Regional Business Growth Initiative

Information and Communication Technology Sector

Contents

ICT Project Final Report -12 May 2014

Executive Summary

The Information and Communication Technology (ICT) sector was selected to be included in the Regional Business Growth Initiative because it has good potential for growth and, although it is a small sector at present, we have businesses in this sector operating very successfully on a local, national and global level.

Most of the ICT industry is not infrastructure heavy, does not (at least initially) require purpose built facilities, is not dependent on a large unskilled workforce, its skilled workers can be sourced locally or globally and the businesses are usually location independent. With head offices based here and a national and global market, the ICT sector may be relatively small but can be a major source of income for the region.

The Wellington region has a much higher proportion of ICT companies and ICT professionals than the New Zealand average and, while there is no strong business case for these businesses to be located outside Wellington at present, limitations on earthquake proof buildings, the need for disaster recovery sites and staff located in Kapiti can only mean locations outside Wellington will become more attractive over time.

These factors, coupled with the significant growth in local ICT businesses have lead to the conclusion that there is a significant opportunity for the development of the sector in Kapiti and Horowhenua.

Six (6) key factors emerged as important for successful ICT business operation: staff, accommodation, infrastructure/connectivity, business connection networks, transport links and business support.

All these factors have elements that limit local growth and the following initiatives have been identified as potential actions to overcome these limiting factors:

1. **Kapiti ICT Hub** - Investigate the potential for a Kapiti ICT hub based on other models of ICT hubs in New Zealand
2. **Digital Leadership Forum** - Support the local Digital Leadership Forum to increase digital uptake and provide the structure to support other ICT initiatives
3. **ICT sector network** - Support the formation of a local ICT business network
4. **ICT people capability development** - Further scoping is done in the setting up of a capability mapping software project to identify local ICT resources for recruitment and development planning
5. **Broadband infrastructure awareness** – Support the dissemination of information on broadband network availability and how to connect
6. **Council ICT sector development support** - Councils adopt a proactive approach to work with the ICT sector to support future development

While some of the initiatives require council support the major project –development of an ICT Hub - is a commercial project and should attract commercial development funding. There is no doubt that development of this type of purpose built facility would be a significant boost to the local ICT sector and would attract new businesses to the area.

Background

Following the Electra Enterprise Forum in April 2013, an Establishment Board was formed to support and attract business growth and development in the Kapiti and Horowhenua region. Four sectors were identified with growth potential: Distribution and Logistics, Service Businesses, Information and Communications Technology (ICT) and Food and Beverage.

Very little data on the local ICT sector is available but data from Grow Wellington confirms this sector as a significant growth area:

"Wellington has the highest concentration of web-based and digital technology companies per capita in New Zealand. The number of ICT export businesses in the region is growing so quickly that Wellingtonians are more than three times as likely to work in ICT as people in other New Zealand cities.

The region's ICT companies Datacom Group, Xero, Intergen and Fronde Systems Group boosted Wellington's growth in the high-technology sector to three times faster than any other region in the country. Trade Me, Catalyst and many other ICT companies have their head offices in Wellington.

Wellington city is also a global choice for business start-ups and relocations in this sector, with companies finding the capital's lower rental and operational costs, compactness and robust data and telecommunications connections ideal for areas such as web and mobile software development."

Objectives

The Initiative Group Terms of Reference outlined the objectives as:

1. Produce a stock take of the current ICT businesses in the region
2. Determine what are the regions resources/attributes which support the business initiative
3. Identify the current gaps and roadblocks preventing growth in the region
4. Recommend actions to fix/remove the gaps and roadblocks
5. Identify support resources and incentives available for existing and new businesses
6. Develop an initial selling proposition

The Regional Business Growth Initiative Co-ordination Committee (RBGICC) has also adopted an overall goal of increasing employment in the region by 5% over 5 years.

Scope

The intent of this report was not to focus on identifying the generic issues impacting businesses generally within the region but to identify initiatives that will improve the region's attractiveness to ICT businesses to locate in the region and to assist existing businesses expand.

For the purposes of this initiative, ICT businesses were defined as businesses that work in Information and Communication Technology related fields. While not a definitive list, this includes businesses involved in things such as computer software and hardware, electronics, internet development and services, data warehousing, telecommunication networks and services, data and computer network management and support services, and home network and computer services.

(Initially call centre management was also included within the scope but ultimately it was excluded as it is being adequately considered as part of the Service Business Initiative).

Issues relating to the quality and the availability of broadband services for all businesses in the regions have also been identified. While non-ICT businesses were not the focus of this initiative, quality broadband availability is critical for most businesses and particularly critical for ICT businesses. Regional telecommunication and broadband network and service availability has been identified. Current coverage and medium-term investment plans and maps have been sourced from Chorus and are available from the authors on request. Coverage and availability within Kapiti and Horowhenua of other fibre, HFC (cable), fixed wireless, mobile and satellite broadband networks has also been identified and is outlined in Appendix Two.

Methodology

To achieve a good understanding of the ICT sector in the Kapiti and Horowhenua regions, the businesses operating in this sector where identified and asked to complete a survey asking three (3) key basic questions:

1. Why are you based in Kapiti or Horowhenua?
2. To be successful, what are the key issues that are important to your business?
3. What are the things stopping you from expanding?

Identifying the businesses in the ICT sector was the most difficult part of the process as many businesses work "off the radar" during their establishment and early development and there is no ICT business network in the region. Publically available business contact databases were sourced and updated and the ICT businesses and professionals that were known were asked for their local contacts. It is inevitable that many ICT businesses will not have been identified by this process. In addition, sole traders servicing the local community were not the target business type and were not included in this survey unless they indicated a positive growth strategy.

Consultants working in the industry as well as those directly involved with an ICT business in the region were included in the survey and businesses in Kapiti, Horowhenua and Wellington were surveyed to capture issues from those already here as well as those with potential to move to Kapiti/Horowhenua. Businesses profiles were obtained and an updated database has been produced.

The major regional and national infrastructure providers were also interviewed so a complete understanding of infrastructure issues could be included.

Stock Take of the Current Businesses in the Region

To gain a full industry profile, four segments of the industry were surveyed:

1. businesses that operate in Horowhenua and/or Kapiti
2. businesses located in Wellington but owned/operated by people living in Horowhenua or Kapiti
3. Wellington based and operated businesses
4. the major regional and national infrastructure and service providers

A total of 29 ICT businesses were surveyed. Of those, 20 were local businesses and the following business profiles were identified:

ICT Project Final Report -12 May 2014

Type

The businesses ranged from small IT service businesses to businesses with sophisticated products, international customers and staff working from multiple locations.

Size

Business size reflected this diversity with staff numbers as follows: (based on Full Time Equivalent Employees)

Table 1 – Kapiti & Horowhenua Local ICT Business Size

Staff Number	Number of Businesses
1 – 5	11
6 – 14	4
15 – 29	2
30 – 50	3

Location

While the majority of the businesses surveyed were in urban locations (either commercial or residential) a number were based in more isolated settings. These businesses were located more remotely because they were either start-up businesses combining home or office premises or as a distinct lifestyle choice. Some businesses also had one or more other offices around the country or people working in remote locations in either sales or local technical support functions.

Table 2 - Kapiti & Horowhenua Local ICT Business Location

Area	Number of Businesses
Paekakariki to Waikanae	13
Otaki	2
Levin	1
Other Rural	2
Porirua	2

Customer Location (% local, regional, national and international)

The businesses in our survey worked significantly outside of their immediate location with only twenty one (21%) of customers identified as local. Thirty percent (30%) of customers were in the wider regional area (Wellington, Wairarapa), 34% national (predominantly Auckland) and 15% of customers were international.

Resources and Attributes that Support the Local ICT Sector

Business Location Drivers

Why are they located in Kapiti/Horowhenua?

The overwhelming response to this question was that lifestyle and sense of community were the key location drivers. Lifestyle factors include rural outlooks, proximity to coast and hills, the short travelling time to work and the ability to have a strong involvement in community activities. Family connections were also important. Access to good schools was seen as a positive for Paraparaumu and Waikanae but was considered a negative for Levin and Otaki.

From a purely ICT business location viewpoint, the lifestyle factors are not significantly different from other towns in New Zealand and are not a compelling selling proposition for ICT businesses being based in Kapiti or Horowhenua. However, a range of other factors have emerged that are positive factors in business location especially for Kapiti. These include:

- North of Centennial Highway (for earthquake risk mitigation)
- Availability of direct flights to Auckland and Christchurch from Paraparaumu
- On completion, the Expressway and Transmission Gully roads will give easy access to Wellington
- Good rail link for commuting in either direction (except for Otaki)
- Competitively priced office space and lower staff costs

As can be seen from the location statistics, the number of ICT businesses that were identified outside of Paraparaumu was comparatively modest. While many of the lifestyle factors that have attracted the people owning ICT businesses across the wider region were similar, Paraparaumu was definitely seen as the favoured location. The key factor for this was the relatively easy access to Wellington from Paraparaumu. Many businesses mentioned that they often had to travel to Wellington to visit customers and it was just workable travelling from Paraparaumu. A number also mentioned the need to visit customers in Auckland and not having to travel to Wellington Airport was a significant advantage. Other contributing factors mentioned were the quality of schools and staff being able to commute by train from Wellington.

Current Gaps and Roadblocks Preventing Growth in the Region

What do they need to operate successfully?

Businesses were asked what the factors that enabled them to operate successfully were and what are the key issues stopping expansion.

Across the 25 businesses we surveyed, six (6) key factors emerged as important for successful business operation: staff, accommodation, infrastructure/connectivity, business connection networks, transport links and business support.

While these are generic across all business sectors to some extent, particular issues that apply to the ICT sector are discussed below.

Staff

Overall this is a highly skilled and highly paid sector with wages/salaries in ICT twice the New Zealand average and growing faster than the average wage (Ref: Ministry of Business Innovation & Employment, Information and Communications Technology Report, July 2013). Staffing requirements vary across the sector and include tech savvy school leavers for customer service and website maintenance positions, ICT managers with many years' experience for management roles and highly skilled developers and those with niche skills for specific projects. Because of this wide range in the demographics and skillset of people working in the sector, the issues that businesses face depend on the specific type of staff they employ.

Staff availability was considered more of an issue for the more skilled positions due to the overall shortage of skilled ICT workers in New Zealand and having to compete with ICT companies offering good jobs in Wellington. On the plus side, a number of businesses said that staffing costs for skilled

people were lower than in Wellington as people are prepared to trade higher salaries for better quality lifestyle.

There is a particular issue in attracting staff in the age group/lifestyle stage (20-35, single or without families) were Coast life is not as attractive as city living. The unique highly skilled software development skills needed often occur in this age group and many of the larger businesses and those working internationally have staff either working from home or in office space in other cities around New Zealand or the world.

There are also a number of local businesses, especially in the web site support sector, where a good school aptitude in ICT is sufficient for entry level positions. However, no local programmes were seen as providing relevant work based skills beyond this basic level and a gap was indentified in skills training for younger people. Various businesses used interns either on an internal basis or through the intern programme at Victoria University.

Table 3 – Summary of ICT Businesses Staff Issues

Staff Skill Set	Issue Affecting Growth	Options	Recommendations
Tech savvy but formal qualifications or experience not needed	• Not currently a significant issue but has the potential to be a problem	• Employ from local colleges and polytechnics • Staff commute out of Wellington	• Liaise with local colleges and polytechnics
Tech savvy with some experience and tertiary qualifications	• Those in the 20-35 age bracket preferring city living	• Staff commute out of Wellington • Staff work remotely • Create a more attractive working environment	• Provide funky space to work and good networking opportunities
Experienced IT professionals	• Not a significant issue but has the potential to be a problem • Often older people and keen to work and live outside the city	• Staff commute out of Wellington • Staff work remotely • Create a more attractive working environment	• Support the development of local ICT networking events to enable project collaboration and continue to develop professionally
Highly skilled software developer	• Limited numbers nationally	• Employ staff outside the area or internationally • Create a more attractive working environment	• Provide funky space to work and good networking opportunities • Investigate capability mapping of IT professionals interested in working in the region

Accommodation

The working environment is an extremely important factor in this sector to be able to attract staff who might otherwise work in Wellington. This means that in addition to the space often needing to have high spec infrastructure (reliable communications and stable power), it also needs to be an attractive work environment. The optimal design for a space was often described as "funky"!

The type of space that would be attractive to an ICT business is generally not considered to be readily available in either Horowhenua or Kapiti. Many businesses work from converted shops or industrial spaces and the office stock in the region is seen as old and tired.

Office rents for the space that is available are typically lower than in Wellington and many start-ups work from home offices.

Four of the larger local companies are expanding and/or looking for good quality space and they have indicated that this is not readily available.

Table 4 – Summary of ICT Businesses Accommodation Issues

Size of Business	Issue Affecting Growth	Options	Recommendations
Start-ups and small businesses with 1-2 FTE's	• Work in isolation • Limited ability for collaborative projects • Often work from home	• Link up with other start ups • Move to an incubator facility	• Provide casual collaborative spaces in ICT hub
Small businesses with 2-6 FTE	• Lack of good quality office space in region	• Move to Wellington • Send work outside the region • Move to purpose built premises • Match up empty space with a number of smaller businesses	• Complete feasibility study for building an ICT hub in Kapiti • Work with Unisys to lease vacant floor and connect to ICT campus
Medium to larger businesses.	• Lack of good quality office space in region • Suitable land with appropriate zoning tightly held and/or not available • Require space for 6-50 staff • Need training rooms, server room, video conferencing facilities, funky space to attract staff	• Move to Porirua or Wellington • Build own premises • Send work outside the region • Move to purpose built premises	• Complete feasibility study for building an ICT hub in Kapiti

Infrastructure –Broadband Connectivity

The region is generally well serviced by broadband networks and most people have multiple choices in networks to connect to and RSPs (Retail Service Providers) to buy services from. See Appendix Two for details on available networks.

While most businesses indicated they would benefit from better internet connectivity, the current infrastructure was adequate, if sometimes slow, for all businesses to operate, even from more remote rural locations. At times reliability and downlink speeds were issues and obtaining a new connection in rural areas can be difficult.

The capacity of the rural Chorus network becomes an issue as the capacity of broadband equipment in roadside cabinets becomes full and customers need to wait for someone to disconnect before a connection is available. The only options for connectivity can then become either dial-up, mobile or satellite.

The Rural Broadband Initiative (RBI) will eventually address many of these issues for rural based businesses as Chorus' broadband network is upgraded and Vodafone's RBI fixed wireless services is roiled out. The current 4G mobile network rollout by all three mobile network companies will also provide a significant boost to broadband availability in rural areas over the next couple of years.

Finding information on broadband connection options and how to go about getting a better connection was an area of frustration for many businesses. Making details of the networks available and helping with connectivity options would be of high value.

Table 5 – Summary of ICT Businesses Infrastructure Issues

Size of Business	Issue Affecting Growth	Options	Recommendations
All business sizes	- Difficulty in finding information on connection options - Reliable power - Reliable connectivity	Persevere until connections obtained	- Make information on broadband service options available - Invite ISP companies to networking events - Provide support to help businesses find the best connection options - Complete feasibility study for building an ICT hub in Kapiti with several communications options available and dual power feeds and backup power when the mains are down

Business Connection Networks

Business networking is important to the ICT sector and a recurring theme was the lack of local ICT specific networks. Business networking is often considered part of personal and professional development and a factor in work/life balance. Many in this local sector work in isolation and being able to mix with peers in casual settings is important. Lack of networking also limits the opportunities for collaborative projects.

With many companies having skills in very specific areas, being able to collaborate on larger tenders and projects would enable existing businesses to grow. Business networks already in place, e.g. Chamber of Commerce and Electra Business Breakfasts were seen as positive for meeting locals but not particularly relevant to the ICT sector. Using local networks to match local investors with start-up businesses was seen as a potential way to achieve local investment and support.

Table 6 – Summary of ICT Businesses Business Networking Issues

Size of Business	Issue Affecting Growth	Options	Recommendations
All businesses	• Not knowing who else is working in the ICT sector locally • Working from home or in remote locations • Existing local networks not adding value to ICT businesses • Not being large enough or having skills to compete for bigger contracts	• Utilise existing business networks (e.g. Chamber of Commerce) • Develop a specific ICT business network	• Initiate specific ICT Networking events • Incorporate collaborative working spaces into ICT hub design • Investigate capability mapping of IT professionals interested in working in the region • Support business networking with an investment forum structure to introduce local businesses to local investors

Transport Links

Transport links are important to this sector with over 70% of clients of surveyed businesses located outside the local area. The Expressway and Transmission Gully road projects are seen as a significant step forward. Improving access to customers to Wellington can only improve the attractiveness of the region as a business base.

Kapiti Coast Airport is also seen as a huge positive for the region. Ticket prices are perceived as high compared to flying out of Wellington but the convenience is considered by many to still make the option attractive. The flight schedule to Christchurch is seen as very business unfriendly at present and the view is that business demand would increase significantly if Air New Zealand were to source an additional plane to fly that route during peak business travel hours. Having a regional airport based in Kapiti is also considered to add to the credibility of Kapiti as a business centre.

Meeting with clients and staff by video conferencing is certainly seen as the way of the future. The increasing availability of high-speed broadband networks and cost effective high-definition video conferencing equipment is making this option more acceptable as a replacement for some face-to-face meetings, making it the "transport of the future".

Table 7 – Summary of ICT Businesses Transport Issues

Size of Business	Issue Affecting Growth	Options	Recommendations
All businesses	• Ease of access to clients • Customers and staff viewing Kapiti as a difficult place to get to work	• Travel or commute to Wellington/Auckland • Move closer to clients • Open sales offices in Wellington /Auckland	• Support ICT hub near airport • Hub to have High Definition video conferencing facility • Ensure good public transport and cycle links from train to airport

Business Support Resources and Incentives

Business support was a "wish list" factor for most businesses in this sector. Business owners in this sector are highly motivated and resourceful and often work in an environment that is quite isolated. No businesses mentioned using local council services for business development assistance and businesses did not see councils as development partners. It was unclear whether there was a lack of knowledge of business support services available or whether current support services were not considered appropriate. The previous Kapiti Coast Mayor was seen as a supporter and ambassador for several larger businesses.

Across both districts, a number of businesses expressed disappointment in council tender processes for work in this sector. The view was that projects were either not put out to the local community or they had parameters so tight that only large companies were able to respond and be successful. There is a perception that local councils do not try to buy local and support local businesses.

Generic issues with obtaining consents were raised and a theme that comes through is the need for a single council contact on a project basis to avoid time wasting, avoid different viewpoints from council staff and, overall, to make doing business with the councils a business friendly process.

The importance of the councils' regional economic development strategies being focused on initiatives that will support the business community and that are developed in conjunction with the business sector was seen as vital for sustained growth. Councils have little engagement with the ICT sector at present (although it is a sector with potential for significant growth) and developing a partnership approach to strategy development and subsequent Long Term and Annual Plans can only improve the chances of growth in this sector.

Issues around the District Plan were also identified, with zoning changes that effect business types in differing areas needing discussion with the business community.

In stark contrast to most of the other feedback on businesses dealings with the councils, positive feedback was received from Chorus on their experience in dealing with both councils in relation to rolling out the UFB network. It is worth noting, however, that Chorus has a significant team of people tasked with proactively managing their relationship with councils and they have very good systems and processes to ensuring that their contractors (Downer in Kapiti and Horowhenua) comply with national standards and local council rules.

Table 8 – Summary of ICT Businesses Business Support Issues

Size of Business	Issue Affecting Growth	Options	Recommendations
All businesses	• Never see any council staff or councillors • District plan zoning changes that effect business location • Council ICT work not offered to local community • Economic Strategies not aligned with ICT sector		• Support ICT networking events • Actively work with businesses to become business development partner and promoter • Develop economic development strategies in conjunction with the local ICT sector • Ensure all council ICT work is offered to the local ICT community

| | | | where appropriate |
| | | | • Consult with business community on planning changes |

Recommendations to Facilitate Growth

For a sector that generally operates "below the radar" in terms of local visibility, the ICT sector is in good health and has real potential for expansion and significant job creation.

Six key factors emerged as important for successful business operation: staff, accommodation, infrastructure/connectivity, business connection networks, transport links and business support.

Some issues require large capital investment for a workable solution while other issues can be addressed with existing resources either from the business community or local councils.

Kapiti ICT Hub

Several larger businesses were looking for office space and considering building their own accommodation and several businesses where interested in strata titles for individual floors. The more companies we talked to, both large and small, in Kapiti and Wellington the more interest we found in a purpose built site.

From the local need for purpose built office space, the concept of an ICT hub emerged and was incredibly popular with all the businesses surveyed. The larger companies expressed interest in relocating into a hub and smaller businesses were interested in either smaller/flexible spaces or in the opportunity a hub provides for using high-tech facilities and for networking with other ICT professionals.

The Clean Tec Building in Otaki was not seen as a preferable location and the old Telstra building in Paraparaumu, while initially built for ICT activities (a call centre), had not been available in configurations suitable to local ICT businesses. The overwhelming preference was a new purpose built facility close to Kapiti Coast Airport.

Local interest has been expressed that would fill 150 plus seats in a purpose built building. While providing a building to fix a few local companies accommodation issues would not in itself support business growth for the region, it does provide the catalyst to develop an ICT hub, which, if done right, creates the environment to support significant growth in the sector.

In addition to providing space for the existing local companies, there is also a strong selling proposition for companies from Wellington having a "warm site" in Kapiti and initial conversations with Wellington companies have confirmed this interest. A "warm site" gives those living locally a local office to work from and, if a move from Wellington is suddenly needed, a company can increase the use of this office knowing that it is live and operating. Many Wellington companies work on a project by project basis and have staff commuting from Kapiti. As projects expand and Wellington space becomes limiting, having a "satellite" office in Kapiti becomes very attractive.

Ultimately, it is envisaged that the ICT hub environment that supports creativity, innovation and collaboration will be the attraction for companies outside the region to move here. Companies may well relocate here or open offices here regardless of office space limitations at their existing sites.

Overseas studies that have looked at the economic benefits of ICT hubs and the ICT sector in cities or regions have identified that there can be a significant economic multiplier effect from the industry (see for example "The IT Industry: Hub of the Massachusetts Technology Economy, University of

Massachusetts – Donahue Institute, November 2009"). This means that spending and employment that the ICT sector directly creates can result in additional local spending and local employment outside the sector. The impact of attracting new companies into a Kapiti ICT hub is likely to be significantly greater than just the direct jobs that will be created.

Other opportunities that were identified with potential are our local aged care sector offering a testing environment for ICT innovations in healthcare. The creative digital sector, while currently very small in the district, also has the potential to be part of a new ICT hub. At this stage only one (1) business in the creative digital sector was surveyed – further scoping is needed to determine who is in these areas and what their needs would be.

An ICT hub can also be a link with local universities, polytechnics and colleges and provides an opportunity for local workplace training and employment.

Flexible and configurable spaces and on-site business support services would also allow the hub to act as an incubator for a range of new and start-up businesses.

Key elements identified as important were:

- A funky campus style site with good indoor and outdoor spaces for people to meet.
- Open style office space that was flexible for multiple needs. Easily configurable for a new tenant or an existing tenant expanding.
- The ability to have a combination of private space and the use of the shared facilities.
- Shared meeting rooms and spaces for functions, customers events etc.
- HD video conferencing facility.
- Robust building infrastructure - power, internet connectivity, security etc.
- Space where small companies could rent just one or two desks and use them on a hot desk type arrangement.
- The ability to come into the centre for just a few days per week to work closely with other companies.
- Lots of parking for both staff and customers.
- Ensure good public transport and cycle links from train to airport.
- Facilities for bike storage and on site showers.
- An on-site cafe that could cater for staff.
- Close to other cafes for meetings and lunches etc.

The EPIC Centre in Christchurch has been mentioned as a very good model of a new ICT hub (see www.epicinnovation.co.nz/) and it is recommended that this model is investigated further.

The next step for this initiative is to develop the concept into a firm proposal. This would need to include identifying a development partner and site options and the creation of concept designs so that the current interest can be firmed up. An initial business case to prove the financial viability of the ICT hub would also need to be developed as a next step.

Digital Leadership Forum

There is already an initiative underway in Kapiti to create a Digital Leadership Forum (DLF). There have been a number started in cities and regions around New Zealand over the past few years and there are successful models to look at such as Wanganui, Gisborne and Dunedin. The purpose of the DLFs is to support the uptake of digital technologies that underpin the economic and social wellbeing of their regions.

DLFs have been the key vehicle for a number of communities, business groups and councils to develop a digital vision and strategy for their region. These strategies have been critical as a key support for ensuring that many of the economic development plans and social aspirations have the digital infrastructure, capability and knowledge needed to be successful.

It is recommended that full support is given to ensure that the Kapiti DLF is adequately resourced and supported with the right leadership. An effective DLF would be the ideal organisation to take on the role of driving a number of the recommended ICT initiatives.

ICT Sector Network

All businesses surveyed supported the formation of a local ICT network where local business owners can meet on both a formal (to share, learn or collaborate) and informal basis (mentoring, swapping ideas, and meeting other people working in the sector). Events appropriate to the sector would aid professional development and remove the isolation that some businesses worked in. Initially this could be a Digital Leadership Forum and/or Chamber of Commerce led initiative but, if successful, it is likely to gain momentum of its own.

The ICT hub would be the ideal venue to hold networking events and there are a number of topics that would be interesting to the ICT community to create events around. The ICT Hub combined with a functioning Kapiti and Horowhenua ICT sector network would create the right environment to attract ICT networking, training and conference events to Kapiti that would currently only be held in Wellington. The recommendation on broadband infrastructure awareness (see below) would create a number of opportunities to bring the ICT community together to get networking underway.

There are potential strong links between the creation of an ICT sector networking group and the recommendation to identify the capability of ICT sector people living in Kapiti and Horowhenua. The ability to identify and link with the people working in the sector, particularly those living in Kapiti and Horowhenua but working in Wellington, and to understand what skills and experience they have would be invaluable for ICT companies needing to recruit new staff.

ICT People Capability Development

Opportunities exist to grow local employment in the sector. Liaison with local colleges, polytechnics and universities to ensure courses are aligned to the needs of the sector and students are given the opportunity to understand the full breadth of the sector is important. There is a need for the ICT sector to have a conversation with the education sector as a whole and develop strategies to ensure the right subjects are being made available to local students so they are well equipped to participate in the industry. There is also real potential for the local ICT sector to coordinate on opportunities to provide workplace training opportunities and internships for ICT graduates. This potential will be significantly enhanced if the sector can get better coordinated through strong local networks and having an ICT hub to centre the industry around.

There is also an opportunity to provide a capability mapping of IT professionals living or interested in working in the region. The ability to know who is working or living in the area and who has specific skills would facilitate recruitment. We have a local provider of capability mapping software and it is recommended further scoping is done in the setting up of this project.

Broadband Infrastructure Awareness

While broadband connectivity options across the region are generally good, knowledge of the options is often poor and the experience of connecting is often not good. A stocktake of the currently available broadband network options and medium-term investment plans has been

undertaken and an overview of them is set out in Appendix Two. Making this information widely available within the sector, as well as to the community and businesses generally, would ensure the most is made out of the options available.

One of the early projects that the Digital Leadership Forum could undertake is a campaign of educating and up skilling the community in services that are available and how to access them.

An example of how something similar is already being done is in Dunedin. The Digital Leadership Forum group there have a group called Digital Ambassadors; local technology and business experts who run a free service by volunteering their time to answer "digital questions". See www.digitaloffice.co.nz/our-projects/ambassadors for more information. This is one approach, others would include a council or business funded "help centre". It is recommended the digital ambassador approach is further scoped.

Council ICT Sector Development Support

As a key sector for potential business growth, it is recommended that Council actively work with businesses to become a business development partner and promoter. This could occur in various ways: supporting an ICT hub with a key council project manager, supporting networking events where councillors attended, all contracts for council ICT services being offered to the local ICT community wherever possible and effectively consulting with the business community on planning changes.

Conclusion

The ICT sector in Kapiti has real potential for growth that will positively contribute to job creation and generating income for the community.

The following initiatives have been identified with the potential to assist in this growth:

1. **Kapiti ICT Hub** - Investigate the potential for a Kapiti ICT hub based on other models of ICT hubs in New Zealand
2. **Digital Leadership Forum** - Support the formation of a local Digital Leadership Forum to increase digital uptake and provide the structure to support other ICT initiatives
3. **ICT sector network** - Support the formation of a local ICT business network
4. **ICT people capability development** - Further scoping is done in the setting up a capability mapping software project to identify local ICT resources for recruitment and development planning
5. **Broadband infrastructure awareness** – Support the dissemination of information on broadband network availability and how to connect
6. **Council ICT sector development support** - Councils adopt a proactive approach to work with the ICT sector support future development

Appendix One - Database of ICT Businesses

Commercially sensitive - Available by request

Appendix Two – Kapiti and Horowhenua Broadband Network

Introduction

One of the initiatives undertaken while compiling information for this report was to produce a summary of the broadband networks across the Kapiti and Horowhenua regions, any future development plans for them and a list of the business focused RSPs (Retail Service Providers) who are present in Kapiti and Horowhenua.

The level of knowledge of the options and services available is generally very low. Many people also have had poor experiences in trying to find out information or dealing with RSPs when wanting to get services or dealing with issues with existing services.

Overview

Connection to the Internet generally involves a chain of interconnected networks and elements, each of which can have an impact on the end user experience. At one end is the end users device (computer, tablet, smartphone etc) and at the other is usually a server that contains the data or runs the service the end user is accessing. For the purpose of understanding the networks and services that are available to Kapiti and Horowhenua residents and businesses, the key network elements that are important to consider are:

- Local Access Networks - that customers physically connect to; and
- Backhaul Networks - that connect the local access networks to the major centres where RSPs services are located (predominantly Auckland, Wellington and Christchurch).

Local Access Networks

The urban parts of Kapiti and, to a lesser extent Horowhenua, are relatively well served by local access networks. In addition, the Crown sponsored UFB (Ultra-fast Broadband Initiative) and RBI (Rural Broadband Initiative) projects will make a significant investment in a combination of fibre optic, copper based ADSL/VDSL and fixed wireless broadband infrastructure right across the region through to 2015 for RBI and 2019 for UFB. At that point, the vast majority of business and residential customers should have access to fast broadband services, and those in the urban areas of Paekakariki, Paraparaumu, Waikanae and Levin will have access to ultra-fast broadband. For the small minority of businesses who are outside the reach of the terrestrial (fibre, HFC, DSL, fixed wireless and mobile services), most should be able to purchase a satellite broadband service.

At a high level, the following broadband networks operate across the region or within parts of it:

- **Chorus DSL (Digital Subscriber Line) network** – While some rural customers will not be able to access the service because they are too far away from the closest roadside cabinet or there is no spare equipment installed, close to 100% of Kapiti and Horowhenua is covered by Chorus' wholesale UBA (Unbundled Bitstream Access) service, which is delivered using the DSL network. Approximately 90% of customers are currently able to access the network with a connection speed of at least 5Mbps, depending on factors like the quality of their house wiring etc. It is the regulated broadband service that RSPs buy from Chorus to deliver their retail broadband services to their customers. The service uses the copper landline network to connect an end-user premise to the DSL equipment (DSLAM or Digital Subscriber

Line Access Multiplexer) situated in an exchange building or roadside cabinet. It is most commonly delivered in conjunction with a POTS (Plain old telephone service) over the same copper line

There are three generations of DSL equipment in Chorus' network. Most of Chorus' urban network, which covers 85% of all households in New Zealand, and an increasing proportion of the rural network, has been upgraded to VDSL 2 (Very high bit rate DSL) equipment. Depending on how it is set up by the network operator and limitations imposed by local regulation, VDSL 2 can deliver downlink speeds up to 100Mbps and uplink speeds of up to 100Mbps. Actual speeds will almost always be lower than this as the speed of the service drops as the distance of the copper wires between the end-user and the roadside cabinet or exchange building increases. Poor quality internal house wiring (that connects the Chorus network where it enters a house (called the ETP or External Termination Point) to the customers DSL modem can also have a significant detrimental impact on broadband performance.

Chorus' service also limits the uplink speed to 10Mbps, and in some situations the downlink speed is limited to 55Mbps to give the service a better reach. Chorus estimates that approximately 60% of their urban customers will able to connect to VDSL 2 at downlink speeds in excess of 15Mbps. Current average downlink speed across Chorus' VDSL network is in excess of 40Mbps, with more than 10% of customers experiencing downlink speeds of greater than 70Mbps.

While most of Chorus' upgraded DSL network is VDSL 2 technology, the majority of services running over the network are delivered as ADSL 2+ (Asymmetric DSL), which has a maximum downlink speed of 24Mbps and uplink speed of 1Mbps.

Much of the rural DSL network is still equipped with the original ADSL 1 equipment, which has a maximum downlink speed of 7.6Mbps and uplink speed of 800kbps. In the rural network, the backhaul service that connects the rural cabinet to the local telephone exchange is often over multiple copper lines, which can limit the maximum throughput of the service. Chorus' network availability tool that provides an indication of which DSL services are available at any New Zealand address can be found atwww.chorus.co.nz/maps

- **Chorus UCLL network** – in addition to the regulated UBA services described above, Chorus is required to provide direct access to its copper network (called UCLL or Unbundled Copper Local Loop) and allow RSPs to install their own broadband equipment in Chorus' exchange buildings and/or roadside cabinets. The larger RSPs have extensively utilised this service in areas where they are able to gain enough market share to make the economics of deploying their own equipment pay. However, to date no RSPs have taken up this option in Kapiti or the Horowhenua, instead choosing to deliver their services using the Chorus UBA service.

In 1970 the New Zealand Post Office (NZPO) introduced the first data service in New Zealand utilising the copper local loop network that has since become the Chorus UCLL network. Since that time, the NZPO, and ultimately Telecom, has delivered a significant array of business voice and data services over the copper network utilising almost every technology the telecommunications industry has developed during that period.

Today, Telecom and some of the larger RSPs still utilise the UCLL network to deliver business voice and data services other than the DSL based services outlined above. This means that business that still rely on services that utilise legacy technologies delivered over twisted pair copper can often still buy them. However, most RSPs, including Telecom, are actively trying

to migrate customers off these legacy technologies and onto IP based services so the availability of these legacy services is fast reducing.

- **Chorus RBI DSL network** – Chorus, in conjunction with Vodafone, have contracted with the Crown to upgrade the rural broadband network to provide a minimum of 5Mbps downlink speed to 80% of rural households. Vodafone is taking on the 80% coverage obligation through the rollout of new fixed wireless cell sites (see below). Chorus is rolling out 3,350 km of fibre optic cable across rural New Zealand to connect rural schools and Vodafone's new cell sites. As it does this, Chorus is also upgrading over 1,000 rural broadband cabinets to ADSL 2+/VDSL 2 and connecting these with fibre optic Gigabit backhaul links.

  When the rollout is completed at the end of 2015, 57% of rural households will be able to connect at a minimum of 5Mbps over the Chorus network. 34% of rural households will be able to connect to VDSL at a minimum speed of 20Mbps. At the end of the RBI rollout, approximately 93% of all Kapiti and Horowhenua households will be able to connect to the Chorus DSL network at a minimum speed of 5Mbps.

  At present, there are some areas where there is not enough capacity in roadside cabinets for all customers who what a DSL service to be connected and some customers have to wait until another customer disconnects before they can be connected. The Chorus RBI upgrade will also replace many of the cabinets that experience a lack of capacity and will solve many of the current capacity issues around Kapiti and Horowhenua.

  Historically, Chorus has made modest investments in the rural network to address areas of no broadband coverage or a lack of capacity. The business case for these investments, however, is very had to make due to the very low customer density relative to the cost. Chorus' recent cost cutting measures because of the signalled reduction in its regulated product prices has seen what little investment there was withdrawn. Outside of RBI, only investment to address urgent maintenance will now be done unless the regulatory battle is ultimately resolved in Chorus' favour.

  Chorus is happy to invest in extending rural broadband coverage where funding can be found by the community or local council. Recent examples have involved councils funding 100% of the upgrade cost.

  Chorus' rural broadband coverage availability tool can be found at www.chorus.co.nz/rural-broadband-initiative/check-our-map/our-network-capability-map

- **Chorus Rural GPON (Gigabit Passive Optical Network, i.e. fibre) network** – as Chorus deploys fibre optic cable as part of the RBI rollout, it will be deploying UFB ducting infrastructure along parts of the rollout. Farms, businesses and households adjacent to this infrastructure will be able to connect to the network and receive the same services that are available within Chorus' UFB network (see below). However, they will need to find an RSP willing to deliver the service and pay for all instillation costs. A map showing the availability of this service can be found at www.chorus.co.nz/rural-broadband-initiative/fibre-in-rural-community/fibre-to-rural-communities-1

- **Chorus business fibre network** – Beginning in 1988, Chorus (including its predecessors, Telecom and the NZPO) has been deploying a fibre optic access network throughout CBDs and business areas in cities and towns across New Zealand. Today, Chorus has defined areas within Paraparaumu, Otaki and Levin called Business Fibre Zones, where it will connect a customer, at the request of an RSP, to a business fibre service (non-UFB) for a connection

ICT Project Final Report -12 May 2014

fee of no more than $1,000. Outside of these zones, any business can be connected to a business fibre service but the install fee can be several thousand dollars depending on the extent of the work needed to connect the customer. This can typically be in the order of $10k to $50k within urban areas and in the $100k plus range outside of urban areas.

The services available over the Chorus fibre network have included many of the legacy voice and data services that are delivered over the UCLL network, but usually the higher bandwidth variants. A number of IP based high bandwidth services (up to 10Gbps) are also available to support business and corporate applications. Plans by some large RSPs include options to deliver speeds as high as 100Gbps in the near future to support customers with the need to create extreme high bandwidth private networks.

As the UFB network is deployed (see below), UFB services will also be available within the Business Fibre Zones and eventually the UFB network will completely subsume the existing business fibre network within the UFB network coverage areas.

There is little publically available information as to where Chorus' Business Fibre Zones are and businesses will need to work through an RSP to determine if they are within the zone. A set of PDF indicative coverage maps of the Chorus network across Kapiti and Horowhenua have been obtained from Chorus and are available from the authors on request.

- **Chorus UFB network** – In 2010 Chorus entered into a contact with the Crown to deploy UFB services in 24 towns and cities across the country (a total of 33 towns and cities are part of the UFB initiative). In Kapiti and Horowhenua this includes, Paekakariki, Raumati, Paraparaumu, Waikanae and Levin. The rollout in Paraparaumu and Levin began in mid-2013 and is likely to take right through to the end of the UFB rollout in 2019. This timeframe is uncertain as only the first three years of the rollout schedule in Kapiti and Horowhenua has been agreed and made public. The rollout in Paekakariki, Raumati and Waikanae is scheduled to begin mid-2014.

As the UFB network rolls out, customers in the completed areas will be able to order UFB services from participating RSPs who have local handover points (where they are able to connect to backhaul services to connect back to their infrastructure in the main cities). At this point it is uncertain which RSPs will provide services in Kapiti and Horowhenua. At the time of writing this report, only Fastcom (a business focused RSP who works with a local Kapiti based agent CCS Technologies) was in the process of building handover points in Paraparaumu and Levin. It is anticipated that all of the larger ISP will also do so in the near future.

The UFB network is being built using a flexible network architecture capable of delivering point-to-point or point-to-multipoint based services. When configured in a point-to-point configuration, where there is a dedicated fibre from the customer's premises to the RSPs equipment or handover point in the Chorus exchange building, very high bandwidth (currently up to 10Gbps) dedicated business services can be delivered. This configuration is similar to the existing business fibre network described above and any of the existing business data services can also be supported. The network can also be configured to provide service redundancy, where two point-to-point connections can be delivered to a single premise over different paths, to provide high network resilience for critical business applications.

The main technology being deployed to deliver UFB services for most business and residential applications is GPON (Gigabit Passive Optical Network) and utilises a point-to-

ICT Project Final Report -12 May 2014

multipoint configuration. The GPON equipment is housed in the Chorus exchange buildings. Feeder fibre connects the GPON equipment to unpowered optical splitters (one feeder fibre per splitter), which are usually housed in roadside cabinets close to customers' premises. Distribution fibre then connects from the optical splitter to individual customers' premises. One feeder fibre and optical splitter can connect up to 32 individual customers.

Chorus' network architecture is continually being developed and is moving to a combination of belowground design (i.e. roadside cabinets and pedestals replaced by belowground pits) and some areal deployments in areas with local planning rules allow (e.g. much of the UFB network in Levin is expected to be deployed on existing power poles). Optical splitter ratios are also being revised in the new architecture with the maximum number of individual customer per splitter reducing to 16.

A GPON network is significantly cheaper to deploy due to the extent of shared network but still has the capability to deliver very high bandwidth services suitable for most applications.

The entry level UFB GPON based broadband service has a downlink speed of 30Mbps and uplink speed 10Mbps. At the top end, Gigabit (1,024Mbps) are planned to be made available over the GPON network in the near future.

UFB network availability maps and future network rollout information can be found at www.chorus.co.nz/maps

- **Vodafone HFC (cable) network** – The Vodafone HFC network was originally built by Kiwi Cable beginning in 1990. That company became Saturn Communications, which was subsequently purchased by Telstra in 1999 and the merged company became TelstraSaturn. A further merger in 2001 with Clear Communication created TelstraClear. Finally, TelstraClear was purchased by Vodafone in 2012.

  The network covers the urban areas from Paekakariki to Waikanae. Coverage is not quite 100% but the vast majority of premises within the urban areas can connect to the network. It was originally built to deliver cable TV with subsequent upgrades allowing the delivery of broadband services over the same cable that delivers the TV signal. Vodafone's fixed line phone service within the HCF coverage area is delivered over a twisted pair copper network that runs alongside the HCF network.

  HFC stands for Hybrid Fibre Coaxial. The network uses fibre optic cable to connect to nodes close to customers premises where coaxial cable is then used to deliver the service the rest of the way to the premises. The underlying technology that delivers the broadband service is DOCSIS 3.0 (Data Over Cable Service Interface Specification v3.0) and has the capability of delivering a maximum downlink speed of 200Mbps. Vodafone currently offers broadband plans over the HFC network with downlink speeds up to 130Mbps and uplink speeds up to 10Mbps. There is further development of the DOCSIS standards underway. DOCSIS 3.1 is expected to be readily available in 2015 for HFC network operators to deploy and will provide the capability to deliver downlink speeds up to 10Gbps and uplink speeds of up to 1Gbps.

- **Vodafone business fibre & copper network** – Vodafone has a reasonably extensive fibre network across the HFC network coverage area. This is the ex TelstraClear network, most of which was built to support their HFC network. This network also gives them the ability to connect to businesses that are close to the path of the existing fibre. However, often there will need to be extensive installation work needed to connect to an individual premise.

In some of the central business districts across the region (Paraparaumu, Levin [check]) Vodafone's fibre network has been built to more easily allow connection to the network and installation cost will be relatively modest. Precise coverage of Vodafone's fibre network is hard to ascertain as outside of their own network coverage, Vodafone will utilise Chorus' or other 3rd parties network rather than their own to reach customers where the economics make sense.

Within Vodafone's Kapiti HFC network coverage area, they also have a twisted pair copper network that utilises a variety of DSL and TDM (Time Division Multiplexing) based technologies. This network delivers a range services from low speed voice and legacy data circuits (technically, not broadband) to 100Mbps business data circuits.

In addition to directly selling services on their network at retail, Vodafone also provides wholesale access to other RSPs to deliver their services over Vodafone's access network [check details].

- **Vodafone 2G GSM, GPRS/3G UMTS/4G LTE mobile network** – The Vodafone network was originally built by American owned BellSouth New Zealand beginning in 1993. The original network utilised 2G (Second Generation) GSM (Global System for Mobile Communications, originally Group Spécial Mobile) technology. Vodafone purchased the network in 1998 and it has gone through many network upgrades and coverage expansions since.

The Vodafone mobile network currently utilises three radio frequencies (900MHz, 1800MHz and 2600MHz) and supports multiple generations of mobile voice and data technologies and applications, allowing Vodafone to offer mobile roaming services to customers of overseas networks operating on different technologies and radio frequencies.

The oldest generation of data services supported is the (2G) GPRS (General Packet Radio Service), which provides dial-up like performance and is not suitable for most modern data applications requiring a Graphical User Interface. It is widely used in New Zealand and globally for Machine 2 Machine (M2M) communication functions such as EFTPOS, vending, machine/metre readings and parking machine transactions, which don't require high bandwidth data connections.

The bulk of Vodafone's mobile data customers utilise the 3G (Third Generation) UMTS (Universal Mobile Telecommunications System) network. (Technically, UMTS is in fact classed as a 4G technology by 3GPP standards body. However, it is commonly referred to as 3G, including by the majority of the telco industry, and will be referred to as 3G in this paper.)

Vodafone's advertising claims its network reaches "97% of where Kiwis live, work and play". As all uses of mobile phones know, actual mobile network coverage can be patchy in places, particularly outside the main urban centres. Mobile data performance can also vary significantly depending on distance from the cell site, physical obstructions (e.g. trees, buildings, hills) between the user and the cell site, the amount of radio spectrum the network operator has available at that site and the number of other users connected to that cell site.

Mobile coverage and performance is progressively being improved through a combination of investment in more urban cell sites, the new cell sites being deployed through the Rural Broadband initiative (see below) and the rollout of LTE technology utilising the new 700MHz radio spectrum (see below).

ICT Project Final Report -12 May 2014

Vodafone use a number of technologies to boost performance and network stability. This includes a Dual Carrier (DC) technology that boosts the throughput of the service. This is available in many main centres and will continue to be rolled out across their network. Overall, most customers should get adequate broadband performance for most applications if they can get reasonable mobile coverage. Real world average performance of UMTS networks usually delivers downlink speeds of around 5Mbps. Within Dual Carrier coverage, average downlink speed can be increased to around 15 to 20Mbps.

The latest generation of mobile technology is LTE (Long Term Evolution), more commonly referred to as 4G (Fourth Generation), and Vodafone launched their service in February 2013 in a limited number of main centres utilising the 1800MHz frequency. At the time of writing this report, Vodafone had extended its coverage to 23 areas, but not including anywhere in Kapiti or Horowhenua.

During the latter part of 2013 and early 2014, the three mobile network companies (2Degrees, Telecom and Vodafone) bid in a Government auction for the 700MHz "Digital Dividend" radio spectrum freed up from decommissioning the analogue TV network. The 700MHz radio spectrum is important to the mobile network operators as it allows them to deploy networks with significantly better coverage and performance, particularly in rural areas, than the higher frequencies they currently have access to and use. Vodafone secured the right (at a cost of $66m) to 2x15MHz blocks of spectrum that will allow them to continue their nationwide rollout of their 4G network.

Radio spectrum is a finite resource, which is why the mobile operators have been prepared to pay so much for it. Ignoring factors relating to signal noise, there is a direct relationship between the amount of spectrum deployed at a site, the number of customers using the site and the performance (speed) customers will be able to achieve.

Current versions of 4G technology will provide maximum downlink speeds of up to 150Mbps and uplink speeds of 75Mbps under ideal conditions (future versions will see substantially greater speeds). Real world conditions with reasonable mobile coverage should still allow customers to reach speeds in the order of 20% to 30% of the theoretical maximums. The use of external directional aerials in a fixed wireless setting, as described below in the RBI fixed wireless section, will produce significantly better service performance and reliability than with a mobile device.

Vodafone's coverage tools to determine predicted coverage for each of its mobile data services at any address can be found at www.vodafone.co.nz/network/coverage/.

- **Vodafone RBI fixed wireless network** – when fully rolled out, the RBI programme will extend to 154 new rural cell sites and 387 upgraded existing rural cell sites. The specification for the fixed wireless broadband service that Vodafone has contracted to deliver is designed to provide a service similar to Chorus' UBA service. Vodafone, together with Chorus, have contracted with the Crown to deliver a minimum downlink speed of 5Mbps and cover a minimum of 80% of rural New Zealand. The contract also requires Vodafone to wholesale the RBI fixed wireless service to other RSPs so that customers have choice for who they can buy their retail service from.

Actual performance of the fixed wireless service should be significantly better than the contracted 5Mbps minimum and actual coverage is expected to be around 87% of rural New Zealand when the rollout is completed in 2015.

Vodafone has also committed to upgrade the technology delivering the fixed wireless service to 4G, as described above, as they rollout their 4G mobile service, and anticipate they will have completed the 4G rollout to the RBI cell sites by the end of 2014. Depending on the distance a customer is from the cell site that their services is delivered from and the number of other customers connecting to that cell site, Vodafone's fixed wireless services delivered over 4G should be able to provide a services with similar levels of performance as the Chorus VDSL network. Utilising the 700MHz radio spectrum should also boost the coverage of the service beyond the 87% of rural New Zealand predicted using their current 3G technology.

The service is delivered using an external directional aerial that is aimed at the nearest Vodafone cell site. The aerial is connected to a modem that provides similar functionality to an ADSL or VDSL modem. A land line equivalent phone service can also be provided using the RBI service.

Service availability maps can be found at www.vodafone.co.nz/broadband/rural/

- **Te Wānanga o Raukawa Otaki fibre network** – in 2009 the Wānanga connected to the KAREN network (Kiwi Advanced Research and Education Network run by REANZ (Research and Education Advanced Network New Zealand Ltd), the Crown-owned company linking education, research and innovation organisations in New Zealand, and across the world).

To connect to the backhaul service PoP (at that time provided by Datalight) the Wānanga deployed a fibre optic cable from the campus site on Tasman Rd, along Mill Rd and through Dunstan St and Arthur St to the railway station.

In a second phase, the Wānanga extended their fibre network along State Haghway 1 to Riverbank Rd and along Riverbank Rd past the intersection of Titoki St. This section includes a spur to the Clean Tech site in Miro St. While the Wānanga's network has been built as a local access network, capable of connecting to premises along its route, it is mainly used for their internal use and has only a small number of private customers, including the Kapiti Coast District Council.

The Wānanga has now disconnected from the KAREN network and is connected to the Internet via a backhaul service provided by Inspire Net Ltd, who leases backhaul fibre from Telecom to connect to their infrastructure in Palmerston North.

The Wānanga is developing plans to deploy internet service in education, public, residential and business communities in Otaki over wireless and fibre where possible but does not currently actively sell broadband services to private businesses and individuals.

- **Telecom 3G UMTS/4G LTE mobile network** – Telecom's mobile data network and service is similar in most respects to Vodafone's. The main difference is that when Telecom built its new XT (3G UMTS) network in 2009, it closed down its old CDMA (3G Code Division Multiple Access) network shortly afterwards, choosing not to support the previous network technologies. This was due to a number of factors but chief among them was the fact that CDMA technology had not achieved the level of worldwide uptake by network operators (therefore, limited demand by international roaming customers) than initially hoped and Telecom needed to use the same radio spectrum it used for CDMA for its new UMTS network.

The Telecom (3G) UMTS network capability is essentially the same as that described above for Vodafone. The underlying technology is the same and Telecom also utilises a Dual Carrier (DC) capability in most main centres.

Telecom also boasts its 3G network covers "97% of the places Kiwis live and work", which suggest its network coverage is very similar to Vodafone's. In reality, while overall coverage may be very similar between the two networks, there are differences in absolute coverage and the quality of coverage between the two networks in many individual areas, particularly rural areas, and potential customers need to ascertain who has the best coverage in the specific areas they plan to use their mobile data services.

Telecom has also started to roll out a (4G) LTE network across the country using some 1800MHz radio spectrum it has access to. At the time of writing this report, Telecom had deployed 4G in parts of Auckland, Wellington and Christchurch.

Telecom also won the rights to some of the 700MHz spectrum for the deployment of its 4G network. It initially won 2x15MHz blocks at a cost of $66m (the same amount and cost as Vodafone). It also won an additional 2x5MHz block, which was not purchased in the first round of bidding, at an additional cost of $83m. This additional 10MHz of spectrum should provide Telecom with a significant advantage when building its 4G network, potentially allowing the Telecom 4G network to deliver greater speeds than its competitors' networks.

Telecom have indicated that they intend to install their own mobile infrastructure on all of the new cell sites that Vodafone is building under the RBI initiative (Vodafone is required to provide access to other mobile and wireless providers on all sites build with the Crown subsidy). These factors should allow Telecom to build a 4G network with comparable rural coverage to Vodafone's. However, at the time of writing this report, Telecom was still waiting for Commerce Commission clearance for the purchase of the additional block of spectrum.

Telecom mobile network coverage tool can be found at
www.telecom.co.nz/mobile/mobile/overview/4gupgrade/

- **2 Degrees 2G/3G mobile network** – 2 Degrees Mobile Ltd is the third entrant into the mobile network business in New Zealand. It entered the market in 2009 after almost a decade of planning and lobbying for changes to the regulatory environment to reduce the barriers for the entry of a new player.

  In 2006 and 2007, the Commerce Commission set out an agenda to make changes to the rules for the mobile industry, which ultimately led to 2 Degrees network build and launch. Most significant was the mandating of the ability of third parties to be able to roam onto the existing network operators networks under certain conditions. This led to an agreement between 2 Degrees and Vodafone that allows 2 Degrees' customers to connect to Vodafone's network when they are outside the 2 Degrees network coverage. In addition, mobile network collocation rules were implemented to facilitate one mobile network operator being able to install its equipment and antennas on another mobile networks operator's cell site mast.

  2 Degrees began its network build in 2007 under the name New Zealand Communications. Prior to that, it had been Econet Wireless under a previous ownership arrangement dating back to the setup of the Hautaki Trust that holds 3G radio spectrum that was won in the early 90's through a Waitangi Tribunal challenge to the Crown's ownership rights. The Hautaki Trust is still a part owner of 2 Degrees through its ownership of its 3G radio spectrum.

The 2 Degrees network utilises the same basic technology as the Telecom and Vodafone networks. It has (2G) GSM and uses EDGE (Enhanced Data Rates for GSM Evolution) for 2G data, which is different and has better capability than Vodafone's 2G data network that uses GPRS. It also uses (3G) UMTS, including Dual Carrier capability. The network extends to all major towns and cities across the country.

Their standard "Zone Data Packs" only allow users to access mobile data on 2 Degrees' own network. The 2 Degrees network coverage across Kapiti and Horowhenua is reasonably extensive and provides cost effective mobile data options for customers not needing to use mobile data outside the 2 Degrees coverage area. The 2 Degrees network zone coverage tool can be found at www.2degreesmobile.co.nz/mobile-data/zones

As mentioned above, 2 Degrees has a roaming agreement Vodafone that allows its users to access 2G and 3G voice services and 3G data services outside of 2 Degrees' own network coverage. 2 Degrees customers wanting to access mobile data outside of the 2 Degrees network coverage need to purchase "NZ Data Packs". Mobile products and services tend to be changed and updated frequently and the mobile data products described here were accurate at the time of writing. The 2 Degrees website should be checked for up to date information on the mobile data products available.

2 Degrees also purchased 700MHz 4G radio spectrum in the recent Crown auction. It won the right to a 2x10MHz block for $44m. This is only ⅔ of the 4G spectrum that Vodafone acquired and ½ the spectrum that Telecom acquired. This will mean that 2 Degrees will need to install more 4G cell sites that the other networks to be able to achieve the same coverage and network performance with its 700MHz spectrum.

2 Degrees plans to begin its 4G rollout during 2014 using 1800MHz spectrum and ultimately complete its network using its 700MHz spectrum.

- **IPSTAR satellite broadband service** – nationwide coverage (subject to terrain – requires line of sight to satellite). Delivers a range of residential and business services with a maximum downlink speed of 4Mbps and maximum uplink speed of 2Mbps. Farmside (www.farmside.co.nz) and Natcom (www.natcom.co.nz) offer broadband plans using ipstar*. Farmside also note that plans using the EUTELSAT GE23 satellite may also be available where line of site to the IPSTAR satellite is not available from a property.
- **Optus satellite broadband service** – nationwide coverage (subject to terrain – requires line of sight to satellite). Delivers a range of residential and business services with a maximum downlink speed of 5Mbps and maximum uplink speed of 1Mbps. Wireless Nation (www.wirelessnation.co.nz) sell the Optus satellite service in New Zealand.

Backhaul Networks

After some industry restructuring over the past few years, there are now four national backhaul network providers – Chorus, FX Networks, Telecom and Vodafone. All four have PoPs (Points of Presence, i.e. places where they can interconnect with local access networks), or the capability to deploying a PoP in all of the main centres across the region if there was a commercial need. The geography of the region, and the fact that all main centres are situated along national highways, means that all of the national backhaul networks pass through each of them.

In addition to the national backhaul operators, there are several operators that have regional networks. A number of the larger RSPs also build their own backhaul networks to carry their internal

traffic between Internet exchanges around the country. These backhaul networks are mostly built by either leasing fibre or buying inter-regional backhaul links from one of the main national backhaul network operators, who all have a range of backhaul products to support from modest use to multiple Gigabit capacity.

A good local example of a regional backhaul network built utilising a combination of dark fibre and inter-regional backhaul links leased from the national backhaul operators is Fastcom's regional backhaul network. This links Wellington, Paraparaumu, Levin, Palmerston North and Masterton in a redundant ring configuration.

Retail Service Providers (RSPs)

During the telecommunications industry restructure and regulatory reforms during 2008 to 2010 to facilitate the Telecom/Chorus participation in the UFB and RBI initiatives and, ultimately, the breakup of Telecom and Chorus into two separate companies, a stronger separation of retail and wholesale functions within the industry was mandated for any party participating in the Crown sponsored initiatives. Chorus became a wholesale only company, only able to sell to RSPs or other network operators on an open access and non-discriminatory basis. To access services on the Chorus network, end-users must purchase from RSPs who have a contract with Chorus. RSP mostly use the Chorus network products as inputs to their own services that they ultimately provide to retail customers.

For a number of Chorus products, an RSP must have a physical handover point in the local Chorus exchange building to be able to provide services to the local area. There are also a number of products that allow an RSP to have Chorus or another backhaul network operator to provide the connection from the local Chorus exchange building to their operation centre, often in Auckland, Wellington or Christchurch. The result is that not all RSPs are able to sell their services in Kapiti and Horowhenua. In particular, not all RSPs are currently able to sell UFB services and, of the ones that do, not all of them will necessarily be set up to sell in Kapiti and Horowhenua.

The current list of RSPs that are known to operate in Kapiti and Horowhenua are as follows:

[The table of RSPs and their web addresses was not available at the time of publishing this report. It is hoped this will be available soon and the report will be updated with the completed table. Please check back on the Electra website to find the updated report.]

ICT Project Final Report -12 May 2014