



Near Future Digital Priorities

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NEAR FUTURE DIGITAL PRIORITIES

1. EXECUTIVE SUMMARY

- 1.1. The purpose of this paper is to set out the Near Future Digital Priorities for New Zealand identified by NZICT Group from consultation with its members, Communities of Interest and key stakeholders including Government agencies.
- 1.2. NZICT consists of nearly 80 members representing companies and organisations involved in the provision of software, hardware, services, networks, education and training. They are involved with five core strategic work streams with the goal of improving New Zealand's competitiveness for the betterment of all New Zealanders. The strategic work areas are Education & Skills, Innovation, Public Sector Productivity, Small Business Productivity, and Industry Value & Profile.
- 1.3. This paper focuses on these core work streams as a platform from which to launch the country's near future digital priorities.
- 1.4. The National led Government has stated that it believes ICT will assist with the transformation of the economy, as we strive to improve GDP growth and competitiveness, typically benchmarked against our major trading partner Australia. Some of this improvement will come from long-term structural changes to the economy; these opportunities are highlighted in the paper. However, NZICT Group believes that by focusing on practical "near future" digital priorities, we can start the step change to New Zealand's productivity, and help drive innovation.
- 1.5. In particular, NZICT believes that the popular debate needs to shift from a singular focus on the construction of fibre infrastructure, to one focused on how we utilise the capabilities provided by broadband to change the fundamental nature of business and government activity. In short, the discussion needs to change from what it is to what it does. Healthy take up of services will rely on informed customers.
- 1.6. This is going to require a team effort across the economy, with government agencies, NGO's, ICT suppliers and customers collaborating like never before. New Zealand must not miss this opportunity to drive fundamental change to the economy. It is worth noting that no country entered the G20 by being leaders in agriculture and tourism alone. New Zealand has the opportunity however, to bolster growth and productivity in these sectors through ICT innovation. ICT and the other technology sectors are also critical to improving our economic performance by export growth generated from content, software, hardware, services, education and training.

- 1.7. It is important to define what is meant when we say ICT, and how it will contribute to this step change because it affects economic performance in two forms:
- a) NZICT and its members want to grow all sectors of the NZ economy by providing fundamental, high quality ICT infrastructure and platforms that horizontally support all industries, businesses, government agencies and citizens in a ubiquitous, pervasive embedded manner. A key part of this approach is lifting the ICT capability of New Zealanders; and
 - b) NZICT and its members want to grow the NZ ICT sector by providing more solutions and services across the economy, and then taking them to the global market. A key part of the approach is utilising world leading distribution strategies and connectivity, supported by an environment of research and development, capital and investment.
- 1.8. NZICT Group is willing to lead activity where needed. It is doing so by focusing on pivotal issues and practical defined outcomes. We are here to recognise areas that require change, to roll our sleeves up and get involved in driving change. In this paper, we are responding to the government's call for bold and well-researched plans, and a commitment to working in partnership to drive the required change.
- 1.9. NZICT views this as part of an ongoing partnership with Government and is willing to directly lead New Zealand's ICT input into the development of the digital economy.

Near Future Digital Priorities 2010

- 1.10. NZICT firmly believes that the short-term strategic imperatives are centred on creating an overall national plan and specific capability in the following areas:
- a) Broadband infrastructure; to create the network platform for economic and social growth and remove the tyranny of distance, domestically and internationally;
 - b) Ensure that Government policy and budget allocations promote and support the delivery of health, education and citizen services through electronic channels. There is a focus on driving public sector productivity through these initiatives;
 - c) Skills and education, to create an education delivery system that ensures New Zealand has a digitally-literate workforce that can be undertaking higher income jobs delivering incremental economic benefit; and
 - d) Innovation; by prioritising and encouraging Research & Development spend in support of practical innovations and creating an accessible commercialisation framework.

2. SUMMARY OF RECOMMENDATIONS

2.1. The following specific recommendations have been categorised in order of importance to support these strategic imperatives.

Top 10:

Recommendation: NZICT and the Government should create a digital future master plan by the end of 2010 to realise the potential of the digital economy in the near future (five years) and to demystify broadband issues and opportunities for the public.

Recommendation: The Government introduces an “Annual Statement of ICT Priorities” in order to provide a clear direction to the ICT industry on policy priorities and spend areas, and to stimulate ICT based innovation and productivity.

Recommendation: NZICT will establish a Panel of Industry Experts to provide advice to Government on large-scale ICT projects and priorities.

Recommendation: NZICT will establish a working group with the Government Technology Services group of the Department of Internal Affairs to develop a programme for improving public sector ICT efficiency, including operational and process cost reduction to an agreed plan and targets.

Recommendation: Government establishes the development of broadband enabled services and the understanding of their impact, as a core Research, Science & Technology priority for public and private sector funding in the 2010 budget, to maximise the return on Crown Fibre Holding’s investment in ultra fast broadband infrastructure.

Recommendation: NZICT, in conjunction with TVNZ, will work with Crown Fibre Holdings to develop pilot Fibre to Small Businesses and Homes demand side initiatives with existing operators or Local Fibre Companies to test customer behaviour and appetite for content and services, tentatively called the ‘Streetsmart’ initiative.

Recommendation: NZICT recommends that the Government continues to consider the competitive entry of Kordia and other operators as soon as possible into the international broadband infrastructure market to foster competition and reduce cost structures for New Zealand businesses and ISP customers.

Recommendation: NZICT will work collaboratively with the Ministry of Education, and other stakeholders including the New Zealand Computer Society and New Zealand Association of Communications Digital and Information Technology Teachers (NZACDITT) to assist with the introduction of the new Digital Technology curriculum as identified in the Body of Knowledge.

Recommendation: NZICT will work collaboratively with the Ministry of Education, the New Zealand Computer Society, NZACDITT and IPENZ to assist in Professional Development required by the introduction of the new Digital Technology curriculum.

Recommendation: NZICT will explore the potential for NZ to become an educational centre of excellence for the development of broadband enabled learning and the potential of export this in the form of distance education, in conjunction with the MoE, NZACDITT and MED.

Next Priorities:

Recommendation: NZICT will work with MED, Department of Labour, Tertiary Education Commission, Ministry of Education, IPENZ and other stakeholders on initiatives arising from the annual Skills Survey, to create better career pathways into the ICT and other technology sectors for students, retraining adults and immigrants.

Recommendation: NZICT supports the expansion of the Computer Clubhouse and Computers in Homes programmes to increase ICT literacy by seeking public and private sector funding and (in kind) sponsorship.

Recommendation: The Square Kilometre Array project is prioritised as a key government science, research and technology initiative given its potential to step change technology development in New Zealand.

Recommendation: Government should support the ANZAC bid and develop a winning strategy, including a direct investment and/or the establishment of a relationship with the International Centre of Radio Astronomy research based in Perth, Western Australia.

Recommendation: The Government should develop a streamlined R&D credit process for companies doing legitimate firm-led R&D, including:

1. the accreditation of companies once; and
2. defining a set amount of R&D spending that can be claimed as a R&D tax credit.

Recommendation: The Government considers Research and Development tax incentives in the 2010 Budget to encourage technology suppliers to be able to use New Zealand as a test bed as part of the ultra fast broadband infrastructure development.

Recommendation: NZICT proposes working with the MED, Crown Fibre Holdings and the Telecommunications Carriers' Forum to define minimum standards for a defined wholesale bitstream service by June 2010.

Recommendation: Government embraces the opportunities for video centric collaboration as a mechanism to drive productivity in the public sector, reduce travel

and carbon emissions, and connect New Zealand more effectively with international markets.

Recommendation: The Government should capitalise on video centric collaboration by implementing new travel policies designed to encourage Members of Parliament and public sector employees to utilise broadband for interaction and meetings, thereby reducing travel costs.

Recommendation: NZICT recommends the implementation of smart energy grids, smart roads, water metering and other industry based telemetry application as part of the Local Fibre Company broadband infrastructure deployment.

Recommendation: The Government expands its RS&T priorities to include developing a national remote monitoring network based on KAREN and other infrastructure to stimulate the development of network based analysis and data processing.

Recommendation: MORST establishes a centre of excellence in 2010 for environmental monitoring, analysis, disaster early warning and decision support, including a consortium between industry, research and governmental bodies.

Recommendation: MORST provides direct investment into developing projects to address identified environmental problem areas in the areas of environmental monitoring, analysis and decision support.

Recommendation: The Government supports the Geospatial industry in its objective of improving national productivity by the establishment of a joint Public-Private working group to formulate geospatial policies and action agendas.

Recommendation: The Government extends the existing parcel of screen production incentives to include digital content in a wider sense by Budget 2010 in order to stimulate the game development and other digital content industries.

Recommendation: The Government provides matching loans or grants to complement international investment in New Zealand research and development.

Recommendation: NZICT Group will work with the Ministry of Economic Development, Telecommunications Industry Group and Business New Zealand to better understand how small businesses are using ICT, with a focus on opportunities to improve productivity.

Recommendation: NZICT and Government jointly embrace the guiding parameters of the World Information Technology & Services Alliance, entitled the "Bermuda Declaration". Together we seek a step change in New Zealand's performance and on a bi-partisan basis. We invite other political parties and organisations to contribute to the vision of New Zealand as a leading ICT enabled economy.

Recommendation: NZICT, supported by MED will monitor the success of the digital economy initiatives by developing an econometric model in 2009-2010, in partnership with the International Institute for Software Economics Innovation and Entrepreneurship, IDC, other research partners and industry stakeholders.

3. STRATEGIC DIGITAL & ICT DIRECTION

The role of ICT from an international context

- 2.2. NZICT Group is a member of the World Information Technology and Service Alliance. WITSA recently held its Global Public Policy Summit (GPPS) in Bermuda. NZICT provided input into this Summit in the form of its Group Strategy document and is therefore pleased to endorse the formal Bermuda Declaration for the ICT sector globally.
- 2.3. This declaration sets the scene for areas of focus by many Governments, and should be viewed as a pointer to the Government and NZICT Group on global policy direction.

Recent WITSA GPPS 2009 in Bermuda

- 2.4. New Zealand became a signatory of the Bermuda Declaration for the ICT sector. The declaration recognises the importance of ICT as a proven driver for global economic activity and growth. It sets out some brief guiding parameters for harnessing the power and benefits of ICT.
- 2.5. The Declaration stated:
 - a) ICT is a proven driver for global economic activity and growth.
 - b) The economic growth generated by the development of the ICT sector will benefit all economies.
 - c) Access to ICT and the knowledge and information provided by the Internet is an important part of an inclusive information society and is essential for broader sustainable economic growth.
 - d) Public-private partnerships are a critical part in building ICT infrastructure and an information society.
 - e) There should be an open trading system between nations free from barriers for ICT products and services. WTO members are urged to reach the compromises needed to achieve a successful conclusion to the Doha Development Agenda.

- f) Harnessing the power and benefits of ICT for society will not come automatically. Only if business and governments work together with other partners, including their education systems, can people everywhere be assured of access to ICT tools and the knowledge and empowerment they deliver.
- g) International strategies to tackle climate change need to make full use of ICT as one of the most powerful tools available, and one of the only ones that can produce dramatic changes without negative effects on prosperity or individual lifestyles.
- h) With the pressure on global public finances, Governments should recognise the use of ICT and technology-enabled change as tools to address their operational costs and efficiencies.
- i) The continued success and growth of ICT depends on trust and confidence; privacy and security should be appropriately integrated into ICT programs, systems, and products from the beginning.

Recommendation: NZICT and Government jointly embrace the guiding parameters of the WITSA Bermuda declaration. Together we seek a step change in New Zealand's performance and on a bi-partisan basis. We invite other political parties and organisations to contribute to the vision of New Zealand as a leading ICT enabled economy.

Recommendation: MED and NZICT monitor the success of the digital economy initiatives by developing an econometric model in 2009-2010 in partnership with the International Institute for Software Economics Innovation and Entrepreneurship, IDC, other research partners and industry stakeholders.

4. PRODUCTIVITY

Public Sector Productivity

Government utilisation and procurement of ICT

- 3.1. The Government as a public sector ICT entity is in a unique position to be the anchor tenant to support new and existing infrastructure. Specifically, the public sector will drive usage of new broadband infrastructure from Local Fibre Companies (LFCs). Government expenditure on ICT in New Zealand is approximately \$2.5 billion (including DHBs and local government) which is 40% of the total spend. Therefore, the direction of government ICT expenditure is crucial in stimulating the development of the ICT sector.
- 3.2. NZICT recognises that the procurement environment accepted by successive governments since the 1980's public sector reforms has created a fragmented supply side engagement, which has resulted in sub-optimal results in terms of economies of scale. Last year, on average 74% of public sector ICT expenditure related to maintaining the status quo, including the operation of existing infrastructure. NZICT puts forward the mantra of "disinvest to reinvest" as a means to free up development funds from within the public sector. These funds can be utilised for projects to enhance information gathering and exchange in the public sector, and with citizens.

Government annual ICT strategy statement identifying priority areas

- 3.3. There has been a move to a more centralised approach to Government ICT strategy managed by the Government Technology Services group within the Department of Internal Affairs. NZICT supports this centralised planning approach. It should clarify the strategic objectives of Government ICT spend, and enable consequent research and development opportunities for the industry to take.
- 3.4. NZICT proposes that the Government make an "Annual Statement of ICT Priorities". This will enable transparency, certainty and direction of public sector ICT spending for all stakeholders involved. It will also encourage private sector investment, including research and development. This will stimulate ICT based innovation within the economy.

Recommendation: The Government introduces an "Annual Statement of ICT Priorities" in order to provide clear direction for the ICT industry on policy priorities, spend areas and to stimulate ICT based innovation.

ICT as enabler of government productivity

3.5. NZICT is focused on making a difference in three distinct areas over the next 3 years:

- a) Addressing the \$1.8b annual Government IT expenditure. NZICT believes that it can improve innovation and increase the government return on IT expenditure by 10% equating to \$180m savings per annum. This will create the opportunity for savings to be reinvested into applications that can transform sector productivity. This will be achieved by:
 - i. Government Procurement Transformation; and
 - ii. Service Delivery Transformation.

- b) Addressing the \$70b annual Government spend. Through the use of IT, NZICT believes that it can improve the overall government spend by 2% equating to \$140m savings per annum with a particular focus on Health, Education and reducing Travel costs; and

- c) Addressing the \$180b annual GDP. Through reducing the cost of compliance and interaction with the government, and commercialising the IP currently held by government, NZICT believes it can improve overall productivity by 0.5% equating to \$90m improvement to GDP per annum. Particular focus will be on company compliance costs and the commercial leverage of IP.

Recommendation: NZICT will establish a working group with the Government Technology Services group of the Department of Internal Affairs to develop a programme for improving public sector ICT efficiency including operational and process cost reduction to an agreed plan and targets.

Recommendation: NZICT will establish an expert advisory panel to provide advice to Government on large-scale ICT projects and priorities.

Recommendation: Government embraces the opportunities for video centric collaboration as a mechanism to drive productivity in the public sector, reduce travel and carbon emissions, and connect New Zealand more effectively with international markets.

Recommendation: The Government should capitalise on video centric collaboration by implementing new travel policies designed to encourage Members of Parliament and public sector employees to utilise broadband for interaction and meetings, thereby reducing travel costs.

Linking Government spending to innovation and stimulating broadband investment

- 3.6. Directionally, NZICT continues to advocate for the public sector to take the lead in utilising broadband infrastructure for the delivery of its services. This can serve to encourage private sector investment in the ultra fast broadband infrastructure and network enabled applications. NZICT proposes that the Government stimulate the development of cloud computing and New Zealand developed SOE and SAAS applications driving demand for capacity on the new broadband infrastructure as a nationwide anchor tenant or user for dark fibre or layer 2 purchasers (carriers and service providers). This will send a positive signal to potential private sector investors and give them added confidence with regard to the potential return on their investment, given the size of the public sector's likely usage, and the stimulation to other sectors of their commitment to cloud computing. This can be achieved by establishing a strategic policy for government departments and agencies to embrace a vision and direction of a tripartite alliance of cloud computing, New Zealand SAAS web applications and a shared data processing environment for their own requirements.
- 3.7. Cloud computing would also have a positive carbon footprint for the sector and meet the Government's own sustainability goals. A recent IDC/Industry report indicated that ICT has the potential to reduce carbon emissions by 25 per cent in G20 countries.¹ Centralised data centres would result in reduced power consumption, a smaller real estate requirement and reduced ICT management costs for the public sector. The data centre resources created, particularly in regional areas, could also stimulate services for local businesses and residential customers alike.
- 3.8. For this to be capitalised on, a strong top down policy direction is needed from the Government. Previous attempts to develop shared infrastructure or resources within the state sector have failed, partly as a result of the structure of state sector agency responsibilities and deliverables, with individual departments primarily responsible to their Minister for outcomes. NZICT would like to establish a working group with the MED and DIA to develop a strategy that would enable New Zealand to take advantage of this opportunity to create a networked public (both central and local government) and private sector.

¹ IDC ICT Sustainability Index™, IDC paper to be released at the UN Climate Change Conference, December 10, 2009

Small Business Productivity

- 3.9. The business community needs to be informed and educated about how ICT can add value and drive productivity, and the impact fibre can have for their business models (see Streetsmart initiative).
- 3.10. NZICT working with other organisations like the Telecommunications Industry Group and Business New Zealand, would like to see NZ Small Business informed and empowered on how to use ICT to be more productive. Productivity means creating a higher value outcome for a lower input, i.e. doing more with less.
- 3.11. There are 440,000 SMEs in NZ and 97% of these employ less than 20 people. They account for 30% of NZ's employment and 38% of NZ's GDP. These businesses are typically owner managed and their focus is all about keeping the business going. IT is seen perceived as "nice to have" not vital and as long as it works then its fine.
- 3.12. Not all businesses are the same, and even within business sectors, the use of ICT to lift productivity will differ. NZICT's hypothesis is that small businesses, which make up the majority of NZ business, are missing opportunities to improve their productivity and profitability.
- 3.13. Businesses invest in ICT for a combination of reasons. Research has shown that companies that have adopted broadband and ICT as a basis for their business believe that it contributes to improved performance in four main ways:
- a) Development of new products and services;
 - b) Generation of new customers;
 - c) Reduction in costs; and
 - d) Improved productivity.
- 3.14. NZICT will test four hypotheses:
- a) The use of ICT by SMEs is still relatively under-developed². SMEs tend to use the internet to send emails, transfer files or documents or gather information. It is hard to isolate trends in IT adoption from more general economic and organisational change drivers;
 - b) SMEs benefit from a reliable, stable and open business environment. Ease of access to fibre based broadband and easy to use ICT solutions at an optimal price point will significantly benefit the sector;

² Monash University Family and Small Business Research Unit

- c) SMEs growth rates lag behind larger enterprises because; and
- d) SMEs are often forced to accept generic solutions as they find them and they are not able to demand customisation of ICT solutions as easily as larger firms SMEs have limited resources for experimentation and cannot afford to make expensive mistakes.

3.15. SMEs often have small and clearly defined niche markets which are restricted to certain regions and certain parts of the value chain and therefore do not have access to the economies of scale enjoyed by larger enterprises.

3.16. SMEs frequently have legacy systems which have become outdated and, due to a lack of ongoing ICT investment in upgrades, now require significant expenditure to replace systems.

3.17. Research³ shows that ICT use in SMEs is impacted by the following factors:

- a) Size of firm (the smaller the less likely to use ICT);
- b) Age of firm (younger firms and firms with younger employees are more likely to use ICT);
- c) Wholesale and retail sectors are more likely to use ICT than other industry sectors;
- d) ICT experience of senior management or owners; and
- e) Usage is mainly for operational and administrative support rather than strategic decision making.

3.18. The following are seen as barriers to using ICT:

- a) A lack of awareness of potential impact/benefits of ICT;
- b) High initial set-up costs perception and a lack of understanding of the cost/benefit ratio;
- c) Security/privacy issues;
- d) Lack of staff to implement ICT and a “do-it-yourself” attitude;
- e) General lack of management capability/capacity of SME owners;

³ UK Analysis of SME businesses 2005

- f) A lack of trust in, or a poor perception of the ICT Industry;
- g) Low digital literacy/lack of knowledge of ICT; and
- h) Lack of awareness of available education/skills training and tools.

Recommendation: NZICT Group will work with the Ministry of Economic Development, Telecommunications Industry Group and Business New Zealand to better understand how small businesses are using ICT, with a focus on opportunities to improve productivity.

5. EDUCATION & SKILLS

4.1. NZICT works alongside a number of organisations in the education sector including the Ministry of Education, NZACDITT, NZ Computer Society, IPENZ, Computer Clubhouse and the Computers in Homes. The ICT industry sees education as key to not only the success of the ICT industry, but the nation's overall success.

New technologies curriculum including digital technologies

4.2. NZICT is focusing on a number of objectives related to the development of the new digital technologies curriculum, and other related technology subject areas. These changes are the most significant in a decade and will be implemented from 2011 in successive years for secondary school years 11, 12 and 13 respectively.

4.3. There are three major areas to focus on from these changes:

- a) Digital Technology curriculum;
- b) Teacher professional development; and
- c) Utilisation of broadband as a 21st century teaching tool, and potentially turning this IP into exportable software and services.

4.4. NZICT supports the outcomes of the Digital Technologies Experts Panel (DTEP) and the Body of Knowledge (BoK) subsequently developed. NZICT is collaborating closely with a number of individuals and organisations to ensure that the new curriculum will address the skills requirements of the industry.

Recommendation: NZICT will work collaboratively with the Ministry of Education, and other stakeholders including the New Zealand Computer Society and New Zealand Association of Communications Digital and Information Technology Teachers “NZACDITT” to assist with the introduction of the new Digital Technology curriculum as identified in the Body of Knowledge.

Teacher Professional Development (PD)

4.5. NZICT supports the Professional development of teachers as a key education sector priority. Ultra Fast Broadband will enable new ways of delivering appropriate PD to all Digital Technology teachers, other technology subject teachers, and potentially other subjects.

Recommendation: NZICT will work collaboratively with the Ministry of Education, the New Zealand Computer Society, NZACDITT and IPENZ to assist in Professional Development required by the introduction of the new Digital Technology curriculum.

Broadband as a Learning Platform

4.6. Delivery of distance education is an integral part of many of the ICT clusters funded by the Ministry of Education. Ultra Fast Broadband will provide a sound platform for delivery of curriculum to students and PD for teachers. It will also open up opportunities for more distance education, and industry involvement in the classroom, than currently exists.

Recommendation: NZICT will explore the potential for NZ to become an educational centre of excellence for the development of broadband enabled learning and the potential of export this in the form of distance education, in conjunction with the MoE, NZACDITT and MED.

Industry Skill Base

4.7. NZICT has developed an annual ICT skills survey with MED, that will become the benchmark for identifying key skills related issues. The 2009 survey confirmed the skills shortage within New Zealand, and identified a number of areas for development.

4.8. NZICT will work with MED, MoE, TEC, Department of Labour, ITPNZ, IPENZ, Universities and other organisations on career development and education pathways including

- a) FutureinTech;
- b) Techlink;

- c) Tech Hui; and
- d) Engagement with tertiary providers including universities and ITPs.

Recommendation: NZICT will work with MED, Department of Labour, Tertiary Education Commission, Ministry of Education, IPENZ and other stakeholders on initiatives arising from the annual Skills Survey, to create better career pathways into the ICT and other technology sectors for students, retraining adults and immigrants.

Other Educational Initiatives: Computer Clubhouse and Computers in Homes

Computer Clubhouse

- 4.9. NZICT Group supports the goals of the Computer Clubhouse 274 and its operating principles.
- 4.10. “Public-private partnerships between disadvantaged communities, businesses, philanthropists and universities as a key to a successful approach in addressing digital inclusion” (Meredyth 2003).
- 4.11. NZICT supports the Computer Clubhouse view that this provides the best results, ROI and educational outcomes, and their evaluation brings some science into this equation as well. In essence NZICT endorses the following core thinking:
 - a) We are preparing our infrastructure, organisational behaviour and resources to move our digital community towards cloud technology, to this regards we believe;
 - b) Schools, Institutions and Government should work closely with the ICT industry to ensure a long-term level of seamless integration within the economy/society AND cohort life-long learning portability of digital content/digital portfolio’s; and
 - c) A three-year evaluation (September 2009) was published detailing the impact that Clubhouse 274 has had on youth and the community of Otara. The evaluation was a synthesis of research undertaken by SRI International and a set of community informatics (CI) tools developed by the Computer Clubhouse Trust.
- 4.12. In the evaluation, an extensive review of current research linked the rational of being digitally fluent to better equipping young people within a modern 21st century economy, workforce and a civil society. To increase digital fluency the project focused on implementing the Computer Clubhouse learning model and increasing social and cultural capital by building a connected community of learners.

4.13. The key findings were;

- a) There is greater engagement in learning through ICT;
- b) Higher number of students attaining NCEA levels;
- c) Higher number of students going onto tertiary training;
- d) Youth acquiring a 21st century skill base that matches New Zealand's digitally emergent economy;
- e) Young people are able to locate their learning experience within their cultural experience and knowledge;
- f) Young people can learn and work collaboratively and develop relationships of trust, a critical competency in a connected society; and
- g) Higher work ethic and productivity.

4.14. NZICT supports the Computer Clubhouse and its targets for 2009-2011 in the deployment of new community Computer Clubhouses.

2009-2010:

Hamilton	Wanganui	Whakatane	Naenae
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2010-2011:

Papakura	Mangere	Penrose	Waitakere
North Shore City	Moerewa (Northland)		

Digitally Literate Nation

4.15. The MED has indicated that its digital literacy programme may not have additional funding post 2010/2011. The next Budget will not include additional funds for this programme beyond the current DIA and MED vote. There is a possibility for the private sector to assist with the existing initiatives including: Computers in Homes and the Corporate PC refresh programme.

Recommendation: NZICT supports the expansion of the Computer Clubhouse and Computers in Homes programmes to increase ICT literacy by seeking public and private sector funding and (in kind) sponsorship.

6. INNOVATION

Research, Science and Technology priorities

- 6.1. New Zealand needs to take its entrepreneurial and innovative spirit and apply it to science and technology in order to become attractive to international companies and investors.
- 6.2. Given New Zealand's size, there is an opportunity to encourage research and development specifically in relation to applications enabled by ultra fast broadband. NZICT, along with other stakeholders, recently submitted a paper as part of the Government's review of the Research and Development incentives programme.

Recommendation: The Government considers Research and Development tax incentives in the 2010 Budget to encourage technology suppliers to be able to use New Zealand as a test bed as part of the ultra fast broadband infrastructure development.

Recommendation: The Government develops a streamlined R&D credit process for companies doing legitimate firm-led R&D including;

1. the accreditation of companies once and,
2. defining a set amount of R&D spending that can be claimed as a R&D tax credit.

Recommendation: The Government provides matching loans or grants to complement international investment in New Zealand R&D.

Broadband applications research

- 6.3. This needs to be a priority funding area for Research and Science Technology, as we design 21st century applications, and potentially then take these to the world. The education and health sectors, primary production sectors, and the development of cloud services for NZ businesses provide the perfect opportunity.
- 6.4. The Health and Society budget needs to specifically target research-based on the impact of broadband for the education and health sectors. This is to enable productivity improvements, better outcomes for students and patients, and potential foreign exchange earnings from international resale of the outcomes.
- 6.5. Applications enabled by broadband should be a long-term platform research area with funding to explore its potential impact on NZ society and business performance.

- 6.6. New Zealand already has a strong reputation in both health and education for innovation and this should be leveraged. NZ also has the ability to position itself as a global test market for education and health applications, with consequent benefits for standards in both sectors.

Recommendation: Government establishes the development of broadband enabled services and the understanding of their impact, as a core Research, Science & Technology priority for public and private sector funding in the 2010 budget, to maximise the return on Crown Fibre Holding's investment in ultra fast broadband infrastructure.

Research, Science & Technology strategy

- 6.7. The science system must be transparent and responsive with minimal compliance costs. It has to be regulated by appropriate scientific evaluation and accountability, allowing effective oversight and outcome focus.
- 6.8. NZICT believes that the RST strategy should comprise of a mix of competitive and strategic funding tools and a balance of basic, applied and translational research appropriate to an overall strategy and appropriate to national size.
- 6.9. To foster efficiency, emphasis should be given to where a multi-organisational approach is possible so that critical mass can be achieved, duplication is avoided, advanced infrastructure can be developed, and latent and real synergies across partners can be exploited.

Collaboration in the industry

- 6.10. The Square Kilometre Array is one of the world's largest radio astronomy projects, with 3.5 billion Euros estimated to be invested by a multi-lateral funding group. The project is about determining the origins of the solar system and the celestial events that have impact its development over the life of our planet. This is big science on the scale of the Haldron collider and space programme, will all of the consequent technology challenges involved, including processing more data in a year (14 exabytes) than mankind currently generates in total (4 exabytes).
- 6.11. The bid for SKA is between Australia/New Zealand and southern Africa, for the location of its satellite dish infrastructure, and the supporting research and development, processing and dissemination systems. Success with this bid would result in an unparalleled innovation opportunity for the NZ ICT industry.
- 6.12. NZICT has established the NZSKA Research and Industry Consortium, working with the scientific community to maximize the opportunity for this country. Opportunities for the ICT industry will be numerous, they include:
- a) Development of image and data processing technology;

- b) Development of web dissemination tools including hosting;
- c) Super computer resources and data storage; and
- d) Network architecture and design, and ultra fast broadband infrastructure, between the radio telescopes located in New Zealand and those in Australia.

Recommendation: The Square Kilometre Array project is prioritised as a key government science, research and technology initiative given its potential to step change technology development in New Zealand.

Recommendation: Government should support the ANZAC bid and develop a winning strategy, including a direct investment and/or the establishment of a relationship with the International Centre of Radio Astronomy research based in Perth, Western Australia.

Environmental management

6.13. Environmental management (resource utilisation, pollution and allocation) is increasingly becoming a contentious issue in NZ and globally, e.g. water management. Many areas of New Zealand are already experiencing significant contention for scarce resources (e.g. Canterbury Plains), or have significant problems with pollution of environmental resources shared by many other users (e.g. Rotorua Lakes).

6.14. Unfortunately our current understanding of many of these resources, and how they are being used, is very rudimentary and undeveloped. This lack of knowledge can severely hamper our ability to use these resources in a sustainable manner (e.g. allocate sufficient water resource for farming without compromising the environment).

6.15. ICT can provide a significant role in environmental management, and helping to deliver improved outcomes. Specifically to address our inability to understand our environmental performance and resource usage and make informed decisions about these. The ICT industry could work with research and government/local government communities to create new solutions for monitoring of environmental conditions, analysis of these and enabling decision support based on this analysis.

6.16. Opportunities for the ICT industry are diverse, and include:

- a) Development of remote monitoring/sensor solutions to measure and report environmental factors such as resource availability, consumption, pollution.

- b) Development of remote networks to support these monitoring/sensor solutions, including remote wired and wireless networks.
- c) Design and development of computer applications to analyse and report these environmental parameters to enable more informed decision making by resource users.
- d) Creation of an export industry around these environmental monitoring, analysis and decision support solutions.

Recommendation: The Government expands its RS&T priorities to include developing a national remote monitoring network based on KAREN and other infrastructure to stimulate the development of network based analysis and data processing.

Recommendation: MORST establishes a centre of excellence in 2010 for environmental monitoring, analysis, disaster early warning and decision support, including a consortium between industry, research and governmental bodies.

Recommendation: MORST provides direct investment into developing projects to address identified environmental problem areas in the areas of environmental monitoring, analysis and decision support.

Specific industry stimulation within the ICT sector

6.17. ICT supports and enables a number of related industries and opportunities within the NZ economy. These industries typically use ICT as their core development platform. Their growth sparks innovation and significant economic activity in the ICT sector. NZICT has therefore developed a pro-active engagement programme with these groups to identify issues of common interest that could enable additional growth, and consequent mutual benefit.

New Media technologies

6.18. Media, graphics, film, 3D projects and computer gaming applications, and production technologies are building off world leading initiatives and capabilities by New Zealand ICT companies like Weta Digital, Massive, Right Hemisphere, Sidhe Interactive and Nextspace.

6.19. High speed broadband coupled with investment, incentives, policy and promotion could enable New Zealand to be the “Film, 3D and Gaming global development lab” to commercialise applications based on this technology, which typically require high speed broadband links.

6.20. These applications could be paradigm changing for the New Zealand economy, and generate significant foreign exchange from their international

commercialisation. In addition, this development activity could have other spin-offs including nationwide 3D training for private and public sector workers, sports coaches and participants, health professionals, teachers and their students.

- 6.21. We need to take the opportunity to expand now as a way to attract investment and create a growth industry sector that delivers on its potential. NZICT believes this could provide New Zealand with another credible heavyweight foreign exchange earning industry.

Recommendation: The government extends the existing parcel of screen production incentives to include digital content in a wider sense by Budget 2010 in order to stimulate the game development and other digital content industries.

Spatial Industries

- 6.22. Geospatial is another key area from which productivity gains can be acquired.

- a) The recently released ACIL Tasman report provides robust economic analysis that quantifies the contribution spatial information makes to the New Zealand economy, as well as opportunities for this contribution to grow. The report concludes that the use and re-use of spatial information is estimated to have added \$1.2 billion in productivity related benefits to the New Zealand economy in 2008. It also declares that other (non-productivity) benefits linked to the increasing use of spatial information are probably worth a multiple of this;
- b) Underpinning New Zealand's infrastructures is a vital platform. The increasing need for quality location intelligence is why the spatial technologies are increasingly referred to as the 'platform for infrastructure'. Only spatial information systems can adequately represent every essential characteristic of the physical world, which is critical to enabling infrastructure to be planned well, maintained and managed better; and
- c) However, New Zealand's spatial information policies and systems need significant renovation. NZICT believes that we need to collectively transform these into a modern, nationally coherent, world-class digital spatial data infrastructure. This will address many of the barriers to low productivity which has been highlighted by the ACIL Tasman analysis.

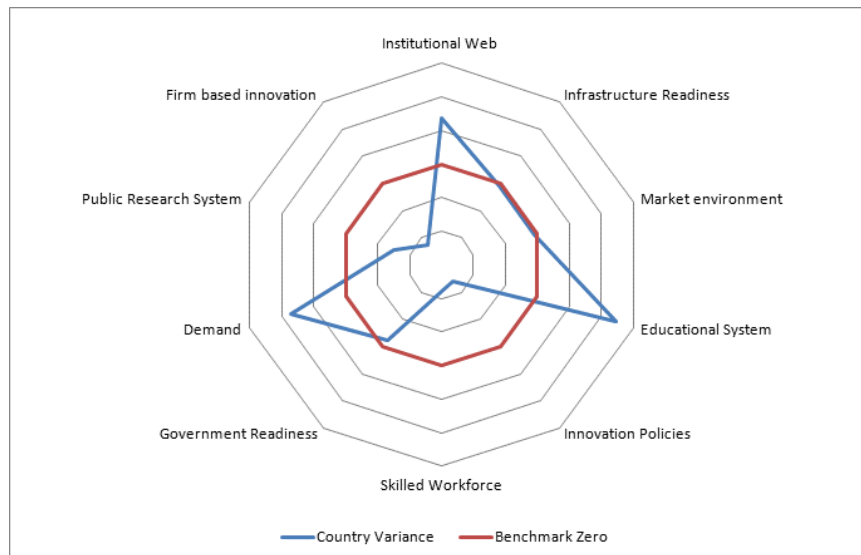
Recommendation: The Government supports the Geospatial industry in its objective of improving national productivity by the establishment of a joint Public-Private working group to formulate geospatial policies and action agendas.

Measurement: New Zealand 'hi-tech' Profile

- 6.23. NZICT, along with the International Institute for Software Economics, Innovation and Entrepreneurship Inc (IISEIE) and its research member Agitavi Research propose to benchmark the New Zealand ICT industry and begin a process of developing growth policies.
- 6.24. IISEIE's core capabilities and focus are on the execution of both primary and market-based research projects in the global ICT using quantitative, qualitative and mixed methods approaches.
- 6.25. This provides knowledge on industry benchmarks and economic development strategies, developments in business models and operations of ICT firms, sectors and markets, and will provide the New Zealand government and ICT industry with the knowledge and understanding required to develop a ranges of polices to support productivity, innovation and economic growth among other things.

Local Software Economy Profile

- 6.26. The following diagram provides a snapshot of the New Zealand Local Software Economy (LSE). This LSE 'spider' is based on the local software economy maturity model research which has been undertaken over the last 18 months by the IISEIE and its research member Agitavi research.



It provides a benchmark (the red circle) of countries in the mature LSE category, and compares the New Zealand variables (the blue) with this benchmark. The top five priorities being:

- a) Innovation Policies;
- b) Firm based innovation;
- c) Skilled Workforce;
- d) Public Research System; and
- e) Government Readiness.

6.27. It should be noted that this LSE spider is from version 1.0 data which is currently being updated to version 2.0 for release in early 2010. As such, it is anticipated that this profile will change with the new data.

6.28. Data for this profile is sourced from the World Economic Forum, World Bank, OECD and IDC.

Benchmarking to set future policy priorities

6.29. It is important that the New Zealand ICT industry along with the government set about a benchmarking exercise as a way to set future policy.

6.30. An example of this is a recent software company study from IISEIE and its members Southern Cross University and Agitavi Research. The study looked at the strategic posture of software companies across Asia Pacific, Middle East and Europe from 2003 to 2009.

6.31. This research shows that almost 2 out of 3 software companies are reactive and have no strategy. The results of this study show that it is integral that the development of any mandatory or incentive-based policies by a central government focus on not only educating people to build technology, but also educating technologists on how to build businesses.

Recommendation: NZICT, supported by MED will monitor the success of the digital economy initiatives by developing an econometric model in 2009-2010, in partnership with the International Institute for Software Economics Innovation and Entrepreneurship, IDC and other research partners and industry stakeholders.

BROADBAND ECONOMY

- 7.1. The greatest impact of ultra fast broadband for the public and private sector alike is the potential to create ubiquitous network connectivity. This enables ICT service models like “cloud computing” “grid computing” and “virtualisation”. The certainty of complementary policy, incentives and lower priced high-speed broadband provided by the Local Fibre Companies (LFCs) available in all major locations nationally will further advance the plans of NZICT members to enter this market.
- 7.2. High-speed broadband is an essential element in the development of the “cloud computing” environment and remote monitoring applications. Availability of fibre-based broadband is a dependant factor in the incentive and market opportunity for New Zealand ICT businesses to invest in developing and deploying a wide set of business, government, community and personal software applications. These applications can be for domestic and generate export returns. They can be commercialised in “Software as a Service” (SAAS), Software Operating Environment (SOE) and Machine to Machine (M2M) models.
- 7.3. The broadband infrastructure can facilitate a range of important monitoring networks and applications that can increase the intelligent monitoring of other major infrastructure, including the electricity grid, road network, water network and M2M communication in all major industries. These 21st century networks can drive productivity gains for New Zealand and assist with areas like emissions monitoring and trading. Economies of scale can be achieved by deploying these in conjunction with the ultra fast broadband infrastructure.
- 7.4. Telemetry can be expanded in major primary production industries, imagine every sheep or cow or tree monitored remotely to determine location, growth and factors inhibiting growth. The dairy industry has already demonstrated the potential for quality control with remote milk vat monitoring on farms, this could be expanded with the combination of fibre and wireless communications.
- 7.5. Tourism can also be expanded with video access and location based services for assets and facilities, including their promotion to visitors. Overseas visitors can preview or review their “100% Pure” experiences. Telemetry can also be utilised to assist with health & safety, including location based monitoring.
- 7.6. There is a significant opportunity to drive productivity in the economy in the business sector from shared services and concepts like cloud computing. These services offer the opportunity for collective use of processing power and applications.

- 7.7. These services can reduce costs for businesses in terms of space (for housing their own server farm or computer room), power consumption and labour costs, delivering better green outcomes and improving energy efficiency. Access to a ubiquitous high-speed broadband network, with redundancy and diversity built into the offerings from service providers, is central to achieving this. From our preliminary research into broadband offerings in other countries, quality of service is available contractually, to guarantee latency and availability, which is of particular importance for business customers and their application requirements.
- 7.8. The 'digital' economy will be enabled by ubiquitous broadband. If sufficient capital is available, new and existing 'light' businesses should thrive in New Zealand. New Zealand has the opportunity to excel in a number of ICT areas and across a number of sectors.

Recommendation: NZICT recommends the implementation and incorporation of smart energy grids, smart roads, water metering and other industry based telemetry applications as part of the Local Fibre Company broadband infrastructure deployment.

Digital master plan

- 7.9. There is a major gap of work and knowledge on how high-speed broadband infrastructure will improve services for businesses and consumers. It will also assist with the growth of New Zealand's digital economy. Education on how broadband can enable a digital economy and indeed, improve the lifestyle of New Zealanders needs to begin now.
- 7.10. New Zealand should follow the path of the Singaporean government's Infocomm Development Authority (IDA). Their paper, entitled iN2015, is the blueprint to navigate Singapore's transition into a global country, through a synthesis of technology, infrastructure, enterprise and manpower.
- 7.11. The master plan was set up to realise the potential of a connected nation in the near future (10 years). iN2015 is widely publicised and has assisted with the technical demystification of ICT in society. IDA also got the public involved with this initiative, which assisted with public education on what better connectivity will bring not only to the business sector, but society as a whole.
- 7.12. A similar paper in New Zealand would spur interest in the government's broadband initiative in terms of what it means for society and spurn any negative connotations.

Recommendation: NZICT and the Government should create a digital future master plan by the end of 2010 to realise the potential of the digital economy in the near future (in five years) and to demystify broadband issues and opportunities for the public.

Fibre to Small Businesses and Homes “Streetsmart” demand side initiative

- 7.13. There is a belief that having content and services delivered directly to small businesses and homes of New Zealanders will increase productivity and reduce costs. This belief is an instinctive one based on little existing empirical evidence.
- 7.14. Work needs to begin urgently to scope out what content and services can be delivered by fibre. Importantly, consumers need to be involved in this process because they will ultimately drive the success and uptake of high speed broadband services.
- 7.15. NZICT in conjunction with TVNZ proposes that Crown Fibre Holdings, Local Fibre Companies or existing operators, along with ICT the industry, should consider piloting some demand side initiatives to test customer behaviour and appetite for content and services.
- 7.16. The pilot could be an expanded version of the recently announced initiative in Tasmania – “Hybrid SmartStreet” - where the State Government has partnered with Hybrid Television Services (a joint venture between Seven Media Group and TVNZ) to deliver content and services via existing fibre to a group of towns. Consumers involved will be monitored over a 12-month period to see how they interact with the fibre. Importantly, a number of Government services, such as education and health, will be developed and tested during the initiative.
- 7.17. With the support of the Government, NZICT, TVNZ and Hybrid Television Services would like to pilot a similar initiative in an area of New Zealand that already has fibre available to a group of small businesses and homes.
- 7.18. The idea behind the pilot would assist in educating New Zealanders in how fast internet across homes, businesses, schools and government could make life better for work, entertainment, leisure and lifestyle.
- 7.19. The project would aim to:
- a) Achieve, discover and communicate a simplified approach to understanding what fibre means in terms of technology, infrastructure and service delivery and how this impacts New Zealand citizens;
 - b) Communicate and demonstrate how a high-speed internet connection in the business home can deliver financial benefits and make life better; and
 - c) Assist New Zealanders with gaining an informed opinion about fibre.

7.20. As in Tasmania, the project could be involved in three primary areas of research.

Understanding the barriers to uptake and usage of high speed broadband

7.21. Both the public and private sectors need to discover whether uptake and usage of high speed broadband is:

- a) A want versus need argument and to extent price plays in uptake and usage;
- b) We also need to understand how network speed factors into demand and whether exponentially faster speeds persuade more consumers to adopt fast internet in their business and/or home. There also needs to be more understanding on what role it can play in changing service delivery models; and
- c) Capacity of download and uploads play in adoption and use of the internet.

Understanding Big Screen behaviour

7.22. Traditionally, broadband content and services were relegated to studies related to the PC. Recently, mobile content and services were introduced through internet-enabled (WAP) phones. With high speed broadband, television can play an integral role in delivering alternative content on-demand.

- a) We need to consider how viewing behaviour may change when entertainment can be delivered on-demand, at TV quality for picture and sound directly to the television; and
- b) Amongst other things we need to consider what new services can be created for the television rather than just translating existing internet services from a PC to a TV interface.

The role of the advertiser

7.23. Today, advertising subsidises the cost to consumers for much of the entertainment consumers enjoy: free-to-air television (100% subsidised by advertisers), newspapers (partly subsidised through print advertisements), magazines (partly subsidised through magazine ads), radio (100% subsidised by advertisers).

7.24. The advertiser plays an integral role in delivering entertainment to the masses. With the onset of Video On-Demand and the proliferation of content available on the web, the role of the advertiser is a critical one.

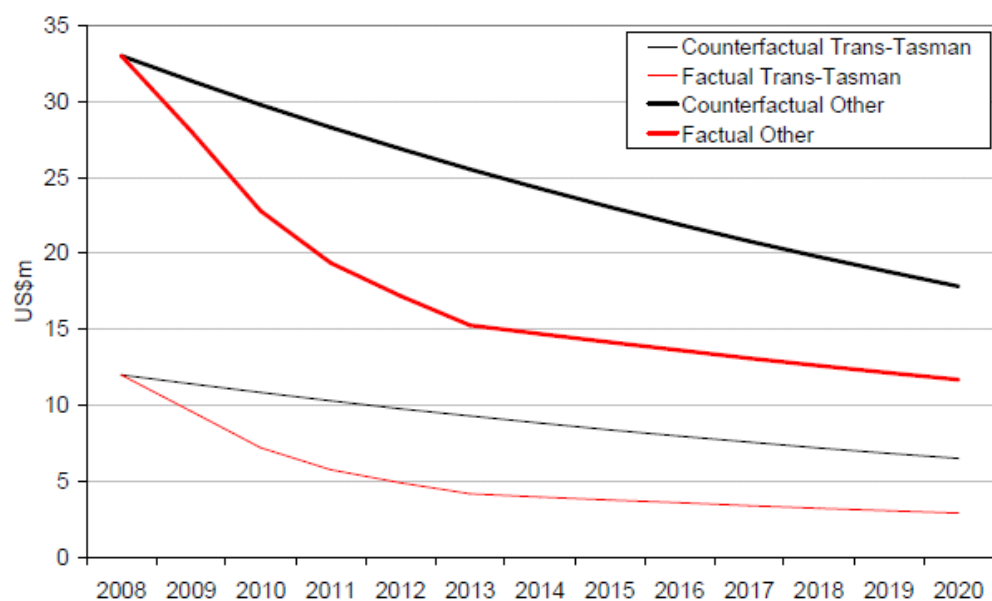
Recommendation: NZICT, in conjunction with TVNZ, will work with Crown Fibre Holdings to develop pilot fibre to Small Businesses and Homes demand side initiatives with existing operators or Local Fibre Companies to test consumer behaviour and appetite for content and services, tentatively called the 'Streetsmart' initiative.

International Connectivity

- 7.25. International connectivity from New Zealand remains significantly more expensive than comparable bandwidth and costs within Asia-Pacific. Capacity on submarine cable systems like Southern Cross is typically purchased by carriers as Indefeasible Rights of Use (IRUs), which is a form of capitalised lease. The term of these leases is typically 15-20 years. IRU holders also pay an annual operations and maintenance fee (O&M) of 3-5% of the IRU cost. Alternatively, they might pay for their proportion of the overall O&M costs.
- 7.26. Southern Cross is the only submarine cable system able to provide connectivity to the USA directly from New Zealand. Southern Cross and Tasman 2 are the only systems able to provide connectivity to Australia, with the latter having limited capacity. Pricing remains a significant issue however. Capacity pricing from New Zealand to the rest of the world is significantly higher than elsewhere in the region. Typically, an IRU for 10 Gigabits from North Asian destinations, e.g. Tokyo, Hong Kong, Seoul, to the USA can be purchased for US\$3-5 million for a new customer. Similar capacity on Southern Cross is priced significantly higher, and pricing depends on the size of purchase.
- 7.27. If New Zealand expects to capitalise on its investment in domestic national broadband infrastructure, it must have access to lower priced international capacity. Given the size of the domestic market and the distances involved, it is unlikely that any new market entrant can afford a new submarine cable build to the USA, which is still the major global internet content hub. However, the opportunity exists to build from New Zealand to link with other international submarine cable systems to get to the USA and other markets. These include linking with systems in Australia, including PPC-1 and Australia Japan Cable (both connect to Guam where they link with several major trans-Pacific systems including Tata and Asia-America Gateway), and Endeavour (Telstra system that connects to the USA). Other system interconnection options include New Caledonia (to connect to the Gondwana and the proposed SPIN systems).
- 7.28. NZICT supports efforts to increase competition in this market, including the proposed Kordia Optikor system to Australia, with the view that this will drive lower international connectivity costs in this country:
- a) The estimated cost from Kordia for a complete Optikor system (Auckland CBD to Sydney CBD and interconnection with PPC-1) is NZ\$175m based on today's supplier costs;

- b) Optikor will directly connect with the PPC-1 cable to the Guam cable hub, facilitating onward connectivity to the rest of the world;
- c) Note that competitive pressure from Kordia has already significantly improved the commercial arrangements that Southern Cross customers have been able to negotiate in the past 2 years;
- d) A forward view on pricing curves for wholesale international submarine cable below provided by Kordia is an output from a Covec study (“Economic Effects of International Internet Bandwidth Competition in New Zealand,” dated 7 February 2009). The factual scenario is that OptiKor™ exists as a new cable from Auckland to Sydney; Counterfactual is SCCN only out of NZ. TAS2 provides no competitive pressure. This demonstrates significant benefits to customers from additional competition;
- e) This pricing would place NZ at similar pricing levels as its other trading partners, and at a similar level to domestic Australian bandwidth pricing from Western and South Australia to the eastern states, our major Australian markets;
- f) It should be noted that the current internet market in New Zealand, in particular data caps or quotas placed on a customer’s usage, is a direct consequence of high international transport costs, given the amount of content hosted in the USA and elsewhere internationally; and
- g) There are also the matters of resiliency and security to consider. Sudden damage to the SC cable, however minor, could result in loss of earnings for many New Zealand companies.

Figure 8 Baseline assumptions about the cost of a 15-year 10 Gbps IRU.



Recommendation: NZICT recommends that the Government continues to consider the competitive entry of Kordia and other operators as soon as possible into the international broadband infrastructure market to foster competition and reduce cost structures for New Zealand businesses and ISP customers.

Standards and interoperability

7.29. NZICT encourages the development, according to EOI (Equivalence of Inputs) process, of minimum standards for defined wholesale bitstream services. Contained within such standards would be the physical and Layer 2 specification for network interconnection, and the definition of minimum network performance and availability attributes. Bitstream service features, such as those supporting differentiated QoS (Quality of Service), should also be defined in order to support both business real time communications services and consumer triple play applications.

Recommendation: NZICT proposes working with the MED, Crown Fibre Holdings and the Telecommunications Carriers' Forum to define minimum standards for a defined wholesale bitstream service by June 2010.