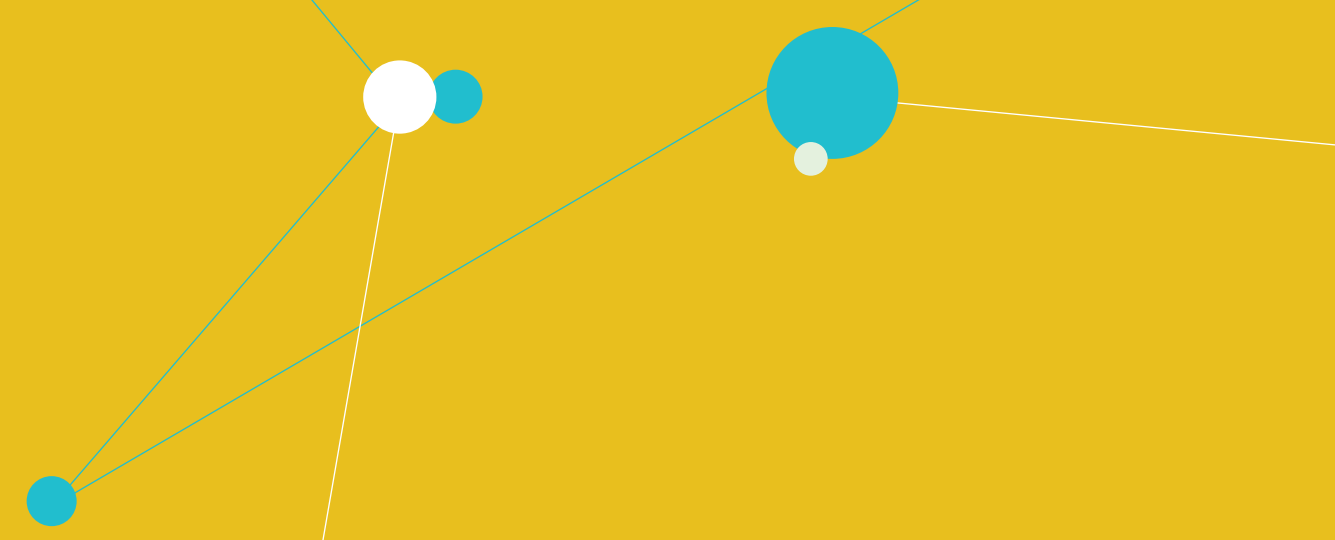




TELECOMMUNICATIONS—
ENABLING NEW ZEALAND'S
FUTURE





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TELECOMMUNICATIONS: ENABLING NEW ZEALAND'S FUTURE

FOREWORD BY GEOFF THORN, CEO OF NEW ZEALAND TELECOMMUNICATIONS FORUM (TCF)

Telecommunications services have become a key staple of modern life. As consumers, we expect fast, ubiquitous access to networks that allow us to get on with our digitally-connected lives.

These are genuinely revolutionary times, for the user and for the telecommunications industry which enables it all. Such immense change warrants a closer look at New Zealand's telecommunications sector. We believe the time is right to think about where we are, how our industry is performing, and where technology is taking us.

This document summarises how New Zealand compares with our OECD counterparts; the contribution of the sector to the domestic economy; and insights into what the future may hold.

New Zealand's world class digital network

The telecommunications industry in New Zealand is investing at one of the highest rates in the OECD. It is one of New Zealand's most

innovative sectors, and provides a range of services that are increasingly competitive on both price and quality compared to other countries. The sector is helping to lift our living standards, drive technological change, and enhance the economy's underlying productivity capacity.

Such progress is the result of unprecedented levels of investment by industry participants, innovation, industry collaboration as well as improving competition in a number of areas in the market. Combined, these factors make New Zealand a more prosperous place to live and do business.

The roll out of Ultra Fast Broadband (the most ambitious project to date); the Rural Broadband Initiative; and the exceptionally quick deployment of three separate 4G mobile networks has underpinned this progress. These services are improving New Zealanders' access and connectivity speeds.

Connecting learning centres, healthcare providers, emergency services and other community services to high speed broadband is delivering life-changing benefits for individuals and groups.

Today, New Zealand has approximately five million telecommunications connections. These require a high quality, reliable service for purposes such as banking, communication, education, entertainment and more.

As for tomorrow, we can assume the demand for data will continue to rise at a breath-taking rate. Digital natives, the next generation of New Zealand's leaders, are growing up with technology at their fingertips. The Internet of Things is fast becoming a reality, reinventing how we operate: from the explosion of health-related wearables and devices that report minutiae on our wellbeing; to driverless cars capable of safely navigating from A to B without human input.

To conclude, we've come a long way in a short time. The sector has undergone massive transformation in the last decade, and we're now performing beyond our OECD peers in many ways.

As a nation, we can be proud of our world class telecommunications networks. Through sensible future investment, innovation and competitive markets we can remain in that position.

“ AS A NATION, WE CAN BE PROUD OF OUR WORLD CLASS NETWORKS.

The information in this document is presented in good faith using the information available at the time of preparation (November 2015). The TCF appointed an independent research company (Sapere Group) to undertake industry research sourced from publicly available information. This is a summarised version of that research. Full details on data source and references are listed in the full report, a copy of which is available from the TCF.

While the TCF has made every effort to ensure the accuracy of this report, it takes no responsibility for any errors or omissions in relation to the information contained herein. The TCF will not be liable to any person or organisation for any damage or loss which may occur in relation to taking, or not taking, action in respect of any information or advice within this report.

CURRENT STATUS: A SNAPSHOT OF NEW ZEALAND'S TELECOMMUNICATIONS INDUSTRY

\$ 1.7b

Investment \$1.7billion per annum; the second highest out of all OECD countries.



Equal highest users of smartphone banking in OECD.



Roll out of UFB and rural broadband initiative accelerates.



Early adopter of devices – video surveillance, tracking, healthcare monitoring.

4G

Rapid deployment of three 4G networks.



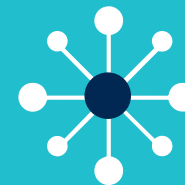
Nearly half a million customers moved from capped to uncapped broadband connections in the last year – from 8% to 33% (June 2015).



Fixed and mobile download and upload speeds improving.



The telecommunications sector employs 14,460 full time employees.



250% increase in total UFB connections (in the year to Sept 2015); Fastest fibre uptake in the developed world.



Consumer telco costs have declined while nearly all other household expenditure has increased.

46%

New Zealanders benefiting from increasingly competitive pricing: Mobile pricing reduced 46% over 2 years to 2014, second greatest reduction in mobile prices in the OECD.



New Zealand households now consuming double amount of data as they did 12 months ago.

REALITY CHECK: TELECOMMUNICATIONS MAKING A DIFFERENCE

NEW ZEALAND'S TELECOMMUNICATIONS SECTOR IS MAKING A SIGNIFICANT CONTRIBUTION TO OUR LOCAL ECONOMY. IT IS A KEY ENABLER OF GDP GROWTH AND PRODUCTIVITY, AND IS PREDICTED TO LIFT NEW ZEALAND'S GDP BY 1.5%*

*Source: broadbandtoolkit.org/1.3

- The ICT's sector contribution was higher than any other OECD country, including our 10 main OECD export competitors in two periods: 2001 to 2007; and 2008 to 2013.
- An MBIE report on ICT showed the sector accounts for \$3.09 billion of gross domestic product, growing at an annual pace of 9.3 percent between 2008 and 2013.
- A 2012 study into the social and economic impacts of UFB and RBI for New Zealand showed that the economic activity generated from building UFB and RBI will grow our GDP by \$5.5bn over 20 years – that's a \$1.37 GDP impact for every \$1 invested.

The study, by Alcatel Lucent's research arm, Bell Labs, indicated that over 20 years, up to **\$33bn will be saved from doing things more efficiently and effectively online.** Here's how:

In healthcare: more video-conferencing between doctors, specialists and patients, resulting in faster access to physicians, faster delivery of care and remote diagnostics. These changes will reduce emergency room visits, hospital admission, the need for tests and the costs of long-term prescription drugs. *Estimated savings = \$6bn.*

In education: technology in classrooms improving learning, lowering costs and giving learners and teachers access to national resources such as Te Papa, as faster more consistent broadband speeds enable better video-conferencing. *Estimated savings = \$3bn.*

In business: improved productivity, lower travel costs, greater flexibility for people to work from home, lower network and communication expenses, and saving from putting applications into the cloud. *Estimated savings = \$14bn.*

In agriculture: savings from broadband applications that improve milk solid production – applications such as online farm management and herd management tools and automated farm data collection and analysis tools. *Estimated savings = \$9bn.*

WHAT IS UFB?

Ultra-Fast Broadband is a generic term used to describe the transmission medium (such as fibre, copper or wireless) capable of delivering high-speed internet access.

In New Zealand, the government's UFB initiative is to provide faster, better internet to at least 99 per cent of the population by 2025. The roll out of fibre optic cables throughout towns and cities is enabling users to typically enjoy download speeds of at least 100Mbps.

WHAT IS RBI?

The Rural Broadband Initiative is designed to help rural communities also benefit from high class internet connectivity. The combination of wireless towers, rural cabinets and fibre will enable more than 90 per cent of users outside UFB areas to enjoy broadband internet with minimum peak speeds of 5Mbps, and up to 50Mbps if government targets are met.

TELECOMMUNICATIONS: THE POWER PLAYER FOR NEW ZEALAND INC



EMBRACING THE DIGITAL REVOLUTION

The impact of a world class network on New Zealand's economic and social prosperity goes well beyond the face value of the sector in terms of revenue, investment or employment.

The ability to connect wherever we go and whatever we do unleashes New Zealand from being at the edge of the world geographically, to the virtual centre. These connections drive improvements in health, education and productivity outcomes – locally and globally.

Our country's reputation for innovation and creativity now becomes more visible to the world. As early adopters, we're taking advantage of smart devices and next-generation technology. All New Zealanders are able to collaborate with each other and the rest of the world in a way that only a few were able to in the past.

REPOSITIONED IN THE PECKING ORDER

The economic growth of New Zealand has long been underpinned by a combination of interconnected transport networks (road, ports, airports), along with utility networks and critical services such as hospitals and schools. These have all contributed significantly to the wellbeing of our communities.

Although important in the above equation, telecommunications previously sat below a number of other infrastructure services in the pecking order, particularly when it was primarily focused on the humble telephone, providing voice-only services.

But the growth of the mobile telephone, followed by its evolution towards data, the availability of broadband and smart devices elevated the importance of telecommunications services.

It now ranks in the top echelon of critical infrastructures. Consumers expect network accessibility wherever, whenever. Like power and water, we're accustomed to its availability without giving its source a second thought.

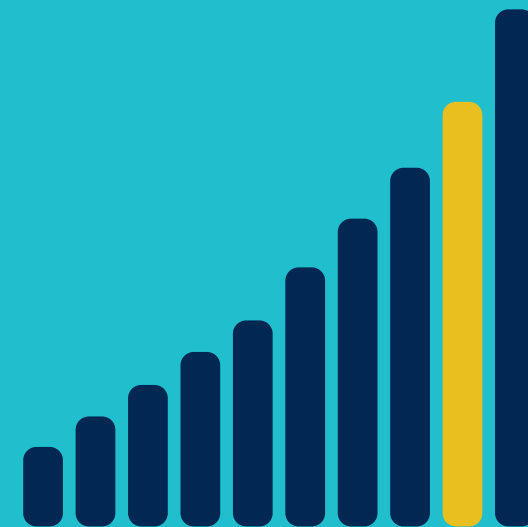
AT A GLANCE



250



WE'RE LEADING THE PACK IN THE DEVELOPED WORLD IN THE SPEED OF OUR SWITCH TO FIBRE-OPTIC BROADBAND, WITH A 250 PER CENT INCREASE IN TOTAL CONNECTIONS LAST YEAR, THE HIGHEST IN THE OECD.

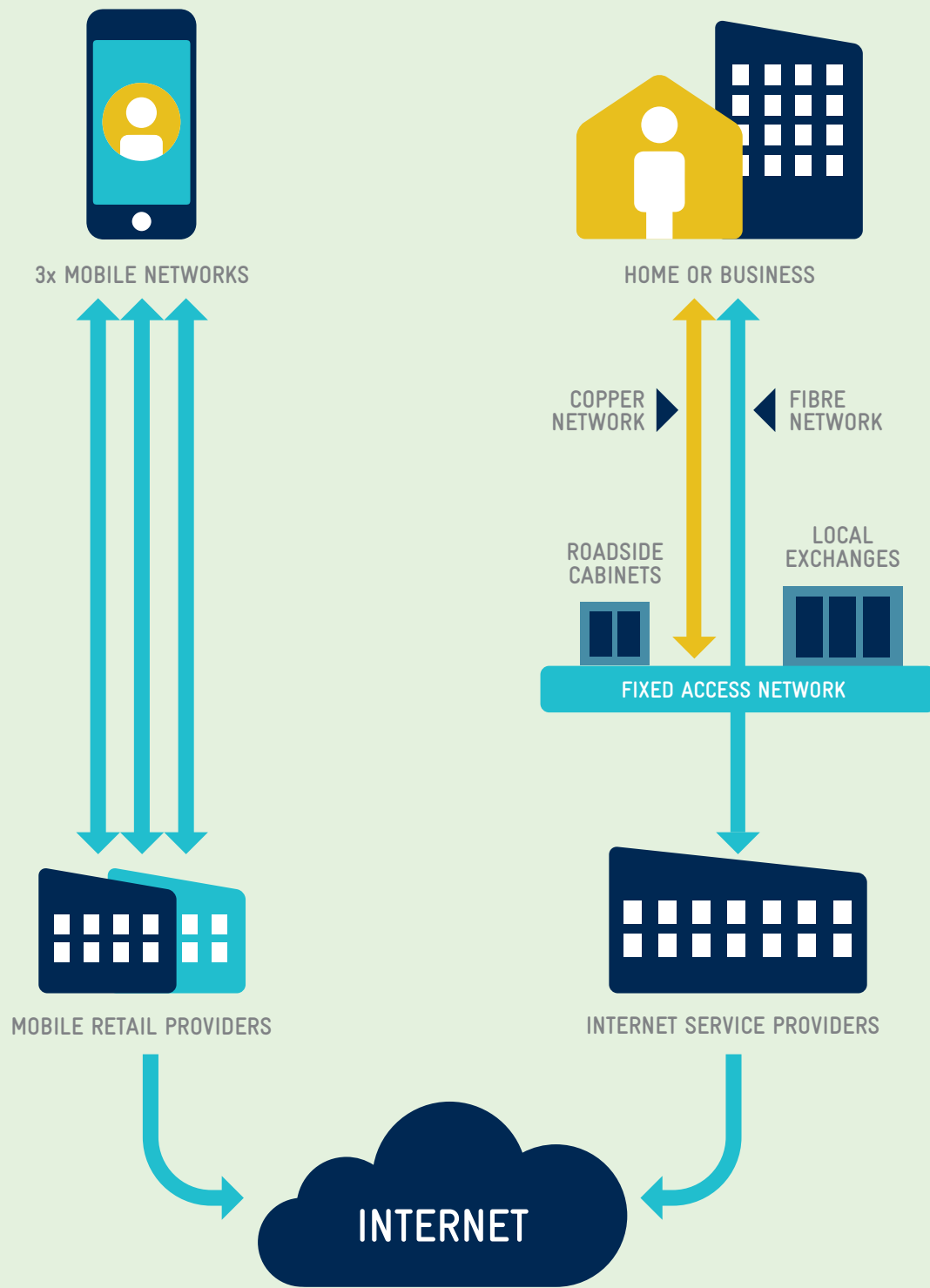


Our investment rate was the second highest out of the top 10 OECD countries which comprise our main competitors in global export markets.



New Zealand's mobile pricing has reduced 46 percent, the second greatest reduction in mobile prices in the OECD.

CONTENT TO CONSUMER: THE DATA JOURNEY



HOW THE NETWORKS WORK NEW ZEALAND'S TELECOMMUNICATIONS PROVIDERS WORK IN UNISON TO CONNECT NEW ZEALANDERS TO THE INTERNET OVER MOBILE, FIXED AND WIRELESS CONNECTIONS.



The fixed access network reaches into homes and businesses over a combination of copper, fibre and in some regions, cable. Chorus delivers the copper network and 70 percent of the UFB fibre network. The remainder of the UFB fibre network is delivered by Northpower Fibre in Northland; Ultrafast Fibre in the Bay of Plenty, Taranaki and the Waikato area; and Enable Networks in Christchurch.

The traffic downstream (or upstream) from each of the 1.22 million connections is then transported around the country by a core network of lines and exchanges before being handed over to broadband retailers – such as Spark, Vodafone, Orcon, 2degrees and many others – at different locations around the country.

The providers optimise their core networks to ensure residential and business consumers get the best possible broadband performance. This includes caching – or keeping local copies – of the most frequently used content for efficiency and managing how the traffic is transported around the country. They also provide the essential online security tools to minimise spam and keep data safe. Software firewalls, sophisticated intrusion detection tools and spam filtering are such examples all designed to thwart malicious content.

Broadband retailers also purchase international capacity that allows New Zealanders to access content from servers around the world, such as YouTube, Google, Facebook and infinitely more.

The mobile network infrastructure runs over a combination of 2G, 3G and 4G technologies operated by Spark, Vodafone and 2degrees. Data is transported to and from a device through to mobile sites, before being connected into the main national data transport networks.

Mobile network services may also be resold by other retail network providers, such as Skinny, Slingshot and Warehouse Mobile.

INVESTMENT & INNOVATION: A WORLD CLASS NETWORK TO BE PROUD OF

GREATER INVESTMENT OUR INVESTMENT RATE WAS THE SECOND HIGHEST OUT OF OUR MAIN OECD RIVALS

Meeting consumer and business demand for new and improved digital services means constant investment and innovation.

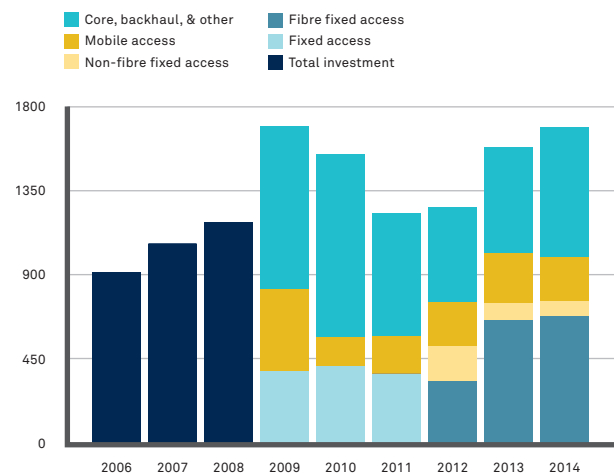
In New Zealand, the sector has made significant infrastructure investments, spending billions over the last few years to support the enormous growth in the volume of data moving around.

In 2014 alone, sector investment increased to \$1.7 billion.

This is one of the highest rates in the OECD, and proportionately more than most other OECD countries.

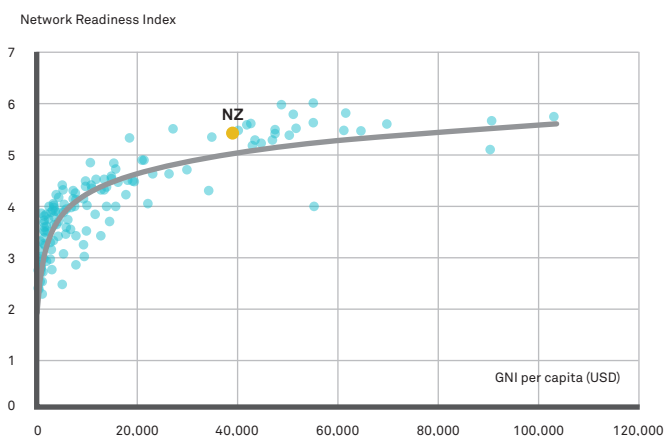
LEADERS IN INNOVATION
THE SECTOR IS ALSO SHOWN
TO BE ONE OF NEW ZEALAND'S
MOST INNOVATIVE. IT PROVIDES
SERVICES THAT ARE
INCREASINGLY COMPETITIVE
ON BOTH PRICE AND QUALITY
COMPARED WITH THOSE
OFFERED IN OTHER COUNTRIES.

ANNUAL TELECOMMUNICATIONS INVESTMENT
BY TYPE (\$M)



NETWORKED READINESS INDEX VERSES
GNI PER CAPITA

Our Network Readiness Index score – a measure on a country's performance in leveraging ICT to boost competitiveness and well-being – is better than most of the 143 countries in the World Economic Forum index.



TELECOMMUNICATIONS: MEGA TRENDS



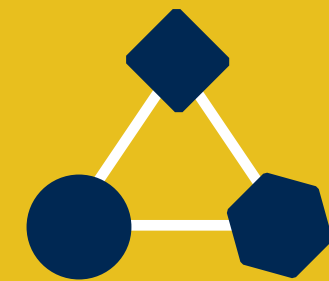
MOBILITY: ANYTIME, ANYWHERE CONNECTIVITY
The combination of wide mobile coverage, high speed fixed line access and other technologies such as wireless provide ubiquitous access to content



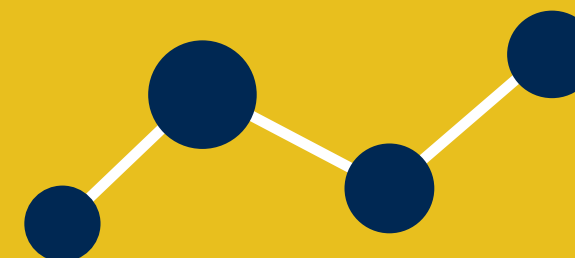
USER DEMAND
Increasing appetite for evermore technology and data in our lives



CLOUD SERVICES
Use of computer hardware and software resources delivered over a network or the Internet



INTERNET OF THINGS
Connecting everyday objects to enable data collection, monitoring, process-improvement and decision-making



BIG DATA
Large volumes of structured and unstructured data that can be analysed to reveal patterns and trends

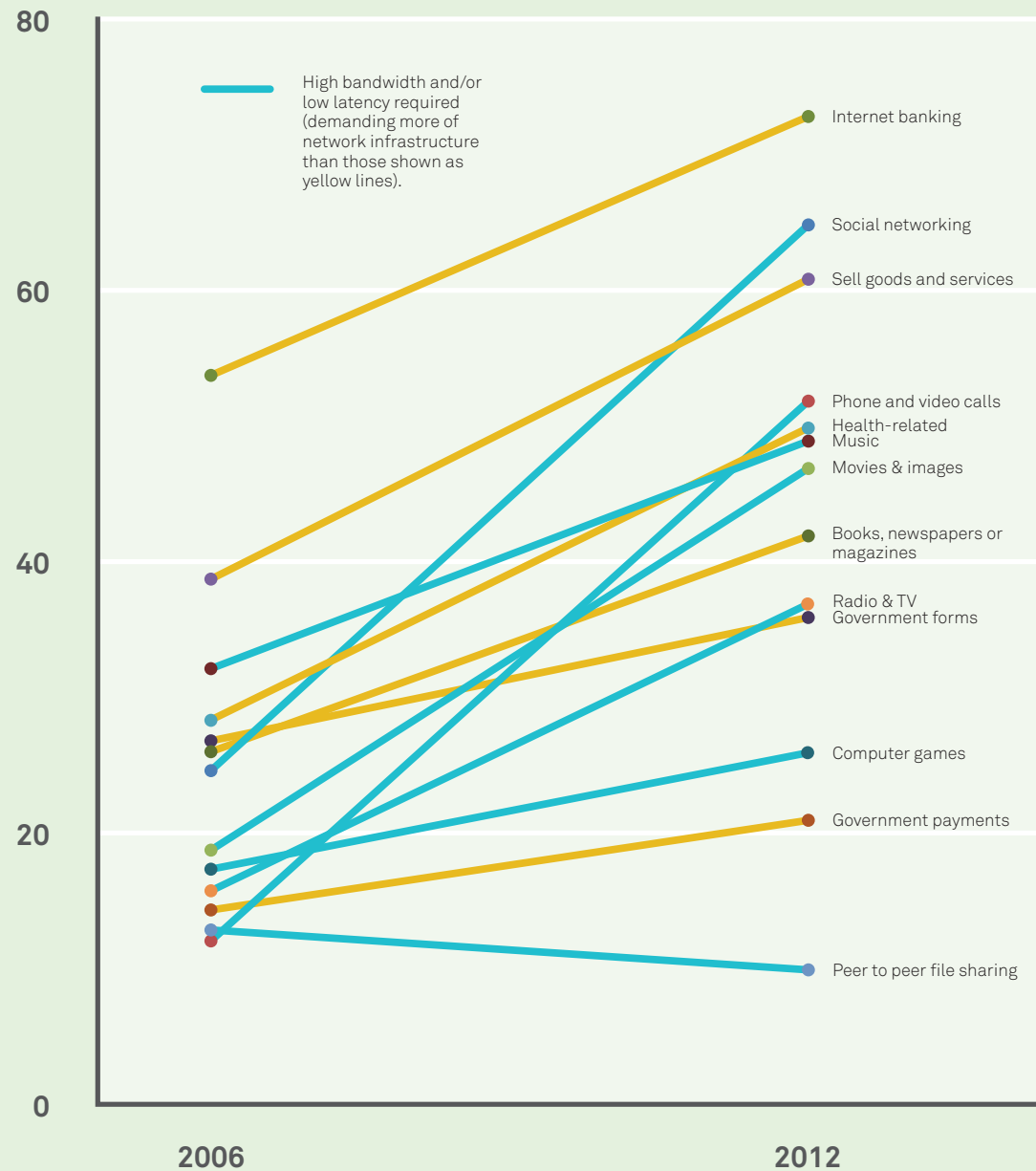


DIGITAL PRIVACY
Protecting personal and company data from unwanted, unauthorised access

CHANGES IN CONSUMER BEHAVIOUR: AHEAD OF THE GAME

NEW ZEALANDERS ARE RAPID ADOPTERS OF TECHNOLOGY, SUBSCRIBE TO NEW SERVICES MORE ENTHUSIASTICALLY THAN MOST, AND ARE SAVVY INTERNET USERS.

ONLINE ACTIVITIES (PERCENT OF INTERNET USERS)




NEW ZEALANDERS LOVE TECHNOLOGY. WE WERE THE EQUAL HIGHEST USERS OF SMARTPHONE BANKING IN OECD IN 2013, AND JOINT LEADERS IN OUR ABILITY FOR FINDING INFORMATION ON LOCAL BUSINESSES OR SERVICES USING A SMARTPHONE.

We're also ranked as a heavy user of mobile devices for purchasing goods online, tied seventh across the OECD.

We show above average growth in use of smart devices such as healthcare monitoring, tracking and video surveillance.

Our attitudes to how we view content is also changing. More than one-in-ten people now say "streaming over the internet" is their main way of watching TV – a figure that has doubled in the past year and brings us into line with Australia and the UK. International trends indicate New Zealand's uptake of subscription video-on-demand services like Lightbox, Neon and Netflix will continue to increase.

Mobile calling minutes continue to rise despite the availability of over the top VoIP (Voice over Internet Protocols) calling on mobiles. In 2013 and 2014, mobile minutes exceeded 10 per cent year on year growth, while mobile data usage patterns are growing fast – at 64 per cent compound annual growth rate.



FASTEST FIBRE UPTAKE IN THE DEVELOPED WORLD

We're leading the pack in the developed world in the speed of our switch to fibre-optic broadband, with a 250 per cent increase in total connections, the highest in the OECD.

OECD: GROWTH OF FIBRE CONNECTIONS AMONG COUNTRIES REPORTING FIBRE SUBSCRIPTIONS, DECEMBER 2013 TO DECEMBER 2014

Country	Growth (%)
New Zealand	250
Spain	150
Belgium	150
Australia	100
Italy	80
France	70
Luxembourg	60
Switzerland	50
Canada	40
Portugal	30
Austria	20
Germany	15
Poland	10
Netherlands	10
Turkey	10
Finland	10
Norway	10
Czech Republic	10
Sweden	10
Iceland	10
United States	10
Slovak Republic	10
Mexico	10
Denmark	10
Slovenia	10
Greece	10
Korea	10
Estonia	10
Japan	10
Ireland	10
OECD average	10

ENHANCING KIWIS' LIVES



CASE STUDY #1

CONNECTING RURAL NEW ZEALAND

Fast and reliable mobile connectivity is important to rural communities where innovations in remote monitoring, machine to machine communications and precision farming are driving productivity improvements across the agriculture sector.

Modern technology available through fast 4G mobile broadband increases coverage and the ability to carry more data.

Waikato dairy farmer Tony Walters finds the network makes a huge difference to productivity. On-farm sensors collect information on rain, wind, temperature and soil moisture, which informs how much ground water can be taken, how much effluent can be applied and how to get the best results from deploying fertilizer.



Being able to access the internet faster allows our farm to make better use of the latest apps and online farming tools to do things like store, record and analyse on-farm data. All of this helps us make better, more informed decisions, making sure we can work faster and smarter."

Tony Walters, Dairy Farmer



CASE STUDY #2

CREATING SAFER COMMUNITIES

Just as mobile applications, tablets and smartphones have helped private sector organisations increase productivity, they are now supporting frontline police officers in their operations and enabling smarter use of resources.

New Zealand's most mobile workforce is now better prepared to react in real time. 6,500 frontline NZ Police officers are equipped with the latest smartphones. Officers on patrol have access to high-speed data and bespoke, innovative applications that run on the smartphones and tablets.

This fresh approach unlocks significant savings through greater efficiency. Productivity savings, which are being re-invested in frontline crime prevention, are also forecast.

This new mobile method of communication transforms how NZ Police do their job, and has meant:

520,000 HOURS ANNUAL PRODUCTIVITY GAINS. THAT'S 30 MINUTES PER OFFICER PER SHIFT WHICH IS DIRECTLY REINVESTED IN FRONTLINE POLICING.

IN BUSINESS, RESEARCH SHOWS THAT AS ORGANISATIONS USE MORE OF THE POTENTIAL OF INTERNET SERVICES, IT COULD BE WORTH AN ADDITIONAL \$34 BILLION IN PRODUCTIVITY IMPACTS TO THE NEW ZEALAND ECONOMY.



CASE STUDY #3

IMPROVING HEALTH STANDARDS

Technology allows access to a connected world. For healthcare, that means better outcomes for patients, as their doctors, clinicians and medical practices can easily see their medical history and access information on the best treatment options.

WellSouth is responsible for working with general practice to provide primary health care to the 300,000 people of Otago and Southland. Its chief information officer, Kyle Forde, is using the gigabit fibre broadband to help deliver improved health services.

Another benefit is online training for medical staff. Clinicians can continue their medical education via digitally-delivered training solutions. It's a simple thing that's making life easier for clinicians. They appreciate being able to spend as much time with patients as possible, and not travelling long distances to and from training seminars.



We're focusing on rolling out HealthCloud, a secure health network for the 85 practices served by WellSouth. This is part of a larger collaboration with primary health organisations across the South Island that aligns with a government shared services strategy for core IT infrastructure. Access to gigabit services in Dunedin makes what was previously a dream, a reality."

Kyle Forde, CIO WellSouth



CASE STUDY #4

EDUCATING THE NEXT GENERATION

Today's young people are growing up in a world where technology is integral to their lives. That's why it is so important the classrooms of today can teach the skills important for tomorrow.

Most New Zealand schools now have a fibre connection to the internet capable of delivering broadband speeds of up to 1Gbps. More than 735,000 teachers, administrators and students also have access to Network for Learning's Managed Network - designed specifically for schools, providing safe, predictable and fast internet with uncapped data, online content filtering and network security services.

Supported by a number of technology partners, these connected classrooms are designed to be responsive to the changing nature of how teachers and students use the internet.

OUR SCHOOLS ARE NOW OPEN TO A WORLD OF ONLINE LEARNING OPPORTUNITIES, MEANING OUR CHILDREN ARE BEST PLACED TO SUCCEED IN THE DIGITAL AGE.

WHAT DOES THE FUTURE LOOK LIKE?



BY 2025, 99% OF NEW ZEALANDERS WILL ENJOY PEAK SPEEDS OF 50MBPS



NZ's fixed internet traffic will double by 2019



'Network busy hour' – the period during which the maximum total traffic load occurs – will increase more than average traffic



Mobile data volume to grow seven-fold by 2019



Our love of video is expected to grow faster than world average

MEETING FUTURE DEMAND FOR DATA

- CONTINUED ROLLOUT OF 4G MOBILE DATA NETWORKS
- HUGE INVESTMENTS IN FIBRE DRIVING UPTAKE TO THE FASTEST IN THE OECD
- CORE OPTICAL TRANSPORT NETWORK AND LOCAL NETWORK UPGRADES
- ADDITIONAL TRANS-TASMAN CABLE UNDERWAY

A WAVE THAT KEEPS ON BUILDING

An exponential wave of change has been building over the last 20 years as every improvement in digital technology and network capability has been matched – and exceeded – by a corresponding rise in demand.

What we do with technology today would have been impossible ten years ago. Every day, it's estimated that over 1.8 billion photos are uploaded and shared on the internet. By 2017, nearly a million minutes of video will cross the internet every second. And according to global estimates, by 2020 there could be over 50 billion devices connecting to all that data.

Here in New Zealand, the tyranny of distance is crumbling in the face of technology, allowing us to stand at the leading edge of this digital revolution. We now expect service when we want it, wherever we are.

THE AVERAGE NEW ZEALAND HOME NOW CONSUMES ALMOST TWICE AS MUCH DATA ON AVERAGE PER DAY AS THEY DID A YEAR AGO. IT'S AS MUCH DATA IN A MONTH AS THE ENTIRE COUNTRY CONSUMED IN A DAY, ONLY 15 YEARS AGO.



A FRAMEWORK FOR FUTURE PROSPERITY

THE GOVERNMENT HAS RECENTLY STATED ITS GOAL FOR 99% OF NEW ZEALANDERS HAVING ACCESS TO BROADBAND SPEEDS OF 50 MBPS BY 2025.

This ambition will place New Zealand in the top echelon of countries in terms of the quality of connections available to business and consumers. At current levels of industry investment, there is no doubt this can be achieved. For the majority of businesses and consumers, it will be exceeded.

We are starting to see innovative uses of technology as a consequence of such profound investment. And when traditionally late adopters migrate towards a technology-rich environment, they stand to make the greatest productivity gains from the investment made.

The real challenge for government is to ensure the regulatory environment supports and facilitates continued investment by the industry to allow New Zealand to truly benefit from world class networks, both mobile and fixed line.

The industry is best placed to make commercial choices about where and how to make these investments. As much as possible, it must have the ability to make its own decisions.

The industry is determined to connect New Zealanders to a future of unbounded possibilities. Finding a way to do that is our biggest challenge – and New Zealand's most exciting opportunity.

COMING NEXT: BALANCING MORE FOR LESS

Our increasing reliance on telecommunications services is putting pressure on network infrastructure. The rise of streaming video, social networking, cloud services, and myriad other applications can potentially congest networks, slow down productivity and ultimately impact our nation's progress.

That's why ongoing, sustainable investment to ensure these networks can cope with future demands is front and centre for the industry.

New Zealand's telecommunications companies must wrestle with sizing their investments to ensure networks provide improved, quality services while still earning reasonable returns for shareholders.

For an industry that has undergone enormous change – just think back to what it was like only ten years ago – it is telling that many industry insiders consider sustainable investing as the biggest challenge yet.


ABOUT TCF

The New Zealand Telecommunications Forum (TCF) plays a vital role in bringing together the telecommunications industry to resolve regulatory, technical and policy issues. In doing so, we enable the best possible outcomes for New Zealand consumers.

THE TCF COMPRISES THE FOLLOWING INDUSTRY PARTICIPANTS:



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