the way in using digitally enabled learning to increase educational achievement. Research from 2013 by the Woolf Fisher Research Centre shows a major increase in educational achievement across the 12 schools involved in Manaikalani. Particular improvement has been seen across the cluster in writing and mathematics. At Tamaki College, NCEA Level 2 pass rates have improved from 26 per cent in 2005, to 51 per cent in 2012, to an incredible 80 per cent in 2013.

There are several keys to the success of Manaikalani:

1. The students own their own devices, with families paying as little as \$3.50 per week to pay them off. Through this personal ownership model parents experience the power that comes from being a direct investor in their child's education and children who own their devices respect and care for them.
2. The children are able to share their learning with the parents. Through Wi-Fi networks established throughout the community, they can continue to learn at home.
3. Manaikalani has developed its own digitally appropriate pedagogy: Learn, Create, Share. Children first learn a new piece of knowledge or skill, and then create based on their learning. Finally, they share what they have learnt and created online via their own blogs that are publically accessible. Parents and family are able to directly engage with what their children are learning, and have become more involved in their children's education.
4. Teachers know how to teach in digital learning environments which are different to traditional classrooms.

Upskilling existing teachers and training new graduates in how to teach in new environments is a critically important step. Manaikalani, with the support of Innovation Partnership members, has initiated a Digital Teacher Academy, which has provided an experience in digital classrooms for graduate teachers while they complete a post graduate degree in Digital Education.

Source: (Education Review, 2014)

## Ultrafast broadband

In advocating for a delay to reducing telecommunications industry levies so as to better provide for, amongst other initiatives, increased rural broadband infrastructure, the Ministry of Business, Innovation and Employment outlined social benefits relating to education, health, connection to government and non-government services, social inclusion, day-to-day transactions and entertainment (MBIE, 2015).

These benefits could apply to all digitally disadvantaged groups.

Removal of cost barriers would be one possibility. In several WIPNZ surveys, attitudes to public funding were probed: "The New Zealand Government should allocate funds to enable all New Zealanders to have access to Internet services" (Gibson, A., Crothers, C., Smith, P., Aguirre, A., Bell, A., 2012). In 2009, 47% of New Zealanders agreed or strongly agreed with the above statement.

## Rights and the internet

Charles Crothers (Auckland University of Technology) published a working paper in 2015 on internet rights and New Zealand (Crothers, 2015).

He tentatively concluded there is wide support in New Zealand for a set of internet rights, and that:

- views on civic rights (e.g. the right to criticise the Government online) and social rights (e.g. the right for those on low incomes for support to access the internet) are distinct,
- the internet could be viewed as an extension of traditional telecommunications, and therefore something that users should pay for, or
- the internet gives access to a new world, and many may need government help to overcome the barriers they face in order to take advantage of it.

## Internet in libraries

The National Library has made it very clear in their long-term Strategic Direction to 2030 that ‘digital’ is a core outcome for all three of their focus areas – Taonga, Knowledge and Reading (National Library, 2016). Examples of the outcomes sought are:

- Taonga – New Zealand’s collecting institutions will have access to expertise to use new technologies and tools that preserve digital heritage
- Knowledge – New Zealand knowledge resources available from libraries, educational, cultural and research institutions will be digitally accessible to all New Zealanders
- Reading – New Zealanders will have the digital literacy skills to access and use knowledge

Since the internet is (in large part) an information source, libraries have taken a strong interest, and provide a venue for many users. Initially this was primarily in terms of access through the provision of computers and internet access.

## Aotearoa People’s Network Kaharoa

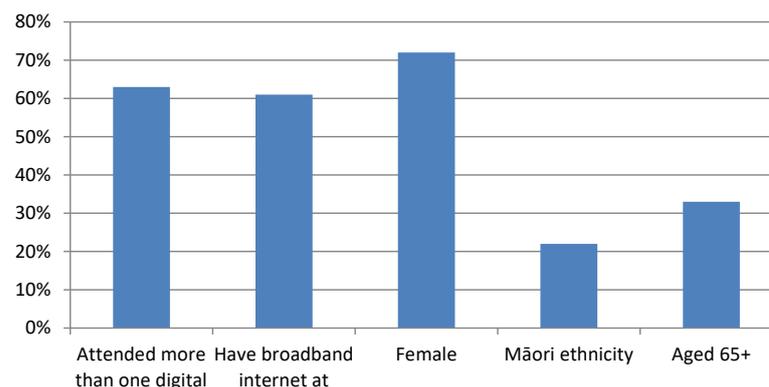
Aotearoa People’s Network Kaharoa (APNK) has led the way, providing free access to broadband internet services in public libraries “to open up the digital world to all people and communities and build staff knowledge and skills about the digital world”. The service is based on a partnership between public libraries and The National Library of New Zealand (APNK, 2017). The first APNK installation took place in Kawerau in 2007 and some 10 years later has expanded to 151 sites in 47 local authority areas with a total of 750 computers. APNK also supports 135 WiFi hotspots that are used by around 4,000 users every day. Other libraries have also recognised the benefits of providing free internet access; in 2015, 79% of libraries offered free WiFi services.

The Strategic Framework for Public Libraries (2012-2017) suggested the APNK has had a significant impact on public libraries in rural and provincial towns, attracting new customers and helping to ensure those that do not have access in their homes are not disadvantaged by the move to online information and services (LGNZ & PLNZ, 2012). However, it is no longer enough to provide free computers and internet access. All libraries must rise to the new challenges of creating digitally included communities. Many are already doing this by offering digital literacy classes for adults, such as Stepping UP and STEM workshops for school children.

## Stepping UP

A growing number of public libraries offer the 20/20 Trust’s Stepping UP digital literacy programme (20/20 Trust, 2016a). Participants complete a short online survey after each module.

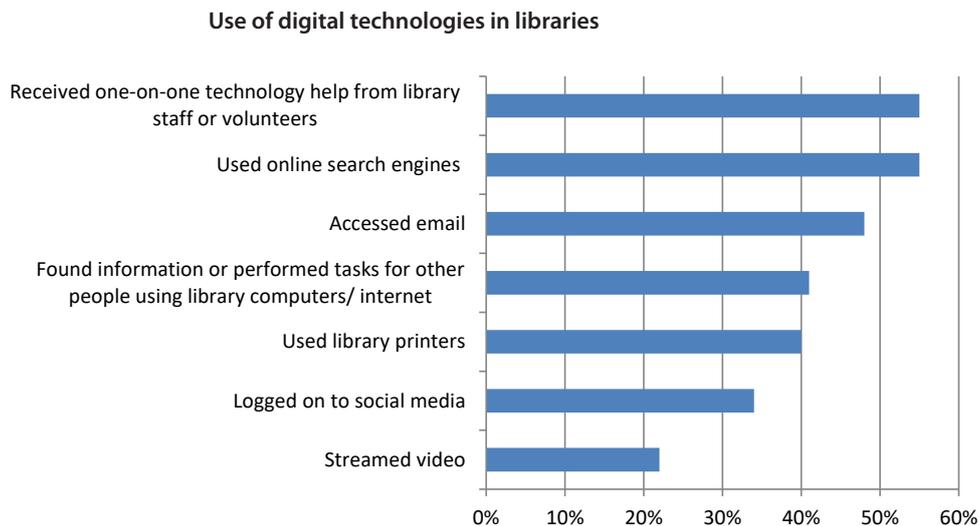
Stepping UP: Participant profiles



## Impact Survey

In March 2016, 11 libraries across New Zealand piloted the Impact Survey administered by the University of Washington and initially funded by the Gates Foundation (PLNZ, 2016). New Zealand is the first country outside North America to use the survey, which gathers data about the impact of access to digital technologies through libraries.

The results of this survey revealed that library users, in the preceding 12-month period, had used digital technologies at the library for a variety of purposes. Over half of all respondents reported using the library to receive one-on-one technology help from library staff or volunteers.



## A Government Digital Inclusion Champion?

In other sectors, Government has appointed champions to raise the visibility and awareness of important national issues. Sir Peter Gluckman, as the Government's Chief Science Adviser, is probably the best known example (Gluckman, P, 2017). More recently, MBIE has appointed Professor Margaret Hyland as Chief Scientist (MBIE, 2017). In the United Kingdom, Baroness Martha Lane Fox was appointed Digital Champion in 2010 and when she stood down in 2013, Prime Minister David Cameron acknowledged that her work "has helped establish a digital culture at the heart of government. That culture is, in turn, transforming how government works and stimulating a new digital economy, improving millions of lives each day" (Lane Fox, M, 2013). In 2011, the European Commissioner called for all EU states to appoint a Digital Champion, similar to the UK (BBC, 2011).

New Zealand has its own digital heroes, including people like Rod Drury (Xero), Frances Valintine (Founder of the Mind Lab) and Michelle Dickinson (aka Nanogirl), but in order to achieve systemic change, we believe New Zealand needs champions within government (both central and local government). We recommend that every government agency be tasked with identifying a digital champion.

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**We believe that New Zealanders need champions within government level (both central government and local government). But rather than a single champion, we recommend that every government agency be tasked with identifying a digital champion.**

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# How do we know when we've got there?

## Measuring success



We have identified three robust measures of digital inclusion – the UK Digital Capability Monitor, the European Digital Economy and Society Index, and the Australian Digital Inclusion Index. There may be others, but these three provide a good starting point for the development of a New Zealand Digital Inclusion Index. The three overseas measures all go beyond the more basic connectivity (access) indicators and to varying degrees tackle the other more challenging dimensions of digital inclusion – motivation, skills and trust. A brief explanation of each measure is provided below. Results from recent surveys are included in Appendix 5.

### The UK Digital Capability Monitor

In recent years, the digital inclusion focus for the UK has been on addressing basic digital skills and basic online skills; together these are referred to as “digital capability” (Ipsos MORI, 2015). The 2015 report drew on data from Ipsos Connect’s quarterly Tech Tracker. This involves face-to-face interviewing to ensure no online bias, and in 2015 involved some 4000 interviews.

The interview questions were based on the five digital skills and eleven digital tasks, set as the benchmark in the UK for Basic Digital Skills. Participants were asked what tasks they could do if asked and what tasks they had done during the last three months. Participants having all five digital skills were recognised as having reached the Basic Digital Skill Level.

Digital Skills	Digital Tasks
Managing Information	<ul style="list-style-type: none"><li>• Use a search engine to look for information online</li><li>• Find a website I have visited before</li><li>• Download/save a photo I found online</li></ul>
Communicating	<ul style="list-style-type: none"><li>• Send a personal message via email or online messaging service</li><li>• Carefully make comments and share information online</li></ul>
Transacting	<ul style="list-style-type: none"><li>• Buy items or services from a website</li><li>• Buy and install apps on a device</li></ul>
Creating	<ul style="list-style-type: none"><li>• Complete online application forms which include personal details</li><li>• Create something new from existing online images, music or video</li></ul>
Problem solving	<ul style="list-style-type: none"><li>• Verify sources of information I found online</li><li>• Solve a problem with a device/digital service using online help</li></ul>

The UK has also undertaken work on developing a digital exclusion heatmap (Doteveryone, 2017). The heatmap shows the likelihood of exclusion at local authority level. Eight different metrics have been used to calculate the overall likelihood of exclusion. Four of these are digital metrics (combined infrastructure, access, basic digital skills and basic digital skills used), which have been aggregated to provide a combined digital indicator. Four are social metrics (age, education, income and health), which have been aggregated to create a combined social indicator. These combined indicators have been further aggregated using a formula designed by the London School of Economics and Political Science to provide a single measure of predicted overall exclusion from a digital United Kingdom.

### The European Digital Economy & Society Index (DESI)

The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe’s digital performance and tracks the evolution of EU member states in digital competitiveness (EC, 2016). The DESI is structured around five principal dimensions:

1. Connectivity: measures the deployment of broadband infrastructure and its quality.
2. Human Capital: measures the skills needed to take advantage of the possibilities offered by a digital society.
3. Use of Internet: accounts for the variety of activities performed by citizens already online.
4. Integration of Digital Technology: measures the digitisation of businesses and their exploitation of the online sales channel.

5. Digital Public Services: measures the digitisation of public services, focusing on eGovernment.

## Australian Digital Inclusion Index

The Australian Digital Inclusion Index (ADII) (Thomas, J, Barraket, J, Ewing, S, MacDonald, T, Mundell, M & Tucker, J, 2016) compiles numerous variables into a score ranging from 0 to 100. Higher scores mean higher levels of inclusion. Scores are benchmarked against a 'perfectly digitally included' individual – a hypothetical person who scores in the highest range for every variable. This individual:

- accesses the internet daily, both at home and away
- owns multiple internet products, including a PC or tablet
- owns a mobile phone, with data, on the 4G network
- has a fixed broadband connection (cable or NBN)
- has a mobile and fixed internet data allowance greater than the ADII benchmark
- spends less money on the internet (as a proportion of household income) and receives more value (data allowance per dollar) than the ADII benchmark, and
- exhibits positive attitudes, basic skills, and online activity

The ADII comprises three sub-indices, each of which is made up of various components, which are in turn built up from underlying variables (survey questions).

The Access sub-index has *three components*:

1. Internet Access: frequency, places, and number of access points
2. Internet Technology: computers, mobile phones, mobile broadband, and fixed broadband
3. Internet Data Allowance: mobile and fixed internet.

The Affordability sub-index has *two components*:

1. Relative Expenditure: share of household income spent on internet access
2. Value of Expenditure: total internet data allowance per dollar of expenditure.

The Digital Ability sub-index has *three components*:

1. Attitudes, including notions of control, enthusiasm, learning, and confidence
2. Basic Skills, including mobile phone, banking, shopping, community, and information skills.
3. Activities, including accessing content, communication, transactions, commerce, media, and information.

## Limitations of current New Zealand digital inclusion measures and research, and building our evidence base

A number of existing research efforts in New Zealand provide some data about New Zealanders' access to, and use of, the internet. Most of this research tends to focus on the 'access' dimension, i.e. connectivity to and affordability of the internet. Some has been initiated by digitally disadvantaged stakeholder groups, who recognise the opportunities provided by the internet for the people they represent, but often face real challenges in securing the necessary resources to overcome digital inclusion barriers, especially around access and skills.

All the New Zealand research efforts were limited in scope and either unable to provide robust data at a local level or unable to measure more than one digital inclusion dimension. There is no single survey focussing on digital inclusion. It is possible to extract some interesting and useful information from existing surveys but none provide a comprehensive picture of digital inclusion at a level of granulation that would be useful to local communities as well as central government.

## Measures of Success

Unlike the UK and Australia, New Zealand has no ongoing digital inclusion measures. The biennial World Internet Project in New Zealand (WIPNZ) provides valuable national data on internet use, i.e. who is using the internet and for what purpose (Smith, P., Bell, A., Miller, M & Crothers, C. , 2016). The findings from all five of the WIPNZ reports

since 2007 have consistently highlighted the existence of digital divides within groups relating to household income, age, geographic area and ethnicity. While some of these divides appear to have decreased somewhat over time, new divides have been found to emerge as technology develops and people, either lacking the digital skills or the resources to buy new devices or services, are unable to engage in certain activities. The WIPNZ surveys use a national sample (1377 respondents in 2015), derived mainly from people with a fixed telephone line or an existing internet connection, and do not provide data at a Local Authority Level.

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Unlike the UK and Australia, New Zealand has no ongoing digital inclusion measures.

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The latest PIAAC report used surveys carried out in 2014-15 and did provide more localised data, as this was based on a sample size of over 6000 adults. While this survey did provide a good snapshot of adult skills for problem-solving in a technology-rich environment, it will not provide the necessary annual data to monitor digital inclusion progress.

The most comprehensive survey tool is the national 5-yearly population and household Census, the most recent being held in 2013, but this was limited in terms of digital inclusion measures (Statistics NZ, 2013). Only one question addressed 'digital' issues and simply asked householders if they had a mobile phone or a telephone and whether they had fax or internet access. The next Census will be in 2018 and this creates an opportunity to gather richer data, especially in terms of the type of household internet access. The question about home fax machines should also be replaced with one about scanning equipment, as scanners and the internet have now largely replaced the need for fax.

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The surveys used to create the Australian Digital Inclusion Index are carried out by Roy Morgan Research as part of their Single Source Survey that reaches some 50,000 Australians every year (Roy Morgan, 2017). The survey includes questions about skill levels and has a large enough sample to be able to report at a local level.

It is clear that until New Zealand implements a comprehensive monitoring regime, progress towards any digital inclusion goals will be limited. In the absence of any ongoing outcome data, government is unlikely to make substantial investments. This means that funding for digital inclusion programmes is likely to remain restricted to small-scale pilots and projects. The availability of consistently reported outcomes would certainly help in cost-benefit evaluations.

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We consider this to be one of the top priorities for a Digital Inclusion Agenda, if not *the* top priority. An option could be to increase the frequency of the World Internet Project to an annual survey, but this would also need the scope to be expanded. Special efforts would also need to be made to include the digitally disconnected, those who cannot be reached by telephone or the internet. We note that the WIPNZ 2015 round did include face-to-face focus groups with a small number of people from one disadvantaged community (South Auckland). This did demonstrate a mechanism for capturing more localised data, but it would involve a major effort (and cost) to expand this model to other disadvantaged communities.

We also noted that a number of the groups that we have identified with people who are 'at risk' of being digitally disadvantaged do carry out their own surveys from time to time, subject to funding availability. We suggest that a set of standard digital inclusion questions (Appendix 3) be promulgated to these groups and encourage them to include them in any future surveys.

## Intervention criteria

Almost without exception, the proponents of digital inclusion initiatives claim their interventions have been 'successful' and have contributed towards the objective of a more digitally included society. But in the absence of any formal evaluations or assessments, these initiatives often fail to achieve scale. Typically, project funding comes to an end without any business plan for continuing or expanding the initiative. Reliance on community funding is part of the problem. Most community and government funding for digital initiatives has been contestable and not only has this created a burden on applicants, but it has also presented challenges for the people having to decide which projects to support.

We consider that the UK Government's Digital Service Team's checklist for "doing digital inclusion" provides a good framework for developing intervention criteria to measure the effectiveness of programmes (GDS, 2014). The approach we recommend in assessing digital inclusion interventions draws on the GDS checklist. Suggested criteria are:

1. Is there a clear statement of the problem, i.e. what particular user needs are we trying to address?
2. What information do we have about possible solutions, i.e.
  - a. what can we learn from previous digital inclusion initiatives that have attempted to address the same problem?
  - b. Are these initiatives scalable?
  - c. Do they offer value for money?
3. How well do we understand the motivations of digitally disadvantaged groups, i.e. what application or set of applications would provide the motivation for them to go online?
4. What barriers do these people face in going online? Is it technical access? Affordability of current services? Skills and confidence to use digital technologies? Concerns about internet safety?
5. What is the planned intervention logic? What do we know about the counterfactual?
6. Is there a fit with government policy? How well does the initiative complement other (non-digital) government objectives?
7. Are there organisations with delivery capability?

## Risk and Uncertainty

New initiatives always come with a degree of risk and uncertainty. The biggest risk for technology initiatives is that enthusiasts can at times place more importance on their own agendas than those of the people they are trying to support. One way to reduce risk is to follow the intervention criteria listed above in assessing new interventions. Lessons from other digital inclusion initiatives suggest that the following strategies can also help to reduce risk and uncertainty:

- Authentic reason for families to engage
- Programme only delivered in response to demand
- Strong local programme ownership
- Delivery by trusted local partners
- Flexibility in programme delivery to meet individual needs
- Creating a fun learning environment
- A strong incentive to complete
- Tangible rewards
- Participants contribute towards the costs of the programme (skin in the game)
- Success is celebrated

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One way to reduce risk is to follow an agreed set of intervention criteria in assessing new digital inclusion projects and programmes.

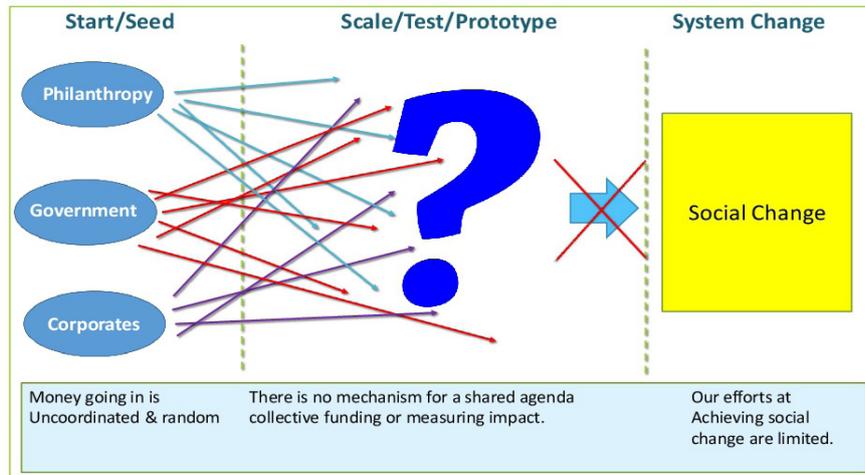
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## From Projects to Programmes

Economic and social participation and access to information are key issues for local and central governments. However, the evidence from overseas and New Zealand research suggests this is not just a matter for government, but rather requires a joined up whole-of-community response.

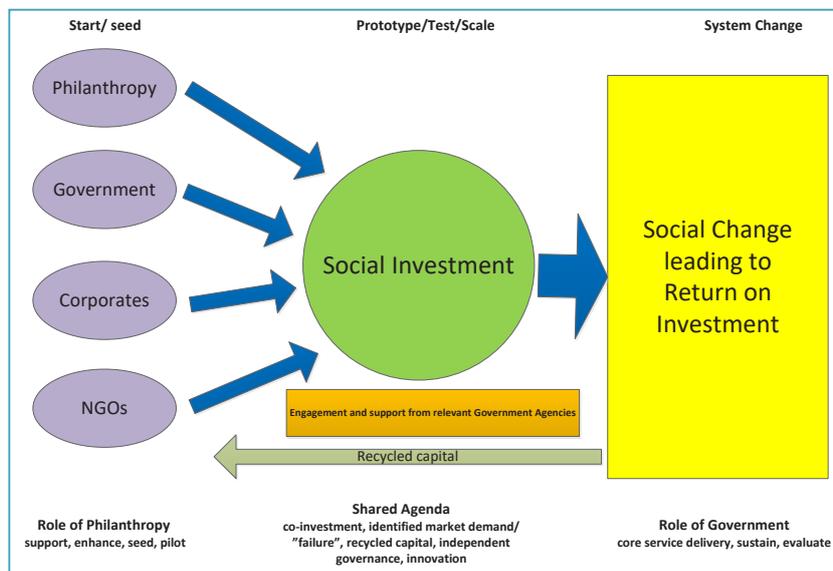
Sir Stephen Tindall, summed up the dilemma that New Zealand faces in trying to achieve a whole-of-community response to major social issues in a single powerful diagram (Tindall, 2016). With his permission the diagram has been reproduced below. The diagram reflects what is so familiar to community organisations that typically operate in the middle, drawing on resources from government, philanthropists and corporates to implement 'good ideas' and deliver 'on-the-ground' responses to community needs. Certainly this is true for organisations involved in developing and promoting digital initiatives. As a country there are many 'good ideas' and it is fortunate to have

philanthropists such as the Tindall Foundation and others willing to help realise these ideas. But it is disappointing to see initiatives stall when funding comes to an end without any widespread system change.



Source: Guest lecture by Sir Stephen Tindall at The Treasury, December 2016

To conclude his lecture, Sir Stephen presented an equally powerful image of what needs to happen to solve this problem – a coordinated joined-up approach. Sir Stephen’s diagram could easily be adapted for the Digital Inclusion Agenda.



Source: Adapted from guest lecture by Sir Stephen Tindall at The Treasury, December 2016

Government has made its position clear in terms of an evidence-based social investment approach for improving the lives of New Zealanders (The Treasury, 2016); the challenge is to create a convincing evidence-base from what are typically small-scale pilot initiatives where most, if not all, of the funding is committed to delivery. Without the evidence base and clear pathways for scaling initiatives, ‘good ideas’ are unlikely to receive the level of support needed to achieve social change and the hoped-for ultimate return on investment.

Digital inclusion brings many benefits - and costs. But there is also a cost to New Zealand in supporting a small percentage of the population who remain digitally excluded for whatever reason.

The internet is not just about the provision of infrastructure and hoping that everyone will automatically derive some benefit; clearly some will, but the focus needs to be on the people who are missing out and who rely on support from others to embrace the digital world.

This is not just a job for government alone. The NGO sector will continue to innovate and provide leadership, because when it comes to operationalising digital inclusion initiatives, the people best able to do this are likely to be in local community organisations.



## Suggestions for further work

### Robust measures of digital capabilities or digital inclusion

**Recommendation 1: That robust measures of digital capabilities and digital inclusion be developed, and an annual survey of citizen capabilities be initiated at a level of granularity that enables reporting at an Area Unit level (where possible).**

Unlike the United Kingdom and Australia, New Zealand lacks ongoing measures of digital capabilities and digital inclusion. While it is possible to extract some interesting and useful information from existing surveys, none provide a comprehensive picture of digital inclusion at a level of granulation that would be useful to local communities and central government. This has made it difficult for the public sector to make informed decisions and/or target activity.

It is helpful to have access to the occasional international indicator to tell us how New Zealand is doing compared to other nations but this is not enough to drive a digital inclusion agenda. The limitation of national statistics based on random samples is that they tend to hide the pockets of people who either do not participate in the surveys or become invisible in averaged data.

The World Internet Project in New Zealand provides useful longitudinal data, but the relatively small sample size means it is unable to adequately monitor progress for digitally disadvantaged groups or provide data at an Area Unit level, or even a Territorial Local Authority level. The Census provides robust data, but is limited in scope (with only one question on household internet access) and frequency (five years). The OECD PIACC survey provides robust data in the three areas of specific relevance to the skills dimension of digital inclusion – life, learning and the workplace. Surveys carried out by stakeholder groups, such as people with disabilities, are constrained by funding limitations and the need to address a wide variety of issues; while digital inclusion is recognised as important, these groups have many other priorities to address.

Consistently reported outcome data is essential for New Zealand to progress beyond pilots and projects, as well as for meaningful cost-benefit evaluations. This should be one of the top priorities for a Digital Inclusion Agenda, if not the top priority.

### Reliable measures of digital disadvantage

**Recommendation 2: That the Government engages with each of the digitally disadvantaged groups identified in this report to understand their specific user motivations and needs.**

The groups identified as being amongst the digitally disadvantaged are also often recognised as a priority by government agencies; however, there appears to be little formal recognition that digital inclusion could be part of the solution to the social and economic challenges of these groups. This report signals some of the motivations, needs and challenges faced by digitally disadvantaged groups

Stakeholder groups that are not digitally included in New Zealand involve families in low socio-economic areas, people with disabilities, Māori and Pasifika youth, offenders and ex-offenders, older age groups and people in the workforce without the digital skills necessary for work. It is not uncommon for there to be an overlap of stakeholder groups when it comes to being either digitally-illiterate, digitally-disconnected or digitally-disadvantaged.

### New Zealand digital inclusion framework or action plan

**Recommendation 3: That the Government create a digital inclusion policy framework.**

Digital inclusion leadership around the world has historically come from non-government organisations, but some governments are now taking a more active role through digital strategies and digital inclusion plans. These continue to rely on ongoing partnerships with businesses, charities and voluntary organisations, especially for building digital skills, confidence and trust. New Zealand has a long history in developing digital strategies, spanning much of the last 20 years. While there has been support for some digital inclusion projects, these have been limited in scope and have typically relied on short-term funding. The challenge New Zealand faces is to migrate successful small-scale projects to national programmes.

Any digital inclusion policy framework should include an explicit aim to create complementary, cost-effective

initiatives that are designed to distribute digital technologies and their benefits more widely. Among the first target populations for these initiatives should be the groups described in this report. This framework needs to be informed by a robust economic study along the lines of the ones carried out in the United Kingdom during the last decade, which identified significant economic benefits for individuals and the economy. To further understand the economic costs to New Zealand and to support the policy process, stakeholders need to be fully aware of what benefits digital inclusion offers New Zealand. A consistent economy-wide model should be used to estimate the likely benefits of a fully digitally inclusive society (and how this links to social, economic and educational goals), and the cost of being digitally excluded.

### Consistent evaluation criteria

**Recommendation 4: That the Government support the development of user-friendly evaluation tools to assist community organisations embarking on digital inclusion initiatives.**

The United Kingdom's Government Digital Service (GDS) team has published a useful checklist for "doing digital inclusion". This focusses on 6 key areas: user needs, improve access, motivate people, keep it safe, work with others and focus on wider outcomes (measure performance). GDS has also prepared a set of tools to assist community organisations in evaluating the effectiveness of digital inclusion initiatives. This includes a step-by-step evaluation toolkit, helping local projects to track progress towards relevant outcomes, and an online digital inclusion dashboard for visualising and reporting on progress towards outcomes nationwide.

These are useful resources which could be replicated in New Zealand.

### Coordinated and ongoing support for digital inclusion initiatives

**Recommendation 5: That the Government develop and promulgate a digital inclusion agenda to allow philanthropists, corporates and the NGO sector to align their efforts.**

The case made by Sir Stephen Tindall, calling for a more joined-up approach in tackling major social issues, has resonated with people working on digital inclusion initiatives. But this does need a clear vision of the outcomes being sought and a rigorous framework to measure the effectiveness and impact of specific initiatives. A possible framework is suggested in this report; what is now needed is the mechanism to implement it.

Government could convene a cross-sector stakeholder group to flesh out a digital inclusion agenda, including goals, timeframes and measures.

### Focus for digital inclusion in government agencies

**Recommendation 6: That government agencies investigate appointing a Digital Inclusion Champion in their organisation to provide leadership as well and a single point of contact for implementing a digital inclusion agenda and monitoring progress.**

The importance of leadership in progressing towards a digitally included nation is a factor that stands out among the countries reviewed in this report. New Zealand has a good number of digital heroes; people who are recognised by their communities for their efforts in helping to create a more equitable and engaged society. But this is not enough in order to achieve societal change. We believe strong voices are required in central government. Other nations have appointed a national digital champion but a more sustainable option could be to raise awareness of 'digital inclusion' in all government agencies, especially those engaging with disadvantaged groups. It is evident that the agencies most directly affected have the mandate to promote digital inclusion.

New Zealand's government agencies have "data champion" roles, so there is a precedent for selecting a well-regarded team member to lead digital inclusion efforts. The digital champions could collaborate in a cross-agency Advisory Group with digital champions from business and the community. The purpose of this group would be to promote the benefits of internet use (especially in terms of encouraging new users), monitor and report on progress towards a digitally included society and periodically review the Core Digital Skills benchmark.

### Prioritising digital inclusion in local government

**Recommendation 7: That Territorial Local Authorities (TLAs) ensure that a digital inclusion plan for their communities is in place, is embedded into their Annual Plans, and is being implemented.**

Local authorities are well-placed to play a key role in achieving digitally included communities. They are responsible for a range of community services, the delivery and impact of which all have the potential to be enhanced with a more digitally competent and engaged citizenry. Regional Councils would have already developed Digital Enablement Plans – which include an element of digital inclusion (as well as business use of ICT) – as part of the UFB and RBI programmes.

A good place to start is with public libraries. Innovative libraries are responding positively to community needs for digital upskilling by offering one-on-one support as well as scheduled digital literacy and digital technology classes. The National Library has set a clear vision for the next decade and their efforts could act as a guide for TLAs looking to develop their own local action plans. Councils could also consider appointing a digital inclusion champion to help maintain momentum.

## Support for intermediaries

**Recommendation 8: That the Government investigate a community digital champion programme, similar to OneDigital in the United Kingdom, for intermediaries delivering social and related services. This action should take note of the need to ensure sustainability.**

Some people are not motivated to engage in the digital world, or simply don't care. Research suggests this is probably because they don't see any particular benefits in going online or they view their lack of digital access and skills as too great a challenge. This is particularly true for older people, who can quickly dismiss the digital world as being something for younger people. But as organisations like SeniorNet have demonstrated, the barriers are more about attitudes and confidence than abilities.

The United Kingdom's OneDigital initiative has successfully demonstrated the value of digital champions in supporting intermediaries who are already delivering some form of social service to people who are among the digitally excluded. The distinct advantage of working through intermediaries is that they have established relationships with people in the most digitally disadvantaged groups and are able to provide training within the specific context of each person's needs. The intermediaries might succeed in offering, for instance, one-on-one support in the context of addressing a health need. In this way they might reach people who would never attend a SeniorNet or Stepping UP class.

**Recommendation 9: That providers of social services be encouraged to upskill their front-line staff with core digital skills so that they can confidently provide advice and support to their clients about relevant online services.**

New Zealand government agencies have at times been accused of a silo approach in dealing with 'at-risk' families (Gammon, 2017). It is important that any agenda for digital inclusion is closely aligned with existing social service programmes to avoid this silo scenario. Households with access to the internet, and adults with the confidence to use the internet to enhance their lives (beyond entertainment) can effectively engage with the various government and NGO agencies providing support. This offers them the opportunity to become more independent.

## Addressing challenges for people with disabilities

**Recommendation 10: That government and NGO agencies supporting people with disabilities work towards reducing the barriers that prevent this groups use of digital technologies on which they are increasingly dependent.**

People with disabilities face numerous barriers in going online, but there is no questioning the high levels of motivation to be able to live independently, engage with their communities and compete on equal terms for jobs. Digital technologies can help with this. The greatest challenge is the affordability of technologies, including assistive devices. People with disabilities will often require training and support in effective use of both software and hardware, and financial assistance with the ongoing costs of the internet. However developers of digital devices and software should also be encouraged to incorporate features that enable use by people with disabilities from the outset, rather than as an afterthought. Significant effort is being invested in the school sector to ensure that every family has affordable options for procuring digital devices for their children; some of the same solutions could be used to help ensure that people with disabilities have the same opportunity.

## Addressing challenges for Seniors

### **Recommendation 11: That the Office for Seniors investigate the value of developing a national digital mentoring programme for seniors (65+).**

While many seniors have taken advantage of digital upskilling opportunities through organisations such as SeniorNet, others have relied on families and friends to help them go online. However, many remain digitally excluded, seeing no particular relevance or usefulness for the internet. While affordability is a challenge for some, the far greater need is around motivation and skills. This suggests that solutions for engaging seniors are more likely to come through one-on-one interactions when seniors are engaging with government agencies, community organisations, family members or digital ‘assistants’.

## Expanding opportunities for digital upskilling

### **Recommendation 12: That the National Library collaborate with public libraries and digital skills training providers to rejuvenate and expand the vision of the Aotearoa Peoples Network Kaharoa to include “just-in-time” digital skills training in all public libraries.**

Like other countries, New Zealand has made substantial investment in digital infrastructure, but not yet in developing people’s skills to make effective use of digital infrastructure. This is especially relevant for the groups who are at most risk of being digitally excluded.

Libraries provide a natural “home” for developing the digital skills of communities. Most now offer free WiFi connectivity as well as access to internet-connected computers. Librarians are increasingly being asked for support around the use of technologies in the library, as well as the use of personal devices that people bring into the library to access the internet. Over 50 libraries already offer Stepping UP digital literacy classes. The Aotearoa People’s Network Kaharoa (APNK) has served remote and rural communities well for more than a decade. But the focus needs to change from ‘infrastructure and access’ to ‘training and skills’.

## Addressing concerns about staying safe online

### **Recommendation 13: That training providers offering digital skills courses be encouraged to embed an internet safety component in their programmes.**

When people go online, it is important they have skills to stay safe and manage risks. While internet service providers do the best they can to block unwanted and unsafe communications, users must take responsibility for their own safety and in the case of parents, the safety of their children. Digital societies must make efforts to keep their citizens safe.

This involves both education policy and legislative interventions. There are good resources and mechanisms for dealing with internet safety issues.

## Support for parents needing digital upskilling

### **Recommendation 14: That Government considers how best to support schools, libraries and digital community hubs to deliver suitable digital skills training for parents and caregivers of children in vulnerable communities.**

Parents and caregivers of young children, including grandparents, are motivated to develop their digital skills in order to support their children’s learning. While some are willing to pursue further studies to gain these skills, most have neither the time, nor the money, nor the inclination to make this commitment.

With the increasing focus on the use of digital devices for learning in schools, this becomes even more important. Opportunities should be available for parents with pre-school children as well. Even if there is equitable access to the internet for all students in their homes, a new divide will quickly emerge between students who receive active support from their parents (who have the confidence to engage with digital technologies) and those who don’t. Schools, libraries and many community centres provide convenient training facilities; the ideal would be to cover the costs of qualified trainers and provide the right incentives for parents to attend.

## Using digital technologies to strengthen school-home engagement

### **Recommendation 15: That schools and communities of learning implement holistic 21st Century learning environments, with emphasis on integrating school and home learning environments.**

A critical dimension of the digital learning environment identified by the 21st Century Learning Reference Group in 2014 was the importance of integrating learning activities between school and home (21st Century Learning Reference Group, 2014). Digital learning provides the opportunity for students to extend their learning hours beyond the compulsory school day, but this does assume students have access to individual learning devices, internet access in their homes and the support of adults who have the digital skills and the motivation to support their children's learning.

A digitally-connected school-home learning environment has the potential to propel New Zealand to the top of the OECD scoreboard for education achievement, as well as technology infrastructure. But it will require a significant investment to increase teachers' capabilities and ensure they have the necessary support and encouragement to embark on this journey. The appointment of a digital champion in every school could be a great first step.

### **Recommendation 16: That public, private, and not-for-profit initiatives supporting affordable home internet access are explored to determine any gaps, particularly for low income families with children (early childhood and school-aged).**

The goal of connecting all households with children to the internet could be hard to achieve, especially for families who believe it is unnecessary. But for those who simply cannot afford the added cost of sustaining an internet connection, there should be subsidised options available. The vision of a 21st Century learning environment embraces not only the school, or other education institution, but also the students' homes. Connectivity at both school and home are essential in leveraging the learning opportunities provided by today's digitally enabled schools. There are already huge pressures on schools to deliver a wide range of curricula in the relatively small window of a student's day. The digital age promises to extend the learning space to 'anywhere' and 'anytime'; we believe it is important a lack of home connectivity doesn't diminish this opportunity.

### **Recommendation 17: Investigate how schools, libraries, marae and community centres, especially those in disadvantaged communities with low household internet connection rates, might best establish and maintain digital community hub services.**

There is extensive telecommunications infrastructure reaching every household and business in New Zealand, offering the potential for universal access to the internet. However, the geographic nature of New Zealand and the widespread population means that access, especially when it comes to capacity and affordability, will be distributed unevenly between urban and rural as well as between high income and low income areas. This suggests the need for community hubs to provide internet access, at least until everyone can afford access in their homes or on their phones. Community hubs have the added advantage of providing opportunities for training and support, and the opportunity for collective endeavours such as community businesses and study groups.

## Raising the digital literacy benchmark for teachers

### **Recommendation 18: That the Ministry of Education develop a digital capability benchmark for all teachers from early childhood to tertiary.**

'Digital fluency' has been identified as a key priority for the ongoing professional development of teachers; the capability of teachers to make effective use of digital technologies and integrate them into teaching and learning practices is consistently recognised as one of the most significant barriers impeding change in the school sector. The same is true for teachers in both early childhood and tertiary education. New models of teacher professional learning and development (PLD) for digital learning environments are being successfully implemented in some schools, but these currently rely on support from philanthropists and corporates.

Digital education initiatives such as the Manaiaakalani digital learning model and the Summer Learning Journey have a proven track record in terms of achieving improved learning outcomes. These initiatives have benefitted from substantial philanthropic support that has enabled the development of a comprehensive professional development programme for teachers as well as robust independent research of student learning outcomes. The results being achieved are persuasive, helped greatly by the investment in PLD.

To deliver on the promise that technology holds for learning, there needs to be effective investment to ensure that teachers are at the forefront of designing and implementing digital literacy. The current collective agreements for primary and secondary school teachers include a statement of professional standards. The standard for primary teachers was last reviewed in 1998 and even then it was accepted as an interim framework. The 2018 review of the collective agreements provides an opportunity to consider whether digital capability benchmarks should be established for all teachers.

### Core digital skills for school leavers

**Recommendation 19: That secondary schools provide opportunities for all students to acquire core digital skills and achieve certification before leaving school.**

Most school leavers are unable to present any evidence of digital competency to a prospective employer. After consultation with representatives from the tertiary sector, it appears that the same issue applies to first year university students. Young people are leaving secondary school without the practical digital skills required in a workplace or for tertiary education studies. The 'digital native' myth that all young people have the necessary digital skills for education and work has proved to be unfounded; while most are confident using digital technologies for social purposes, few have the skills necessary for productive work in digital economies. This has led to discussion about a new digital divide – between those who have social networking skills and those who have practical work-ready digital skills.

**Recommendation 20: That tertiary education institutions consider ways to assess and improve the digital competency of new students.**

There is no well-defined digital competency baseline for students entering New Zealand tertiary education institutions. As a result, many students are not only entering tertiary education with inadequate digital skills, they are also graduating without them. All students entering tertiary education should be assessed for digital skills competency. Where students fail to meet the institution's benchmark for digital skills, they should be required to engage in targeted training.

There is also evidence that many teaching staff in tertiary institutions do not have the digital confidence to effectively integrate digital technologies into learning programmes. Like school teachers, tertiary lecturers and other faculty often have the opportunity to engage in professional learning and development programmes for teaching and learning with digital technologies, but it is not compulsory to accept these opportunities. Therefore, it largely relies on the enthusiasm and interest of the teaching staff in terms of whether they want to engage or not.

### Motivating school children to consider technology careers

**Recommendation 21: That Government consider funding providers of digital technology awareness programmes to deliver hands-on experiences to intermediate level school children (aged 9-12), at least until the new digital technologies curriculum is fully implemented.**

Concerns have been raised by the information technology (IT) industries and IT industry associations for over 20 years about the relatively small number of students choosing careers in IT. Programmes that could have helped often come too late. By the time secondary school students are starting to think about jobs, they discover they do not have the necessary background STEM subjects - science, technology, engineering and mathematics. Educators have realised in recent years that it is important to stimulate interest in a technology career before students start secondary school, so they can make appropriate subject choices.

This has led to a wide range of initiatives, primarily aimed at intermediate level students, which provide hands-on experiences with technologies such as robots, apps, digital music, and 3D printing. A common goal of all these programmes is to interest and excite students in digital technologies and encourage creativity. From 2018, with the introduction of digital technologies as a strand of the technology learning area in the school curriculum, these experiences could be established as part of every student's learning journey. However, given the cost of the equipment and the need for teacher professional development, many students will remain reliant on programmes offered through external providers for some time.

## Building digital capability in the workforce

### **Recommendation 22: That government-funded programmes helping prepare people for work include a mandatory digital skills component.**

In January 2011, the Ministry for Social Development (MSD) announced an innovative approach in preparing people for work. “Training for Work” involved a 13-week training programme and then placement in a job. The programme matches prospective employees with an employer in an industry suited to their skill set, and it provides them with job specific training and work experience. There was no specific requirement for digital skills training but, if there were, this could be a valuable opportunity to contribute directly towards a more digitally skilled workforce. If government contracts required an element of digital skills training, training providers would naturally respond accordingly.

### **Recommendation 23: That employers be encouraged to provide opportunities for their staff to acquire core digital skills to improve productivity.**

The digital skills deficit is evident in the workforce. Half of all New Zealand workers believe they need to acquire more digital skills in order to guarantee their future employability. While much of the discussion around digital literacy, fluency and citizenship focuses on the education sector, it is becoming increasingly accepted that these concepts apply equally to the workplace and to living in digitally-enabled communities.

There are precedents for government and employers to invest in upskilling their staff. For over 20 years, government and employers have collaborated in providing workplace literacy and numeracy skills for their staff. The investment has been justified by improvements in business growth and performance as well as improved productivity. A few employers, including some government agencies, recognise the importance of digital literacy skills in the workplace and continue to invest in their staff. However, most do not.

The real challenge is to help employers understand the value to their businesses of a digitally skilled workforce or, at a more fundamental level, to understand how digital technologies can be deployed within their businesses. This could be of particular use for small businesses. Exposing employers and business owners to the possibilities of digital technologies could be the first step towards improving productivity.

# Glossary of Terms

<b>Assisted digital</b>	Describes a range of developments, strategies, and actions aimed at ensuring that no one is left behind in digital economies.
<b>Core digital skills</b>	This defines the minimum skill-set for people to engage online, for managing information, communicating, transacting, problem-solving and staying safe.
<b>Digital ability</b>	Same as digital literacy.
<b>Digital accessibility</b>	Digital accessibility is the ability of a website, mobile application or electronic document to be easily navigated and understood by a wide range of users, including those users who have visual, auditory, motor or cognitive disabilities.
<b>Digital age</b>	The digital age, also called the information age, is defined as the time period starting in the 1970s with the introduction of the personal computer with subsequent technology introduced providing the ability to transfer information freely and quickly. The time period in which we live now where internet and email are available is an example of the digital age.
<b>Digital awareness</b>	Digital awareness relates to people's individual awareness of their online activity and how that affects their personal and professional life, whether it be today or five years from now.
<b>Digital capability</b>	Digital capability is defined as the skills and/or competencies required for living, learning and working in a digital society.
<b>Digital citizenship</b>	This is about a person's confidence to use digital technologies to fully participate in society. This means that people must not only have digital access and digital skills, but also the understanding of how good citizenship values apply online.
<b>Digital communication</b>	The ability to communicate and collaborate with others using digital technologies and media.
<b>Digital competence</b>	The confident and appropriate use of digital technologies to engage in society.
<b>Digital divide</b>	Digital divide is a term that refers to the gap between demographic population segments and regions that have access to modern information and communications technology, and those that don't or have restricted access. This technology can include the telephone, television, personal computers and the internet.
<b>Digital economy</b>	The digital economy is the worldwide network of economic activities enabled by information and communications technologies (ICT). It can also be defined more simply as an economy based on digital technologies.
<b>Digital emotional intelligence</b>	The ability to be empathetic and build good relationships with others online.
<b>Digital empowerment</b>	Digital empowerment is maximising personal potential through digital technology.

<b>Digital engagement</b>	Digital engagement uses digital tools and techniques to find, listen to and mobilise a community around an issue. The Digital Engagement specialist team in DIA 'provides guidance, tips, and strategic advice across New Zealand Government on how to effectively use the online channel'. The scope of their work is to lead, share and encourage best practice on emerging technologies and information to deliver quality online services that are tailored to the public.
<b>Digital equality</b>	Digital equality means universal access of the internet by making it accessible to everyone, irrespective of one's status in society, be it economical (rich or poor), political (country or abroad), or religious etc.
<b>Digital equity</b>	Digital equity is defined as equal access and opportunity to digital tools, resources, and services to increase digital knowledge, awareness, and skills. This term is often used interchangeably with digital equality (although achieving equity is not always the same as equality).
<b>Digital exclusion</b>	Digital exclusion is part of the overall challenge of exclusion, which typically results in poor health, poor lifelong earnings, marginalisation and social exclusion. It is often used in the same way as "digital divide".
<b>Digital expertise</b>	This refers to the higher level of digital skills required by people who are expected to use digital technologies as part of their daily work.
<b>Digital fluency</b>	A digitally fluent person can decide when to use specific technologies and is able to apply their digital skills to enhance their learning, their work-readiness or their everyday lives.
<b>Digital footprint</b>	Digital footprint refers to the trail, trace, or "footprint" that a person leaves every time they go online.
<b>Digital gap</b>	Same as 'digital divide' above.
<b>Digital identity</b>	The ability to create and manage one's online identity and reputation. This includes an awareness of one's online persona and management of the short-term and long-term impact of one's online presence.
<b>Digital inclusion</b>	A digitally included person is someone who has access to affordable and accessible digital devices and services at a time and place convenient to them, as well as the motivation, skills, and trust to use the internet to pursue and realise meaningful social and economic outcomes.
<b>Digital intelligence</b>	The set of social, emotional and cognitive abilities that enable individuals to face the challenges and adapt to the demands of digital life.
<b>Digital literacy</b>	The ability to effectively and critically locate, evaluate, use and create information with a range of digital technologies. Also referred to as digital information literacy (DIL).
<b>Digital media</b>	Digital media typically refer to the technologies used to access digital content, e.g. smartphones, tablets, computers, TVs
<b>Digital nationhood</b>	Digital nationhood is used to refer to nations that consider themselves to be digitally competent as well as new trans-border 'nations' connected by the internet such as Bit Nation or Estonia's e-Residency.
<b>Digital natives</b>	Digital natives refers to those generations who grow up with digital technologies and are 'native speakers' of the language of computers, video games and internet.

<b>Digital participation</b>	To be a 'digital participant' means making informed use of digital technology and media in one's own life. It means recognising how technology and media offer opportunities for people to participate in new kinds of social activities, civic life, learning and work, and it also means recognising that technology and media must be challenged and questioned rather than accepted passively.
<b>Digital proficiency</b>	A digitally proficient person is able to understand, select and use technologies.
<b>Digital readiness</b>	Digital readiness includes: (1) Digital skills, that is, the skills necessary to initiate an online session, surf the internet and share content online; (2) Trust, that is, people's beliefs about their capacity to determine the trustworthiness of information online and safeguard personal information. These two factors express themselves in the third dimension of digital readiness, namely Use – the degree to which people use digital tools in the course of carrying out online tasks.
<b>Digital rights</b>	The ability to understand and uphold personal and legal rights, including the rights to privacy, intellectual property, freedom of speech and protection from hate speech.
<b>Digital safety</b>	The ability to manage risks online, e.g. cyberbullying, grooming, radicalisation, as well as problematic content, e.g. violence and obscenity, and to avoid and limit these risks.
<b>Digital security</b>	The ability to detect cyber threats, e.g. hacking, scams, malware, phishing attacks, to understand best practices and to use suitable security tools for data protection.
<b>Digital society</b>	A Digital Society is a modern, progressive society that is formed as a result of the adoption and integration of Information and Communication Technologies at home, work, education and recreation.
<b>Digital skills</b>	These are the specific skills needed to engage online, getting connected, managing information, communicating, transacting, creating, problem-solving and staying safe.
<b>Digital transformation</b>	Digital transformation typically refers to the acceleration of business activities, processes, competencies and models to fully leverage the changes and opportunities of digital technologies. Some governments also use the term to refer to whole-of-society changes.
<b>Digital usability</b>	This relates to the ease of use of human-machine interfaces when interacting with digital systems. It also take account of user needs, especially people with disabilities, by ensuring the digital system is digitally accessible.
<b>Digital use</b>	The ability to use digital devices and media, including the skills to manage the devices in order to achieve a healthy balance between life online and offline.
<b>Universal design</b>	The idea that accessibility and usability standards should be blended together in order to create technology that is usable for everyone.

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## APPENDIX 1: Core Digital Skills for Life<sup>7</sup>

Getting Connected	Managing information	Communicating	Transacting
<ul style="list-style-type: none"> <li>• Setting up digital devices (computers, smartphones, tablets)</li> <li>• Loading application software to computers</li> <li>• Downloading apps to phones and tablets</li> <li>• Understanding computer and internet terminology</li> <li>• Logging onto devices and managing passwords</li> <li>• Selecting automatic updates</li> <li>• Basic troubleshooting</li> <li>• Backing up files and keeping copies in the cloud</li> <li>• Connecting to a WiFi network</li> <li>• Keyboarding</li> </ul>	<ul style="list-style-type: none"> <li>• Managing files and folders</li> <li>• Use a search engine to find and compare information</li> <li>• Bookmark useful websites and services</li> <li>• Access new sources of entertainment and games</li> <li>• Assess the accuracy of sources of information, e.g. discern fake news</li> <li>• Respect other's information and have your own information respected (understand copyright issues)</li> </ul>	<ul style="list-style-type: none"> <li>• Keep in touch using email, instant messaging, video calls and social media</li> <li>• Post on forums to connect with communities</li> <li>• Communicate with organisations about their products and services</li> </ul>	<ul style="list-style-type: none"> <li>• Use online marketplaces to buy and sell</li> <li>• Book travel</li> <li>• Manage bank accounts</li> <li>• Pay bills online</li> <li>• Access government services</li> </ul>
Problem-solving	Creating	Staying Safe	
<ul style="list-style-type: none"> <li>• Use online resources to undertake tasks</li> <li>• Use feedback from other internet users to solve common problems</li> <li>• Access online support services</li> <li>• Discern accurate sources of support</li> </ul>	<ul style="list-style-type: none"> <li>• Create a social media post</li> <li>• Create a text document such as a CV</li> <li>• Create and share a photo album</li> <li>• Create and share feedback about products and services</li> </ul>	<ul style="list-style-type: none"> <li>• Use security tools when browsing</li> <li>• Regularly update and run virus-checking software</li> <li>• Manage parental controls</li> <li>• Understand how to manage online identities</li> <li>• Identify scams and other harmful digital communications and know how to manage</li> <li>• Use security settings</li> <li>• Use secure websites for financial transactions</li> <li>• Protect personal data</li> <li>• Respect the privacy of others</li> <li>• Avoid malicious websites, scams and pop-up windows</li> <li>• Practise safe, legal and ethical behaviours online (netiquette)</li> <li>• Use ergonomically good practices when using digital devices</li> </ul>	

<sup>7</sup> Sources: Adapted from Basic Digital Skills definition developed by Go ON UK (Doteveryone, 2017) and 20/20 Trust Digital Step modules (20/20 Trust, 2017)

## APPENDIX 2:

# Applying the Core Digital Skills Framework

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### Examples of capabilities for seniors

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|----------------------|---|
| Managing information | <ul style="list-style-type: none"><li>• Complete online forms</li><li>• Manage personal information</li><li>• Use search tools to find information online</li></ul>   |
| Communicating        | <ul style="list-style-type: none"><li>• Keep in touch using email, instant messaging, video calls and social media to reduce social isolation</li><li>• Post on forums to connect with communities and to participate in local and central government topics</li><li>• Reduce household spending by using online communication tools like Skype and Facetime</li></ul>  |
| Transacting          | <ul style="list-style-type: none"><li>• Set up a RealMe identity</li><li>• Set up My MSD</li><li>• Use online marketplaces to buy and sell, e.g. TradeMe</li><li>• Book travel online</li><li>• Manage bank accounts online</li><li>• Pay bills online</li><li>• Complete tax returns online</li><li>• Access government services online</li><li>• Competency with use of public digital kiosks, e.g. ATMs, ticket machines, ordering burgers at McDonalds, checking in at airports</li></ul> |
| Problem-solving      | <ul style="list-style-type: none"><li>• Access health portal ManageMyHealth</li><li>• Use online tutorials to undertake tasks</li><li>• Fixing simple problems occurring on digital devices - not having to rely on others</li></ul>  |
| Creating             | <ul style="list-style-type: none"><li>• Share digital photos with family and friends</li><li>• Writing life stories and creating articles</li><li>• Creating genealogies using online tools</li></ul>   |

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### Examples of capabilities for new entrants to school (Age 5)

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|----------------------|---|
| Managing information | <ul style="list-style-type: none"><li>• Listening to stories on a digital device</li><li>• Using the internet to locate information</li><li>• Navigate and select resources on simple digital devices such as smartphones and tablets</li></ul> |
| Communicating        | <ul style="list-style-type: none"><li>• Using telephones, email and online communications tools such as skype to keep in touch with parents</li></ul>   |
| Transacting          | <ul style="list-style-type: none"><li>• Understanding why passwords are required for most transactions</li></ul>  |
| Problem-solving      | <ul style="list-style-type: none"><li>• Playing games on computers</li><li>• Drawing pictures on a digital device</li></ul>   |
| Creating             | <ul style="list-style-type: none"><li>• Using digital devices in role-play activities</li><li>• Taking digital photos, videos or audio recordings and sharing with parents, e.g. e-portfolios</li></ul>   |

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### Examples of capabilities for students entering intermediate school (Age 11)

Managing information	<ul style="list-style-type: none"> <li>• Use Google to find information for a school project</li> <li>• Use a browser to access pre-selected websites</li> <li>• Access pre-selected YouTube videos</li> <li>• Know how to respond to inappropriate online material, e.g. tell your parents</li> <li>• Know how to access and use online learning resources, e.g. Mathletics, Reading Eggs</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>• Understand about cyber-bullying and tell adults if a friend is being cyber-bullied</li> <li>• Never go and meet a new friend you have met online</li> <li>• Posting to managed blogs</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Understanding about downloading apps and programmes</li> <li>• Not posting bad stuff about other people</li> </ul>
Problem-solving stolen	<ul style="list-style-type: none"> <li>• Understand how to take care of digital devices and avoid them being damaged or stolen</li> </ul>
Creating	<ul style="list-style-type: none"> <li>• Create artworks using digital tools and share these online</li> <li>• Create slideshows</li> </ul>

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### Examples of capabilities for students entering secondary school (Age 13)

Managing information	<ul style="list-style-type: none"> <li>• Use search tools efficiently to find information</li> <li>• Know how to reference information extracted from the internet</li> <li>• Know how to respond to inappropriate online material, e.g. tell your parents</li> <li>• Understand risks and copyright issues of file sharing</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>• Use internet and common digital devices and software to connect with other users and devices, e.g. email, messaging, texting, forums, social media</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Post to managed blog sites</li> <li>• Be sensible about things you post online</li> <li>• Understand that online posts are permanent</li> </ul>
Problem-solving	<ul style="list-style-type: none"> <li>• Skills certification for basic digital skills</li> <li>• Use online tutorials for learning, e.g. Khan Academy</li> </ul>
Creating	<ul style="list-style-type: none"> <li>• Enter and graph data in a simple spreadsheet</li> <li>• Create presentations using commonly available tools such as PowerPoint, Keynote or Prezi</li> <li>• Create new code to manage computer functions</li> </ul>

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### Examples of capabilities for all school leavers

Managing information	<ul style="list-style-type: none"> <li>• Use a search engine to find information about courses of study or job vacancies, e.g. SEEK</li> <li>• Consult authoritative online resources using basic search and navigation features of a web browser</li> <li>• Critically assess the accuracy of sources of information</li> <li>• Know how to reference information extracted from the internet</li> <li>• Know how to store and retrieve electronic documents for future use</li> </ul>
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Communicating	<ul style="list-style-type: none"> <li>• Use internet and common digital devices and software to connect with other users and devices, e.g. email, messaging, texting, forums, social media</li> <li>• Manage email attachments and know how to download and open .pdf documents</li> <li>• Understand how to use common social software to enhance learning and business opportunities</li> <li>• Contribute to online discussion groups</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Internet banking</li> <li>• Booking travel</li> <li>• Using Studylink for managing student loans</li> <li>• Setting up a RealMe identity for government transactions, e.g. IRD</li> </ul>
Problem-solving	<ul style="list-style-type: none"> <li>• Skills certification for digital productivity software such as word processing and spreadsheets</li> <li>• Use online tutorials to extend learning and solve problems</li> <li>• Use specialised software tools to analyse and synthesise information</li> </ul>
Creating	<ul style="list-style-type: none"> <li>• Enter and graph data in spreadsheets</li> <li>• Present information using multiple formats, e.g. document, spreadsheet, audiovisual</li> <li>• Collaborate in the production of a shared document</li> <li>• Create new code to manage computer functions</li> </ul>

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### Examples of capabilities for the workplace

Managing information	<ul style="list-style-type: none"> <li>• Use search tools to find information online</li> <li>• Manage information in workplace-based systems</li> <li>• Prepare reports</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>• Use internet and common digital devices and software to connect with other users and devices, e.g. email, messaging, texting, forums, social media</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Book travel</li> <li>• Purchase and sell goods online</li> <li>• Manage bank accounts</li> <li>• Pay bills online</li> <li>• Access government services</li> </ul>
Problem-solving	<ul style="list-style-type: none"> <li>• Skills certification for digital productivity software such as word processing and spreadsheets</li> <li>• Use online tutorials to undertake simple tasks</li> </ul>
Creating	<ul style="list-style-type: none"> <li>• Create text documents efficiently (using software productivity tools)</li> <li>• Collaborate in the production of shared documents</li> <li>• Create new code to manage computer functions</li> </ul>

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### Examples of capabilities for small business and NFPs

Managing information	<ul style="list-style-type: none"> <li>• Use online tools to research and identify new markets</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>• Use internet and common digital devices and software to connect with customers and suppliers</li> </ul>
Transacting	<ul style="list-style-type: none"> <li>• Buy and sell goods and services online</li> </ul>

- Understand about digital marketing
  - Book travel
  - Manage bank accounts
  - Pay bills online
  - Access government services, e.g. IRD for tax returns
- Problem-solving
- Use online accounting packages such as Xero or MYOB
- Creating
- Graph data in spreadsheets
  - Know how to create presentations using commonly available tools such as PowerPoint, Keynote or Prezi
  - Know how to create and update websites

## APPENDIX 3: Case Study Matrix

This report refers to a number of digital inclusion initiatives already operating in New Zealand that could warrant further evaluation. For most of the initiatives there is limited independent research evidence of their success or of their value for money, but nevertheless there is enough evidence to justify applying the digital inclusion measures of success identified in this paper. This will at least help us start to build an evidence base to inform future policies and investment strategies.

The initiatives have been categorised using the digital inclusion matrix (below). Brief case studies for some of these have been presented by way of illustration throughout this report.

	Life	Learning	Workplace
Motivation	iPads for Visually Impaired DigiMama WeVisit Smartstart	Computers in Homes Hi-Tech Youth Summer Learning Journey Manaiakalani Gaming Workshops OMGTech! Mind Lab Hour of Code	KiwiSkills Working from Home
Access	School Community Hubs APNK Library Free WiFi Accessible content Wired Marae	Spark Jump Digital Wings	Techsoup
Skills	Stepping UP Techsoup Library Digital Hubs SeniorNet Digital Power UP (Pasifika)	Hi-Tech Youth/ Computer Clubhouse Code Club Aotearoa Microsoft Digital Academy Pathways Awarua Digital Playspace Mind Lab Postgraduate programme for teachers	ICDL Microsoft Office Specialist High value tech jobs (Māori) Secure Online Learning Digital Journey
Trust	Connect Smart	NetSafe Hectors World	Connect Smart
Research	World Internet Project biennial survey Literacy and Numeracy Assessment Tool Digital Inclusion Map Census 2013		

## APPENDIX 4: Standard Digital Inclusion Questions

Digital Inclusion Element	Suggested Questions
<b>Motivation</b>	<p>1. Which of the following statements do you agree with? Scale: Strongly agree to strongly disagree?</p> <ul style="list-style-type: none"> <li>• I like to do as much learning as possible.</li> <li>• I like to keep up with new technologies like ipads and Smartphones</li> <li>• I can save money by buying goods or services online</li> <li>• I like to keep up with the news and sports events as they happen</li> <li>• It is important to be digitally literate today</li> <li>• I can find information online that improves my health</li> <li>• I can find a job online</li> <li>• I need to know how to use the internet to help my children and grandchildren with homework</li> <li>• The internet is important for keeping connected with family and whanau</li> </ul> <p>2. How likely would each of the following factors encourage you to make more use of the internet? Scale: Highly to not at all</p> <ul style="list-style-type: none"> <li>• Monthly subscriptions were more affordable</li> <li>• More data at an affordable rate</li> <li>• Internet connection was faster</li> <li>• Internet connection had fewer technical issues</li> <li>• There was more content relevant to where I live</li> <li>• All government services were online</li> <li>• My local community services were online</li> <li>• Training on how to access and use the internet was available in my local community and affordable</li> <li>• I had my own personal digital device or computer or Smartphone</li> <li>• There were easier and safer tools to use online to share content with my family</li> </ul>
<b>Access</b>	<p>1. Do you have an internet connection at home? Yes/No</p> <p>If yes, what type of internet connection do you have in your home?</p> <ul style="list-style-type: none"> <li>• ADSL Broadband (with landline)</li> <li>• Naked DSL Broadband (without landline)</li> <li>• Satellite or Wireless in rural areas</li> <li>• Ultrafast fibre (UFB)</li> <li>• Rural Broadband (RBI)</li> <li>• Spark Jump</li> <li>• Mobile Broadband/Spark Jump</li> <li>• Dial-up• Other (please explain)</li> </ul> <p>If no, why have you not connected your home to the internet?</p> <ul style="list-style-type: none"> <li>• No internet service available</li> <li>• Too expensive/cannot afford monthly payments</li> <li>• No time/too busy</li> <li>• Not confident about using it/confused by technology</li> <li>• Worried about staying safe online/cyberbullying/scams</li> <li>• Worried about my privacy</li> <li>• Disruption to my family life</li> <li>• Internet makes life harder</li> </ul>

	<p>2. Do you ever use the internet in public facilities in the community where you live? At least once a week/at least once a month/a couple of times in the last year/never done this</p> <ul style="list-style-type: none"> <li>• Local library</li> <li>• Public wifi on the street</li> <li>• Local school</li> <li>• Wananga, polytech or other training facility</li> <li>• Cafe</li> <li>• Another person's home</li> <li>• On another person's device</li> <li>• Other</li> </ul>
<b>Skills</b>	1. How would you rate your ability to use the internet? Excellent/Good/Fair/Poor
	<p>2. How frequently do you use the internet to do the following?</p> <ul style="list-style-type: none"> <li>• Look for information about health, jobs, local events, sport, planning vacations</li> <li>• Buying or using the following services online? Paying bills, comparing products, use bank services, order groceries online, sell online</li> <li>• Use of social media/ posting photos, writing a blog, having your own website etc</li> </ul>
<b>Trust</b>	1. How would you rate the reliability of the information found on the internet? Totally reliable and accurate - totally unreliable and inaccurate scale
	2. How much trust do you have in information from the following services - Television news, print news media, Facebook postings, Stuff online etc. Total trust - No trust at all
	<p>3. Have you had any bad experiences with the internet?</p> <ul style="list-style-type: none"> <li>• Credit card details stolen</li> <li>• Bank login details stolen</li> <li>• Virus infected your computer</li> <li>• Victim of scam</li> <li>• Bought something that was falsely represented</li> </ul>

## APPENDIX 5:

# Digital Inclusion – What does the literature tell us?

## Overseas Digital Inclusion Research

Originally, people were digitally excluded simply due to a lack of access to computers, mobile devices and the internet. Today, at least in developed countries, where the internet and computers are often freely available in libraries and universities, or in cafes and other public spaces, the question of physical access is less of a barrier. In addition, the proliferation and decreasing cost of digital devices has enabled the widespread diffusion of these devices within developed societies. Yet, digital inclusion/exclusion cannot be perceived as a binary; access vs no access or user vs non-user. To correct digital exclusion, it is not sufficient to simply enable access (Livingstone, 2007). A lack of digital skills can also limit the potential of users to explore and fully utilize the benefits of the internet and other digital services. This form of digital exclusion has been termed as the second-level digital divide (Hargittai, 2002.)

The digital divide, in all its forms, can lead to, or even exacerbate, social and economic inequalities (DiMaggio, P., & Bonikowski, B., 2008). While studies have shown that time spent using digital technologies is positively correlated with increased digital literacy (Hargittai, 2002), (Hargittai, 2010), digital technologies can also be used for a range of different purposes, not all of which are productive. DiMaggio differentiated various online/digital activities as either capital-enhancing or recreational activities (DiMaggio, 2004). Past research studies have shown that people of lower socioeconomic status, level of education and/or level of digital skills are more likely to use the internet for recreational purposes, such as Facebook, other social applications, gaming and entertainment (Duggan, M., & Smith, A, 2014), (van Deursen, A. J. A. M., & Dijk, J. A. G. M., 2014). Other studies have shown that internet usage by people from higher socioeconomic status tends to be more capital-enhancing; this includes advanced internet applications for information, communication, education or service-oriented purposes (Bonfadelli, 2002), (Howard, P. E. N., Rainie, L., & Jones, S., 2001), (Peter, J., & Valkenburg, P. M., 2006), (van Dijk, 2005).

Mark Prensky ascribes to a common belief that presumes people belonging to younger generations are inherently skilled due to their early exposure to the internet and digital technologies, thus, along with others, he labels this cohort 'digital natives' (Prensky M., 2005a), (Prensky M., 2005b). Contrary to this belief, numerous studies have shown that younger generations are not a monolithic group of digitally literate people. Demographics, including gender, age, education and socio-economic status, highlight clear differences and inadequacies between young people in terms of their skill levels, understandings of risks, and awareness of internet uses (Calvani, A., Fini, A., Ranieri, M., & Picci, P., 2012), (Gui, M., & Argentin, G., 2011), (Hargittai, 2010), (Livingstone, 2007), (Ofcom, 2015). Research by the ECDL Foundation in Europe in 2016 discovered a huge chasm between young people's perceptions of their digital skills and the reality when subjected to a practical test (ECDL Foundation, 2016). This has led to discussion about the new digital divide – between those who have social networking skills and those who have practical work-ready digital skills. Therefore, an over generalisation of 'digital natives' can lead to negative impacts and exclusionary practices.

## Europe

In 2006 the European Parliament and the Council published a recommendation identifying eight key competencies for lifelong learning – one of these was 'digital competence', which is broadly defined as:

"the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society" (Ferrari, 2013)

This concept has been further developed by the Joint Research Centre of the European Commission into a

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A lack of digital skills can also limit the potential of users to explore and fully utilize the benefits of the internet and other digital services

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People of lower socioeconomic status, level of education and/or level of digital skills are more likely to use the internet for recreational purposes.

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Younger generations are not a monolithic group of digitally literate people. Demographics, including gender, age, education and socio-economic status, highlight clear differences and inadequacies between young people in terms of their skill levels, understandings of risks, and awareness of internet uses.

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comprehensive framework and set of tools for evaluating skills for learning, working and living in the 21st Century. In 2012, the Joint Research Centre suggested that digital competence should be considered as a human right (Ferrari, 2012). In 2016, the European Commission published a digital competence framework for citizens, known as DigComp (EC, 2016a). This framework identified five key areas – information and data literacy, communication and collaboration, digital content creation, safety, and problem solving – as well as 21 specific competencies similar to those used in the UK.

Results are reported as a composite index, the Digital Economy & Society Index (DESI). The DESI 2016 shows that both the European Union as a whole as well as individual Member States are progressing towards a digital economy and society. However, member states are at different levels of development and are progressing at different speeds. Improvement in the overall DESI score was mostly driven by the Connectivity and Integration of Digital Technology dimensions, the two fastest growing dimensions in the index. Developments in Digital Public Services and Human Capital appear to have stagnated during the last year.

Amongst the top performing countries were Finland and Estonia, two countries that are recognised for their efforts to embrace the new digital world and ensure their citizens benefit. Finland published their 2020 Digital Agenda in 2011 (UIS Advisory Board, 2011). The strategy was focused on promoting growth and productivity by directly addressing four challenges:

1. Productivity
2. Ageing population
3. Sustainable development
4. Global competition

The strategy called for government and business services to be digitised to improve productivity as well as recognising the ageing population as a resource instead of a cost. A specific objective was to secure and develop the position of seniors as active citizens. In 2016, the EU DESI index ranked Finland as number one top performer in terms of human capital; 91% of the adult population are internet users and 75% have achieved the EUI benchmark for basic digital skills. Finland also ranked third in terms of digital government services (DG Connect, 2016a).

Estonia ranked as the top performer in terms of digital government services and seventh in terms of human capital; 86% of the adult population are internet users and 65% have achieved the benchmark for basic digital skills (DG Connect, 2016b). Like Finland, Estonia has been pursuing a digital agenda for some years. In 2013, the government published a Digital Agenda for 2020 (Ministry of Economic Affairs and Communications, 2013). A focus of this strategy has been on increasing digital literacy for improving personal well-being as well as the development of higher ICT skills. Like New Zealand, Estonia also set, as a priority, the development of better public services using ICT. As the top performing country in Europe for digital public services, measured by the percentage of citizens transacting with government online (86% completing online forms and 95% filing pre-filled forms online), an outcome that New Zealand is also seeking through Result 10 of the Government's 'Better Public Services' (SSC, 2016).

In the June 2016 quarter, the eight agencies participating in Result 10 achieved 49.7% of all transactions being completed online. While the measures are not directly comparable with those used by Estonia it would be worthwhile taking a closer look at how Estonia has developed the digital competency of their citizens to achieve such a transformation.

New Zealand and Estonia are both part of the D5 group, five countries established in 2014 to promote international cooperation in exploiting the opportunities of the digital world. The next meeting of the D5 group is to be hosted by New Zealand in early 2018 (Dunne, 2016). One of the focus areas to date has been on digital government, where New Zealand has a recognised leadership position with innovations such as the world's first fully online passport renewal service that commenced in 2012 (NZ Government, 2012), and the new SmartStart initiative for new parents which is personalised for each customer (NZ Government, 2017b).

## Australia

In 2011, the Australian Government published the National Digital Economy Strategy (Australian Government, 2011) and an update in 2013, Advancing Australia as a Digital Economy (Australian Government, 2013). The 2013 update acknowledges digital skills as one of the key enablers of digital readiness, and identifies the need to increase the number of people interested in and capable of working in ICT industries as well as equipping all workers with the digital skills needed in their daily working lives. The proposed actions, however, only focus on the development of a

new school curriculum for technologies, aimed at motivating students to pursue ICT careers. There is no evidence of any strategies for growing the digital skills of other students or those already in the workforce.

In 2016 the Australian Council of Social Services (ACOSS) commented:

“This moves the digital divide beyond a notion of social or economic inclusion (based on access and availability of basic infrastructure like the internet), highlighting the direct need for support and training through these transformative advances.” (ACOSS, 2016)

In 2014, a group of researchers from CSIRO called for government to better articulate the role of Next Generation Broadband (NGB) in supporting Australia’s future social and economic prosperity (Mason, 2014). In particular, they sounded warning bells about the groups of Australians who would be left behind because they didn’t have the skills to participate in technology-rich work environments or simply because they could not afford the cost of sustaining an internet connection. They felt more leadership was necessary to build the nation’s digital capability and use NGB to transform business processes.

A more recent development in Australia has been the collaboration between Telstra and Swinburne University of Technology in the development of an Australian Digital Inclusion Index (Thomas, J, Barraket, J, Ewing, S, MacDonald, T, Mundell, M & Tucker, J, 2016). The purpose of the index is to measure the level of digital inclusion across the Australian population, and to monitor this level over time. The index has been designed to measure three key aspects of digital inclusion: access, affordability and digital ability aspects.

The first report on results, summarising the first three years of data (2013-14, 2014-15 and 2015-16), was published in 2016. Data is collected by Roy Morgan Research as part of their Single Source Survey that reaches some 50,000 Australians every year, as well as some in New Zealand. Key findings reported are:

- digital inclusion is growing in Australia (Index has increased from an average of 52.7 to 54.5 over 3 years)
- many Australians are still missing out, especially those with low levels of income, education and employment
- internet access is improving
- digital ability has improved, but lags considerably behind the other two indicators (access and affordability)
- affordability has declined<sup>8</sup>; while value has increased, households are spending a growing proportion of their income on internet services
- people aged 65+ are the least digitally included demographic group
- people with disability have a low level of digital inclusion (10.1 points below the national average), but overall their levels of inclusion are increasing
- indigenous Australians have low digital inclusion, although there has been a small increase over the last 3 years

Until New Zealand is able to produce similar digital inclusion data, we should take special note of these findings. Given the similarity of Australia and New Zealand in terms of both the people and the social and economic challenges, we could consider the ADII as a proxy for New Zealand, until we can gather local data. Analysis of research available in New Zealand (below) certainly seems to align with the Australian findings.

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<sup>8</sup> The World Economic Forum 2016 also reported in their Network Readiness Report that Australia ranked 100th in the world in terms of affordability of a fixed broadband connection. New Zealand was only slightly better in 95th place (WEF, 2016).

## APPENDIX 6: Findings from New Zealand Digital Inclusion Research

### The World Internet Project New Zealand (WIPNZ)

An analysis of all five biennial surveys (2007 to 2015) revealed some key trends:

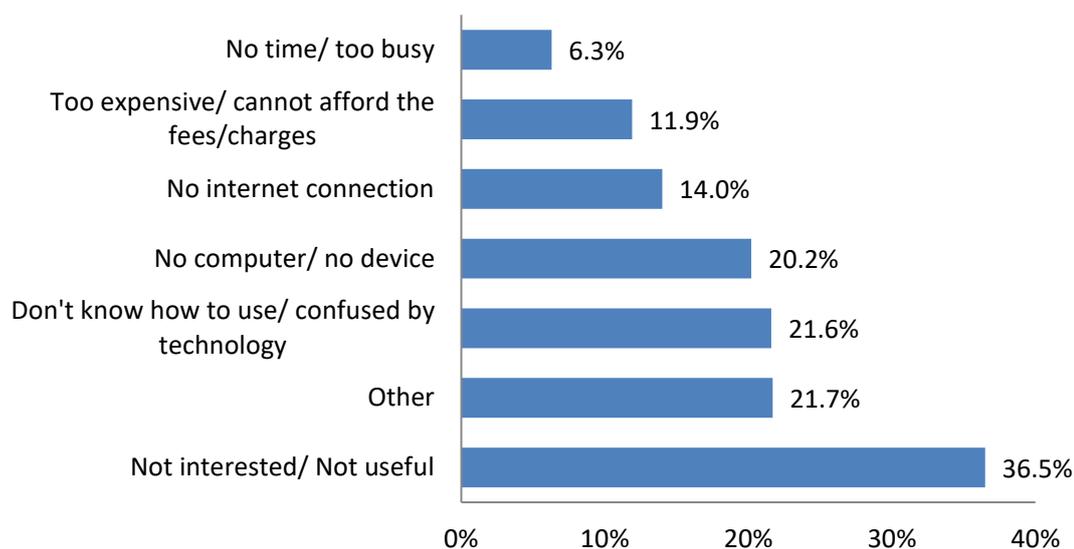
- Increasing rating of ability to use internet
- Slightly decreasing interest in further internet training
- Increasing use of internet (and decreasing non-use)
- Sharply increasing use of social networking services

There is a small (and shrinking) group of non-users and ex-users. The reasons for non-use include: no interest, technology-confusion, not having access and expense (particularly rising over the last two surveys – 2013 and 2015). Increasing concerns about internet costs might seem slightly surprising, given the highly competitive nature of the industry and significant price decreases in recent years. But most changes have been at the top end of the market; the price difference between unlimited data packages and 100GB+ packages has shrunk dramatically but at the lower end of the market, there has been very little change. Certainly consumers get much more for the same dollars, but prices have actually increased for entry-level packages, especially for fixed line services. Until recently it has not been possible to purchase an internet service for under \$60 a month from a mainstream provider. So, as the internet reaches out to households in lower socio-economic areas, pricing of fixed line services will continue to be a barrier.

**The much bigger barrier is “no interest”; this is where efforts need to be focused to make sure “no-one is left behind”.**

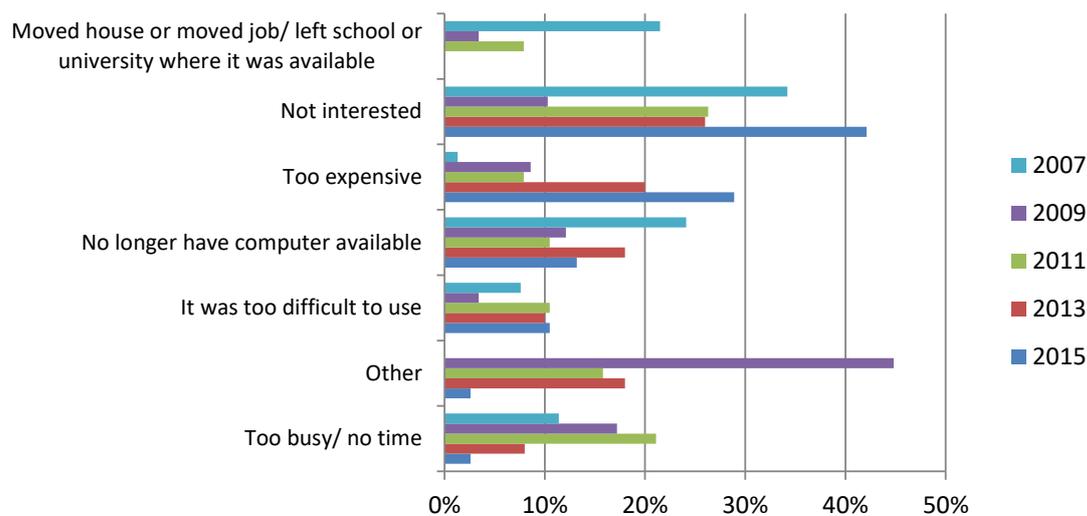
But the much bigger barrier is “no interest”, which we have termed ‘motivation’ in this report. The latest 2015 survey revealed that of the people who don’t use the internet 36.5% indicate that it is because they are ‘not interested/not useful’. This is where efforts need to be focused to make sure “no-one is left behind”.

Reasons why people don’t use the internet (2015 WIPNZ survey)



There has been a similar trend amongst “ex-users”, i.e. people who have used the internet, but for one of more reasons no longer do. In 2015, “not interested” stands out as the most frequently reported response, followed by cost.

Reasons why ex-users stopped using the internet (WIPNZ surveys 2007 – 2015)



## Changing digital divides

An analysis of the five WIPNZ surveys revealed some trends that help to identify groups who may be disadvantaged in terms of their access and use of the internet:

- Internet use decreases as age increases, but overall the gap between older and younger people has reduced since 2007
- Females are higher-end users on social and relational activities, while men are more highly engaged in online entertainment, but there are no gender differences in terms of overall use
- Māori and Pasifika internet use has been consistently lower than for Asian and NZ European ethnicities, but the differences have reduced since 2007, especially for Māori; further qualitative research would be required to understand exactly why differences are reducing and whether this is a trend that can be expected to continue
- Internet use increases with household income for older people, while young people's use is largely independent of income
- Internet use has consistently been higher in cities than in rural areas

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**Māori and Pasifika internet use has been consistently lower than for Asian and NZ European ethnicities, but the differences have reduced since 2007, especially for Māori.**

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## Internet usage in The Southern Initiative

The research found that users in South Auckland recognise the key role the internet plays in day to day life, and appear to value and be comfortable using the internet and associated technologies. Despite this the internet does not appear to be generating as much value for people (including internet users and non-users) compared to other parts of Auckland or New Zealand, because of a lower level of engagement with online services like banking and education. This is also related to the limited internet access experienced by many. How people use the internet (their online activities) has a strong relationship with their understanding of the tools available to them.

The research findings focus on how internet use in the Southern Initiative differs from the rest of Auckland (Crothers, Internet Usage in The Southern Initiative: Memo to the Auckland Council, 2015). The implications of these findings are:

- internet users in South Auckland depend more on connections outside the home
- internet users in South Auckland depend more on mobile devices
- internet use is a newer phenomenon in South Auckland and users are younger
- entertainment dominates online activity in South Auckland
- the internet is generating less value for internet users in South Auckland

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**The reasons stated for not having the internet were mainly related to motivation and costs**

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- online activity is affected by understanding technology
- internet users in South Auckland are more exposed to risk.

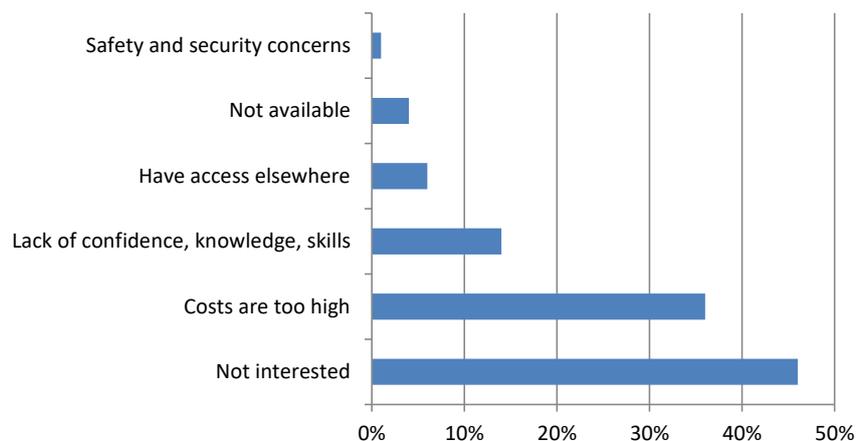
## Household ICT Survey

Key results from the 2012 survey were:

- 20% of all households (326,000) did not have access to the internet
- 12% of all households with dependent children (69,000) did not have access to the internet
- 45% of households with an income of less than \$20,000 (80,000) did not have access to the internet

The reasons stated for not having the internet were mainly related to motivation and costs (see graph).

Reasons for not having an internet connection (HHICT survey, 2012)



## Adult skills survey (OECD PIAAC)

The first three New Zealand reports published by the Ministry of Education are:

- Skills in New Zealand and around the world (MOE, 2016)
- Skills and Work (MOE, 2016a)
- Skills and Education (MOE, 2016b)

The questions covering ICT Skills are asked separately for 'work' and 'everyday life'. Most respondents self-reported that they had the ICT skills needed for work (92.6%), with the majority indicating that their work involves a moderate level of ICT use. Slightly fewer (89.6%) used a computer for everyday life.

The 2014-15 survey was the first time that data had been captured about competencies in solving problems in technology-rich environments. New Zealand scored well above OECD averages for literacy (6th) and numeracy (13th), and topped all OECD nations with problem-solving in technology rich environments (1st).

The sample size of just over 6,000 enables reasonably reliable reporting at a territorial local authority level, although even at this level of granulation there can be challenges; there were no responses from one TLA (Mackenzie) and just four from another (Westland). This resulted in Westland District and Wellington City (with a sample of 244) achieving the same score for digital skills.

Internet NZ and the 20/20 Trust are nevertheless hoping to use PIAAC datasets as part of their Digital Inclusion mapping initiative.

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**New Zealand scored well above OECD averages for literacy (6th) and numeracy (13th), and topped all OECD nations with problem-solving in technology rich environments (1st).**

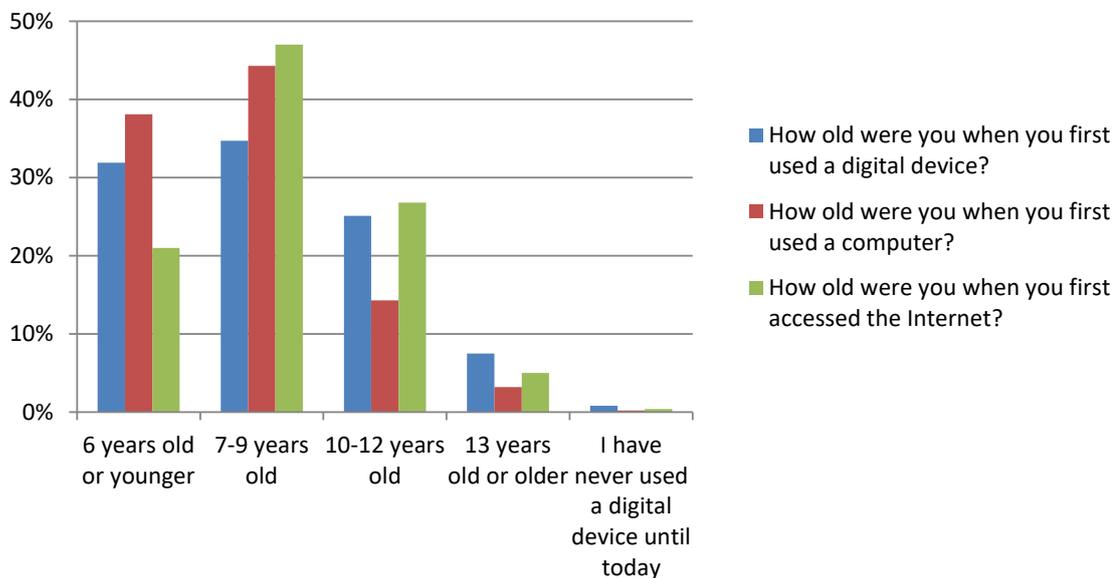
## Ministry of Education PISA

The survey results provide a positive picture of these New Zealand students' access to digital technologies for learning. 96% had access to the internet in their homes, compared to 84% with access at school. The overwhelming majority of students surveyed also demonstrated confidence in using the technologies:

- I feel comfortable using my digital devices at home (96%)
- I like using digital devices (94.5%)
- The internet is a great resource for obtaining information I am interested in (92.8%)
- I use digital devices as I want to use them (89.9%)
- It is very useful to have social networks on the internet (89%)
- If I need a new application, I choose it myself (84.2%)
- When I come across problems with digital devices, I think I can solve them (83.6%)

The 2015 survey provided an interesting insight into when New Zealand children are first getting access to digital technologies.

Access to digital technologies – how old when you first had access?



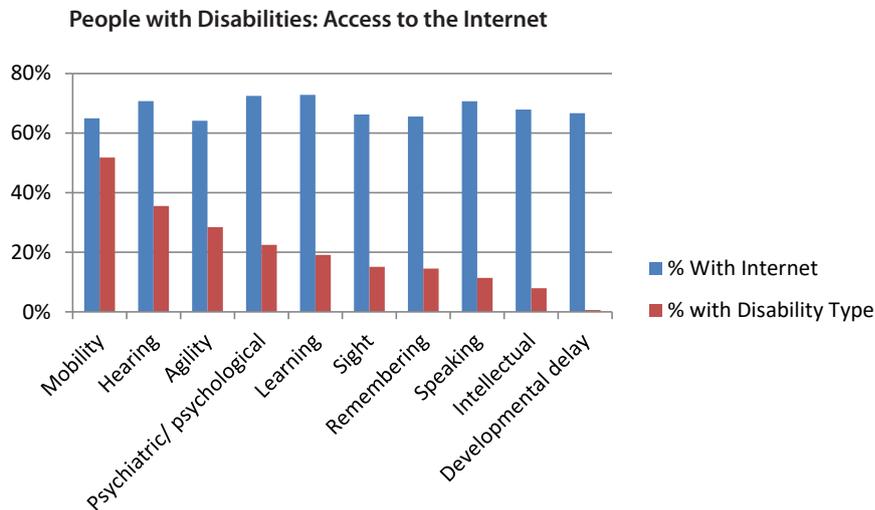
## StatisticsNZ Household Disability Survey

Since Census information about dwellings is attached to each disability survey respondent, a special run of the data was commissioned around whether or not the household had an internet connection. In 2013, an estimated 24% of the population were identified as disabled (1,062,000). Overall, nearly three quarters (72%) of disabled households had a dwelling internet connection. There is little difference in penetration rates compared with people with no disabilities, but those afflicted with the issues of agility, mobility, remembering and developmental decay (i.e. the elderly) have slightly lower rates. For household type the most prevalent category, couple with children (32%), has the highest penetration rate (88%), while single person households (41%) have the lowest. There are similar proportions in each of the household income categories apart from the least wealthy category; coverage increases linearly from 42% in those with least income through to 95% for high income households.

There is little difference in penetration rates compared with people with no disabilities, but those afflicted with the issues of agility, mobility, remembering and developmental decay (i.e. the elderly) have slightly lower rates.

Internet penetration decreases with the age of the disabled person from 80% amongst the youngest two categories to 60% for the oldest. Māori and Pasifika are the least likely to be connected. The survey also revealed that, irrespective of the disability, about the same proportion of people (60-70%) have access to the internet. This does mean though that 30-40% of people with disabilities do suffer from digital access disadvantage. In addition, many websites and web applications do not have good accessibility of content.

**This does mean though that 30-40% of people with disabilities do suffer from digital access disadvantage.**



### The World Internet Project New Zealand (WIPNZ)

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
2007- current	Biennial	Telephone & Internet	1377 (in 2015)	Internet use	InternetNZ (and others)	2017

The World Internet Project is a global initiative with researchers from more than 40 countries and regions examining the social, political, and economic uses and impact of the internet. AUT University’s Institute of Culture, Discourse and Communication has been running the New Zealand branch of the project (the World Internet Project New Zealand or WIPNZ) since 2007. The 2015 survey was the fifth. It drew on a sample of 1,377 respondents supplemented by a further 31 face-to-face interviews that constituted a representative sample of the residents of South Auckland (Crothers, 2015).

#### World Internet Project (Research)



The World Internet Project in New Zealand (WIPNZ) has surveyed a sample of New Zealanders every second year since 2007 about their usage and attitudes towards the internet. This research is the only consistent time series data of internet users and their online use in New Zealand. The survey is carried out by researchers at Auckland University of Technology. The latest survey was in 2015.

Source: (ICDC, 2017)

A wide range of questions are asked about what devices people use, where they use them, and the time spent on the internet. People are questioned about their online activities such as information seeking, entertainment, buying or selling products, communicating with others, social networking and posting content online. The survey also explores people’s attitudes towards the reliability of information online as well as privacy and security in using the internet. Information is also collected from people who have never used the internet and those who have stopped using the internet, identifying their reasons.

Funding for the survey over the years has come from a number of different partners. The 2015 survey was provided by the Ministry of Business, Innovation and Employment, InternetNZ and Buzz Channel Marketing.

In 2016, a trend report was published drawing on data from the five biennial reports (Smith, P., Bell, A., Miller, M & Crothers, C., 2016). This included an analysis of the changing digital divides.

## Internet usage in The Southern Initiative

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
2015	One-off	Face to face	31	Internet use	Auckland Council	None planned

The Southern Initiative is a joint initiative between Auckland Council and central government to transform social and economic wellbeing in the Māngere-Ōtāhuhu, Ōtara-Papatoetoe, Manurewa, and Papakura Local Board Areas. The internet and associated digital tools and technologies are fundamental to this transformation. Of particular importance is equitable access to technology, and how that technology is used.

To date, a detailed understanding of internet usage and online activities at the local level has not existed. This has made it difficult for the public sector to make informed decisions and/or target activity. To address this gap The Southern Initiative funded AUT to expand the scope of the 2015 survey for the World Internet Project New Zealand to include a representative sample (31 individuals) from South Auckland.

## Statistics NZ surveys

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
Census: 2001-2013	5-yearly	Paper and online	1,549,890 households (2013)	Access to internet	Statistics NZ	2018
Household Use of ICT	3-yearly	Telephone interviews (87.5%)	13,046 (2012)	Access to and use of internet	Statistics NZ	Discontinued
2006-2012	Face to face (12.5%)					

Statistics NZ is responsible for the 5-yearly Census and other surveys. Much of the data used in this report comes from the last Census in 2013. This is the only comprehensive survey of all New Zealanders and households, but falls well short of the data needed to monitor and report on digital inclusion. Only one question in the 2013 Census asked about internet access, and it is unclear how households that only had internet access on their smartphones would have responded. For future Census surveys it would be helpful to distinguish as a minimum between the different types of internet connection in households, e.g. smartphone access, ultrafast broadband (fibre or 4G wireless) or standard broadband (ADSL or Naked DSL).

From 2006 until 2012, Statistics NZ conducted a survey of household use of ICT (HHICT) every 3 years. This survey measured access to and use of computers, the internet and mobile phones in New Zealand households (Statistics NZ, 2012). The survey did produce useful national and regional information, but the sample size (13,046 in 2012) was too small to capture reliable data at the Area Unit level.

Statistics NZ has indicated that they have no current plans to re-instate the HHICT survey, but the agency is willing to discuss future needs for household-based information. Given the rapidly changing nature of the digital world, we see a need for a robust annual 'digital inclusion' survey with a focus beyond simple technology counts.

## Adult skills survey (OECD PIAAC)

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
1996-current	10-yearly	Face to face and online	6,177 (in 2015)	Skills	Ministry of Education	2025

New Zealand participated in the mid-2010s OECD Survey of Adult Skills (Education Counts, 2016). This is part of

the OECD's Programme for the International Assessment of Adult Competencies survey (PIAAC). A representative sample of respondents aged 16-65 in each participating country is covered and the survey assesses literacy, numeracy, and the ability to solve problems in technology-rich environments. New Zealand also participated in the 1996 International Adult Literacy Survey (IALS) and the 2006 Adult Literacy and Life Skills Survey (ALL).

The PIAAC survey is being carried out between 2008 and 2019 in 40 countries.

The Ministry of Education contracted the National Research Bureau (NRB) to undertake the data collection for the Survey, which took place April 2014–February 2015. The survey included 6,177 people and 'oversampled' Māori and the 16-25 year old population in order to provide the scope for more in-depth analysis for these groups.

The survey:

- measures the skills and competencies needed for individuals to participate in society and for economies to prosper by assessing literacy and numeracy skills, and ability to solve problems in technology-rich environments
- collects a broad range of information from the adults taking the survey, including education background and how their skills are used at work and in other contexts such as home and the community

## Ministry of Education PISA

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
2000-current	3-yearly	2-hour test	4,500 students (in 2015)	Internet access & digital confidence	Ministry of Education	2018

PISA (Programme for International Student Assessment) is an international study carried out every 3 years, starting in the year 2000 (PISA, 2016). It aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year old students in participating countries/economies. Since the year 2000, over 70 countries and economies have participated in PISA.

PISA assesses how far students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society. In all cycles, the domains of reading, mathematical and scientific literacy are covered in terms of mastery of the school curriculum, and important knowledge and skills in adult life. In 2015, the focus of the survey was scientific literacy and over 4,500 New Zealand students from 183 schools completed a two-hour test and a background questionnaire.

## StatisticsNZ Household Disability Survey

Timeframe	Frequency	Methodology	Sample	Scope	Funding	Next Survey
2001-2013	5-yearly	Paper and online	23,000 (2013)	Access to internet	Statistics NZ	2018

After the 2013 Census the national survey on disability was carried out by Statistics NZ for the fourth time (Statistics NZ, 2013).

Disability is defined as long-term limitation (resulting from impairment) in a person's ability to carry out daily activities. The limitations identified were self-reported or reported on behalf of the disabled person by their parent or primary caregiver. The survey collected data from adults (aged 15 years or over) and children (under 15 years) living in private households or group homes, and from adults living in residential care facilities.

The Household Disability Survey has a sample of 23,000 (14,900 adults and 8,100 children). The sample for the Disability Survey of Residential Facilities (DSRF) was 864 individuals from 177 residential facilities.

Compared with earlier disability surveys, the 2013 Disability Survey included a greater range of information about social outcomes. However, apart from devices (not publically reported) there was no internet-related information.

## Digital Inclusion Map

One of the challenges faced by researchers and policy-makers is to bring together information from different sources to create richer understandings and insights. In recent years, this has been a focus for the New Zealand Government. Two instruments have been developed to facilitate data sharing initially between government agencies but progressively with NGOs and other community organisations:

- Integrated Data Infrastructure (IDI) is a large research database containing microdata about people and households; all data is anonymised so that individuals can not be identified (Statistics NZ, 2016)
- Data Exchange, managed by the Social Investment Unit, allows social sector data to be shared in near real-time between government agencies and social service providers; the data may be anonymised or non-anonymised, depending on individual permissions (SIU, 2017)

Both these tools will be useful in evaluating the effectiveness of digital inclusion initiatives. Other work by the 20/20 Trust and InternetNZ aims to produce a digital inclusion map, building on a number of data sources to identify geographic areas of digital exclusion and enable better targeting of digital opportunities.

### Digital Inclusion Map



In 2015, the 20/20 Trust launched a digital inclusion map identifying over 500 digital inclusion initiatives around the country. It is currently working in collaboration with InternetNZ to create a richer data source, including digital infrastructure and internet access as well as social indicators such as age, education, income and health data. The objective is to build a platform that will enable users to:

- demonstrate when digital inclusion initiatives contribute to better socio-economic outcomes;
- justify digital inclusion initiatives against socio-economic measures; and
- target digital inclusion initiatives for specific geographic communities that face socio-economic challenges.

Source: (20/20 Trust, 2017a)

